MINISTRY OF DEVELOPMENT OF INFORMATION TECHNOLOGIES AND COMMUNICATIONS OF THE REPUBLIC OF UZBEKISTAN

TASHKENT UNIVERSITY OF INFORMATION TECHNOLOGIES NAMED AFTER MUKHAMMAD AL-KHWARIZMI

INTELLECTUAL GENERATION OF UZBEKISTAN

COLLECTION OF SCIENTIFIC ARTICLES OF THE THIRD REPUBLIC STUDENTS' SCIENTIFIC-PRACTICAL CONFERENCE

April 19-20, TUIT

Tashkent – 2017

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PREFACE

On April 14, 2016 in Tashkent University of Information Technologies (TUIT) the Second Students' Scientific Conference under the name of "Intelligent Generation of Uzbekistan (IGU)" was held.

The motivation of the Conference was taken under the Resolution of President of the Republic of Uzbekistan I.A. Karimov "On measures for further enhancement of the system of teaching of foreign languages" Decree № PQ-1875, December 10, 2012.

The aims of the conference are as followings:

- develop talents and skills of scientific researches in the field of technology and improving the students' English language skills;
- encourage students in the academic world;
- expansion the horizons of the Motherland and develop a sense of patriotism;
- development of scientific researches in the field of technology;
- improvement the students' English language skills

More than 100 students of TUIT and its branches participated in the conference with their innovations and projects, which were reflected in their articles in the following scientific journal. They had an opportunity to choose their own direction according to six sections:

I.SECTION: People who made a great contribution for the development of Uzbekistan
II. SECTION: Language And Power Technological revolution of Uzbekistan
III.SECTION: Virtual Reality In Education Future of Uzbekistan in ICT

I-SECTION

PEOPLE WHO MADE A GREAT CONTRIBUTION FOR THE DEVELOPMENT OF UZBEKISTAN

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Summary. *In this article it's discussed about the first president of the republic of Uzbekistan namely, Islom Abduganievich Karimov. The preponderant attention have paid on his lifestyle and difficulties he had faced as well as his brilliant ways to get to the bottom of these obstacles, which led him to become the one and only person ever in the history of Uzbekistan and in the world, furthermore, there also focused upon his contribution to the development of the Uzbekistan by illustrating victories in the sphere of Sport, transportation, education, information technology and current life conditions in which one country couldn't be able to achieve in 25 years.*

Key words: *exceptional leader, polished commander, abundance of Uzbekistan, political figure, prominent statesman, considered as our ancestors.*

The first president of the Republic of Uzbekistan, the prominent statesman, political figure, exceptional leader and polished commander Islom Abduganievich Karimov was born on January 30, 1938 in Samarkand. He was exceedingly talented from his early childhood. Moreover, he was intrigued by engineering and economics as a consequence he acquired the specialty of the mechanical engineer and economist.

Islom Karimov dedicated his life to the prosperity of the Uzbekistan firstly, with his personal courage, an unbending will secondly, national vision and most importantly a special sense of liability for his county and the people, for the destiny of each inhabitants as he said "Your destiny is my destiny. Your happiness is my happiness". During his lifetime he faced number of "impenetrable" stumbling-blocks despite being overwhelmed under such impediments and living sardonic repercussions of the Soviet era which were still casting a shadow upon the future of youth and had to be cleaned

off for the sake of prosperity, he subsequently, surmounted all with his brilliant ideas and solutions which were led the Uzbek nation to the Independence on September 1, 1991.

With the advent of Independence our dreams come true, he said that "I say there is not more happiness for me than the freedom of my Homeland" preserving and ameliorating the sovereignty and independence of Uzbekistan had invariably been a predominant priority for President Islom Karimov. In charging of the independent Uzbekistan for 25 years Islom Karimov had deeply appreciated by Uzbek peoples and he won the highest authority in the country as well as in the international arena.

With Islom Karimov's initiative proliferation in the infrastructure of Uzbekistan have been drastically improved, endeavor in raising progressive young generation saw substantial grow during 25 years, spectrum of sport buildings which were gathered dust have been annihilated and instead contemporary International standardized gyms, training halls and other sport buildings have been built. The objectives behind these were making a healthy and athletic nation and raising professional sportsmen and sportswomen. These priceless efforts are now granting its seeds for example, In Rio Olympiad our team ranked 21st which is the best result in the Central Asia, furthermore, becoming thriving successful in sport is not spontaneous under this there must be a great foundation and he is the man who built such tremendous basement of sport in Uzbekistan.

On one hand the Republic has created a modern road-transport and engineering-communication infrastructure including recently commissioned railway line Angren-PAP with unique tunnel through a mountain pass Kamchik.

On the other hand, the quality of living become better, radically transformation of villages construction of rural houses, building cottages in rural areas were solely had an indispensible impact on the abundance of Uzbekistan. In the meanwhile citizens whose dwelling is in suburbs have opportunity to contact with the world via internet or on Television as well as with their mobile phones, which is cry far from than bygone age.

With Islom Karimov's attitude there have been focused upon the Information Technology development, modernization of telecommunications infrastructure, including the expansion of broadband access to the internet providing a full transaction to digital telephone system, television and radio, ensuring the implementation of "e-government" these can be crystal clear examples. Islom Karimov boosted the academia in Uzbekistan to an international level. It goes without saying, our institutes are the best in Central Asia. To illustrate my point, top international Turin Polytechnic Institute, INHA University in Tashkent and my university Tashkent University of Information Technologies is the sole in central Asia which creates IT developers. Implementation of measure to ensure information security and implementation of modern technologies to protect communications networks, software, and information system and resources further development of the technical infrastructure for the protection of information resources is the main tasks and activities of the Ministry of Development of Information technology and communications of the Republic of Uzbekistan.

Islom Karimov made a great contribution to the development of Uzbekistan, on the whole, he is considered as our ancestors like Amir Temur, Mirzo Ulugbek, it's noteworthy that, he was awarded several titles such as "Uzbekistan Qahramoni", "Amir Temur" additionally for his great contribution to the development of economy, science and education he was awarded honorary titles, orders and medals of number of states and authoritative international organizations.

In conclusion, the entire Uzbek people have suffered the huge and irreparable loss on September 2, 2016. He infinitely loved his people and his entire life; he devoted his whole life to the improvement of Uzbekistan. I personally think we've ample facilities to carry on his works and legacy, we're the future of Uzbekistan and we have to toss the entire state of agitation aside because as Islom Karimov said "Age is ours, the finish is ours".

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THE ROLE AND PLACE OF S.KH. SIRAZHDINOV IN THE MATHEMATICAL SCIENCE OF UZBEKISTAN

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Summary: *This report will tell you about the main facts of the biography and the role and influence of S.Kh. Sirazhdinov - a follower of V.I. Romanovsky and A.N. Kolmogorov, who continued the traditions laid down by his teachers, on the development of mathematical science in Uzbekistan in the second half of the twentieth century.*

Key words: *theory, probability, mathematical, science, follower, academician.*

Sagdi Khasanovich Sirazhdinov was born on May 10, 1920 in the city of Kokand. In 1942 he graduated with honors from the Central Asian State University (now the National University of Uzbekistan named after Mirzo Ulugbek). In the same year he was called up for military service in the Army. After the war, Sagdi Hasanovich entered postgraduate studies and in 1947 defended his thesis (his scientific adviser was academician V.I. Romanovsky, who played a major role in the formation of Sagdi Khasanovich as a scientist and a human). During 1949-1952, Sagdi Hasanovich completed his doctorate at the Steklov Mathematical Institute (Moscow) under the guidance of the outstanding mathematician of the 20th century, Academician Andrei Nikolaevich Kolmogorov. In 1953 he - at the same Institute - defended his doctoral

dissertation. After this defending- on the recommendation of his teacher - A. Kolmogorov - Sagdy Khasanovich during 1953-1956 worked as a professor at M.V.Lomonosov MSU. After returning to Tashkent, Sagdi Hasanovich was appointed as the director of the Institute of Mathematics of the Academy of Sciences of the Republic of Uzbekistan (1957-1966). In 1956 he was elected as an associate of the Academy of Sciences of Uzbekistan, in 1966 - Academician. S.H. Sirazhdinov was in charge of the Department of Probability Theory and Mathematical Statistics of the Tashkent State University (1958-1988), was a rector of the Tashkent State University (in 1966-1971 and 1983-1987), and a vice-president of the Academy of Sciences of the Republic of Uzbekistan (1971-1983)).

After his returning from Moscow in the mid-1950s, S.Kh. Sirazhdinov was full of big plans and ideas. His program envisioned, on the one hand, an increase in the level of mathematical education in the Republic at all levels, beginning since the school bench, on the other hand, the training of highly qualified scientists (doctors and candidates of sciences), not only according to the traditional branches of mathematics already available in Uzbekistan, but also on other, new, modern directions of it, developing in other mathematical centers.

Although the direction of research of S.Kh. Sirazhdinov refers to the theory of probability and mathematical statistics, mathematical analysis and the history of mathematics in Central Asia, he had a beneficial influence and contributed to the development of almost all areas of mathematics in the Republic of Uzbekistan.

By the initiative and with the help of S.Kh. Sirazhdinov many young scientists were sent for internships or postgraduate studies in academic institutions and higher educational centers in Moscow, Leningrad, Novosibirsk, Kiev, which allowed to expand the research topics and go beyond traditional scientific directions.

Simultaneously with this broad front there were activities in other areas: selection of capable students from pedagogical institutes in the regions and transferring them to TashSU, sending best students from TashSU to continue their studies in Moscow, Novosibirsk and other leading universities. In carrying out this work, the high scientific authority of S.Kh. Sirazhdinov, and personal contacts, his friendship with leading mathematicians of academic research centers and universities played important role. Being the rector of the University, Sagdy Khasanovich personally participated in interviews with gifted entrants.

At the same time, the issues of expanding international scientific ties, promoting the results of mathematical research in Uzbekistan, and publishing them in prestigious journals and magazines are also becoming important deal at that time.

This program, which already by the 1960s began to give its positive results, S.Kh. Sirazhdinov consistently carried out to the end of his life and as a result of all this a large complex of measures put into practice, along with worthy associates, disciples and followers-T.A. Sarymsakov, M.S. Salakhitdinov, S.Nagaev, T.D. Juraev, T.A.Azlarov, Sh.K.Formanov, A.V. Nagaev, N.Yu. Satimov, J.H. Hadjiev, etc. - the Tashkent Mathematical School has received a worthy recognition in the world.

This period S.Kh. Sirazhdinov's activity was distinguished by the rise of mathematical creativity, the emergence of the spirit of scientific collectivism, workaholism, the emergence of new major areas of research.

The role of S.Kh. Sirazhdinov in the scientific destiny of very many mathematicians of various specialties, such as academicians N.Yu. Satimov, D.Kh. Khadzhiev, A. Sadullaev, Professor G.N. Salikhov, M.I. Israilov, A. Begmatov, S. Tulaganov, A. Azamov and many others is very significant. Thus he had a very significant impact on the further development of the relevant sections of mathematics in our country: the number theory, computational mathematics, the mathematical theory of control, and the theory of differential games, as well as the theory of invariants, the theory of cubature formulas, the problems of the theory of nonstationary filtration, etc.

Under the guidance of S.Kh. Sirazhdinov and with his active participation (together with Academician G.P. Matvievskaya, Prof. A.A. Akhmedov, Prof.Kh. Tlashov, Prof. D. Ibodov, and others) since 1960 extensive research is being carried out on the history of mathematics in Central Asia, which have been recognized by specialists all over the world. Due to this Tashkent became one of the leading centers of investigations by history of mathematics.

Speaking about the role of S.Kh. Sirazhdinov in the development of mathematics in Uzbekistan, one can't help recalling his care of school mathematics. He deeply understood that the foundation of the building of mathematical science was laid in school mathematics. It is possible that he adopted this from his teacher, Academician A.N. Kolmogorov. Since the 1960th, Republican mathematical Olympiads have been held annually in Uzbekistan (a lot of mathematicians have been actively involved to the preparation of talented schoolchildren). This tradition, founded by S.Kh. Sirazhdinov, continues up to these days by a generation of "Olympic" mentors (let's name just a few of them: N.Yu.Satimov, Sh.K.Formanov, N.N. Ganikhodzhaev, B.Richsiev, R.N.Ganikhodzhaev, O.Kuchkarov)). S.Kh.Sirazhdinov was the chair of the organizing committees of these Olympiads until the end of his life.And now they are headed and conducted by his disciples and followers.

Now let us briefly dwell on researches in the field of probability theory and mathematical statistics - the main field of scientific activity of S.Kh. Sirazhdinov.

His studies on limit theorems for homogeneous Markov chains are especially significant and profound ones. According to the results of studies on homogeneous Markov chains, S.Kh. Sirazhdinov published two monographs: "Limit theorems for homogeneous Markov chains" (1955) and "Limit theorems for sums of random vectors connected in a Markov chain" (1979, together with Sh. K. Formanov). These studies of Sagdi Khasanovich Sirazhdinov found a wide response among specialists and were continued in the works of mathematicians from Moscow, Lithuania, Novosibirsk and other places.

The monograph "The method of series in problems for random walks", written by him together with his student M.U. Gafurov (1987),was the result of their researches on random walks.

A series of papers on local limit theorems conducted by S.Kh. Sirazhdinov and his students (T.A.Azlarov, A.V.Nagaev, A.B.Mukhin, etc.) provided the Tashkent School on Probability Theory one of the leading places in the world in this field of research. They are partly reflected in the monograph by S.Kh. Sirazhdinov "Additive problems with increasing number of summands" (1975, jointly with T.A. Azlarov and T.M. Zuparov).

It should be specially noted that thanks to the efforts of S.Kh. Sirazhdinov, already in the 1960th, the range of studies in the field of probability theory and mathematical statistics in Uzbekistan has considerably expanded.

S.Kh. Sirazhdinov had a beneficial influence on the formation of many mathematicians in the Central Asian Republics. As mentioned above, the circle of scientists who grew up under his influence is very wide, and under his direct supervision more than 10 doctors and more than 40 candidates of science got theirs degrees. Among his students are such well-known scientists as S.V.Nagaev, G.P.Matvievskaya, T..AAzlarov, A.V.Nagaev, T.A.Malevich, Sh.K.Formanov, I.S.Badalbaev, U.Gafurov, B.Abdalimov, A.Akhmedov, M.Mamatov, T.M.Zuparov and others.

The main task that S.Kh. Sirazhdinov set to himself in the early years of his work, was the removal of the mathematical science of Uzbekistan, especially the theory of probability and mathematical statistics, to the world level. It got its decision.

The international symposium with Japanese mathematicians (1975), and, most importantly, the First World Congress of the Bernoulli Society (1986),to the successful holding of which S.Kh.Shirazhdinov dedicated the last few years of his life, was a testimony to the recognition of the achievements of probabilists of Uzbekistan.

The recognition of scientific merits of S.Kh. Sirazhdinov is his elections as a member of the International Statistical Institute (The Hague, 1966) and the Moscow Mathematical Society (1956), awarded him the State Prize named after A.R. Beruny (1973) and conferring the honorary title "Honored Worker of Science of Uzbekistan" (1970), as well as the election of an honorary doctor of a number of foreign universities. S.Kh. Sirazhdinov was a member of the National Committee of Mathematicians, a member of the editorial board of the journal “Theory of Probability and Its Applications”, editor of the journal” Izvestiya AN RUz”, Series of Physical and Mathematical Science.

For outstanding services in the development of mathematical science and the training of scientific personnel, as well as the productive social activities S. Kh. Sirazhdinov was awarded by the highest state awards - many orders and medals.

The mathematicians of Uzbekistan remember with profound gratitude the enormous merits of S.Kh. Sirazhdinov in the development of mathematics in Uzbekistan. His life and work will serve as a model for future generations of mathematicians.

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FIRST PRESIDENT OF THE REPUBLIC OF UZBEKISTAN - ISLAM ABDUGANIEVICH KARIMOV, WHO MADE A GREAT CONTRIBUTION FOR THE DEVELOPMENT OF UZBEKISTAN

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Summary: *This article represents a great contribution of the first President of the Republic of Uzbekistan Islam Karimov for the development of our country.*

Key words: *motherland, president, contribution, Republic, leader, policy, international criteria, cities, villages.*

Our Motherland, the entire Uzbek people have suffered the huge and irreparable loss. On September 2, 2016, after a long illness, the prominent statesman and political figure, First President of the Republic of Uzbekistan Islam Abduganievich Karimov passed away. Islam Abduganievich Karimov was born on January 30, 1938 in Samarkand. He graduated from the Central Asian Polytechnic Institute and the Tashkent Institute of national economy, received specialty of the mechanical engineer and economist. He began his career in 1960 at the "Tashselmash". In 1961-1966, he worked as an engineer, a senior engineer-constructor at the Tashkent aviation production association. In 1966, he joined the State Planning Committee of Uzbek SSR, where he led the way from specialist to first Deputy Chairman of the committee. In 1983 Islam Karimov was appointed Minister of Finance of the UzSSR, in 1986 – Deputy Chairman of the Council of Ministers of the Uzbek SSR and Chairman of State Planning Committee of the Republic.In 1986-1989, he worked as first Secretary of the Kashkadarya provincial party committee. Thanks to his great talent as a leader and organizer, dedication and determination, skill and desire to be among people, the situation in the Kashkadarya region, which was in an extremely difficult socio-economic situation, has changed dramatically in a relatively short term. In June 1989, Islam Karimov was elected the first Secretary of the Communist party of Uzbekistan. It was a time when the Republic stood on the brink of civil war, bloodshed, inter-ethnic and inter-confessional conflicts, the scenarios that took place in neighboring countries. And in this difficult period, he by his foreknowledge, will and determination has protected our people and country from this sad fate. It was then that our people have acquired in the person of Islam Karimov a true leader with personal courage, an unbending will and national vision, a special sense of responsibility for his country and the people, for the fate of each citizen. On March 24, 1990, at the session of the Supreme Soviet of the Uzbek SSR, Islam Karimov was elected President of the Uzbek SSR. On Dec 29, 1991 in the national elections, which were held on an alternative basis, he was

elected the First President of the Republic of Uzbekistan. Leading the independent Uzbekistan for 25 years, Islam Karimov won the highest authority in the country and in the international arena as a distinguished statesman who developed and carried out a well-reasoned strategy of building a legal democratic state and open civil society and market economy. Preserving and strengthening the sovereignty and independence of Uzbekistan had always been a top priority for President Islam Karimov, and this was the fundamental principle of his policy. The people of Uzbekistan inextricably link the vast achievements of the country during the years of independence with the name and activities of our head of state. He is the author of the Constitution of the Republic of Uzbekistan, which fully meets the democratic demands and international criteria, and has become a true guarantor of its implementation.

In 1991 Uzbekistan was a backward agrarian country with a hypertrophied unilateral economy, destructive influence of cotton monopoly, the extremely low level of life. The country had no opportunity to produce many kinds of essential goods, could not satisfy its own needs, primarily for grain and energy.

Islam Abduganievich Karimov was firmly convinced that political independence cannot be secured without economic independence. This was the reason for him to develop the program of fundamental reforms and structural transformation of Uzbekistan's economy, which was based on the known five principles. This program has been recognized worldwide as the "Uzbek model" of development. The fundamental basis of this model was the practical implementation of the strategic priority "Reforms not for reforms, but for the name of people". Under his leadership and initiative, Uzbekistan has undergone extensive structural reforms, including the construction of brand new hi-tech industries, such as petrochemical, chemical, automotive, agricultural and railway engineering, pharmaceutical, electrical, textile industry, production of modern construction materials.

A number of unique world-scale industrial facilities were built, like the Ustyurt and the Shurtan gas and chemical complexes, Bukhara oil refinery plant, Kungrad soda plant, Dehkanabad potash fertilizer plant, auto assembly plants in Andijan, Samarkand, Tashkent and Khorezm regions. The Republic has created a modern road-transport and engineering-communication infrastructure, including the recently commissioned railway line Angren-PAP with the unique tunnel through a mountain pass Kamchik, Tashguzar-Baysun-Kumkurgan. Practical implementation of the reforms implemented by President Islam Karimov, was the accession of Uzbekistan among the five most rapidly growing economies in the world.

Islam Karimov is the organizer of the profound changes in agriculture, the formation of a new class of real land owners – farmers. His initiative has no analogues in the world practice program to radically transformation of villages, construction of rural houses, ensuring the quality and standards of living of the rural population at a level not inferior to the urban. Islam Abduganievich Karimov, as Commander in chief provided the radical reforms, improved combat power and capabilities of the Armed Forces, capable to protect the independence and territorial integrity of the Republic of Uzbekistan, the inviolability of its borders, peaceful and tranquil life of our people. He

developed and implemented the Foreign policy concept of the Republic of Uzbekistan, the cornerstone of which is peace based on non-interference in the internal affairs of other states and resolving emerging contradictions and conflicts only by peaceful political means.

The head of our state made a great contribution to maintaining peace and stability in the region and around the world. Completely abandoning the old dogmas and stereotypes, a large-scale national program on personnel training was developed practically implemented on the initiative of Islam Karimov, the education system undergone radical reforms based on the latest international standards. Islam Abduganievich Karimov directly supervised the work on creating and implementing a radically new system of education of the younger generation, radically changed the thinking and outlook of our youth, which is becoming a decisive force of today and tomorrow of the country.

The head of the country raised the respectful relations to the spiritual values of our people, preservation and development of our sacred religion, traditions and customs, the priceless heritage to the level of state policy; he made a great contribution to raising the authority of Uzbekistan in the international arena. Islam Karimov initiated the formation of civil society institutions, primarily, of increasing the authority of mahalla in government and public administration, expanding its rights and powers. Our nation knows well and highly appreciates the merits of Islam Karimov in conducting large-scale creative work to radically transform the appearance of our capital city – the Tashkent city, cities and villages throughout the country in accordance with the requirements of modern urban planning and architecture.

For outstanding contribution to the formation of a sovereign and independent Uzbekistan, creation of a democratic state of law, civil peace and national accord, and for his firmness and courage, Islam Abduganievich Karimov was awarded the title "Uzbekiston Qahramoni", he was awarded the order "Mustaqillik" and Amir Temur. He was a member of the Academy of Sciences of Uzbekistan for his great contribution to the development of the economy, science and education, honorary doctor of several universities and academician of the academies of sciences of many foreign countries, awarded honorary titles, orders and medals of a number of states and authoritative international organizations. Islam Abduganievich Karimov infinitely loved his people and his entire life, he devoted his whole life to the service of Uzbekistan.

The bright memory of the First President of the Republic of Uzbekistan, the great son of the Uzbek people Islam Abduganievich Karimov, will forever remain in our hearts and grateful memory of our compatriots.

OPENERS OF THE CIVILIZATION DOOR

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Summary. *Uzbekistan has a history of 2750 years. There remained a lot of places of interest and culture heritage. In addion, Uzbekistan is famous with its ancestors such as Muhammad ibn Muso al-Khorazmiy, Imom al-Bukhoriy, Al-Hakim at-Termiziy, Abu Iso Muhammad at-Termiziy, Abu Mansur al-Moturudiy, Abu Nasr Farobiy, Abu Raykhon Beruniy, Abu Ali Ibn Sino,Amir Temur Mirzo Ulug'bek, Alisher Navoi, Zahiriddin Muhammad Bobur and etc. Due to a pleanty of these intellectuals Uzbekistan took a great possession in the world. Up to now these scholors have been counted as openers of the civilization door.*

Key words: *ancestor, intellectuals, heritage, scholor.*

The great mathematician, astronomer and geographer Muhammad ibn Musa al-Khorazmiy played a great role in Uzbek science. He was born in 783 in Khorazm and grew up there. Astronomy and mathematics were highly developed in ancient Khorezm and it promoted his interest to these subjects. He wrote more than 20 works, but now only 10 of them left. These works were devoted to algebra, arithmetic, geography and astronomy. He had founded Bayt al Hikma (The House of Wisdom), at the history of science it was named as "Baghdad academy " or " Ma'mun Academy". Muhammad al Kharazmi was the leader of scientific center to the end of his life. A lot of scholars and scientists from different parts of Central Asia and Arabian East worked there. The richest library of old manuscripts was at their disposal. The observatory had been constructed for works and discoveries. Al-Khorazmiy was the founder of algebra. "Al-jabr" is the biggest algebraic work which has three manuscripts written by him are being kept in the museums of Kabul, Medina and Oxford University.

He wrote his astronomic work "Zij" about in 830 s. it is an essay, consists of a small theoretical part and tables. Moreover, the work is about various planets, their moving and trigonometry and it consists of 37 units. Many scientists used this work. In 1126 it was translated into latin 1914 into German and in 1962 into English languages.

Kitab surat al- ard (The Book of World Picture)- a geographical tractate, where the description of eastern hemisphere had been shown for the first time in the medieval, the Pacific ocean (Bahr al Muzallam) was described, inhabited world map was shown.

He lived in such scientific atmosphere and died in 850 in Baghdad. His ideas caused to develop mathematics and astronomy. Khorazmiy's work are saved in different libraries of the world. Nowadays various streets and organisations are named after his name in our country. In addition, the name of al-Khorazmiy has been given to the Toshkent University of Information Technologies.

A person who took a significant place in the Muslim world Al-Bukhoriy. This great scientist of hadis was born on July 20, 810. Al- Bukhoriy lost his father when he was very young and was brought up by his mother. From his childhood he was very clever, curious and had a quick memory. He had been learning hadises which he had heard since he was 10. In purpose of learning he had made many trips and had taken lessons from over 90 great scientists of those times. Although his hometown was Bukhara he had lived for some periods in Cario, Damascus and Baghdad. He had his own apprentices and he taught in madrasahs. According to some sources he had known about 6000 hadises by heart.

Imam al-Bukhoriy left us great scientific inheritance. The number of his works is over 20. For example “Al jome as-sahih ”, “Al adab al-mufrad”, “Al-tarih”, “Kitob al-kuna”, “Asomi us-sahoba ” and etc. And the most important of them is “Al jome as-sahih” which comprises of 40000 reliable collection of hadises. The Sahih is divided into 79 books, each with numerous chapters with a ruling on a particular issue within fiqh. Then within the chapter will be all the hadiths that he considered authentic that support that ruling. For example, the chapter about extra prayed during the month of Ramadan (Taraweeh) is titled “The Superiority of Extra Prayers at Night in Ramadan ” and it contains six sayings of the Prophet that indicate how important the Taraweeh prayer is and it is next in the importance after Koran in Islam. Imam al - Bukhoriy died from serious illness on September 1, 870 in Samarkand. In 1998 we celebrated his 1225th birthday and his monument was rebuilt. Today Tashkent State University of Islam is named after Imam al-Bukhoriy.

Taking all above into account, I can easily say that we should not only stop moving and just proud of their Inventions which can shake the world. Contrary, we should move and move to achieve for the greatest succession as our ancestors.

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GREAT CONTRIBUTORS TO THE PROSPERITY OF UZBEKISTAN

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Summary. *The great works of our famous, talented people from different spheres like policy, literature, art, sport and their contribution to the prosperity of our Motherland are given in this article proposed.*

Key words: *initiative, ‘‘maqoms’’, invaders, terrorism, immorality, lawlessness, performer, pop, arbiter, "stir".*

Each of us finds ourselves to the word “Homeland” a special meaning. For some this is the place, where he was born, grew up, gained friends; for another - where realized his purpose in life, found him and become useful to society. There are those who defend the peace and quiet of their homeland. Those people not just defenders of the fatherland, and the characters who, without hesitation, gave their lives, protect their homeland from enemies and danger.

Today the defense of the country is a sacred duty and responsibility of everyone, like many years ago. Only now our enemies are not war and invaders, but terrorism,

immorality and lawlessness. In fact, Motherland defenders are people who contribute to the development of Uzbekistan.

Firstly, I would like to mention the initiative of the former President of Uzbekistan Islam Abduganievich Karimov, thanks to who in 1991 Uzbekistan gained its independence.

In addition, I would like to recall the name of Abdulla Oripov, who is the author of the words of our national anthem. Creativity of the poet - this is a new page in the modern Uzbek literature. In his poems, Oripov affects the topic about people, the Motherland and love for it. Therefore, apart from the creation of original works, he translated many works of foreign writers such as Pushkin, Dante, Shevchenko, etc. President Islam Karimov- noted Oripov in 1998 he was awarded the title “Hero of Uzbekistan”.

Name Munojat Yulchievoy means "melody", which fully reflects its soul and what it does. Munojat Yulchieva recognized performer of classical Uzbek songs - "maqoms" - not only in Uzbekistan, but also in Europe. Her creativity is admired, as well as professionals and ordinary listeners.

Erkin Vahidov's creativity, perhaps, familiar to every Uzbek, because his works are included more in the school curriculum. He is one of the most prominent representatives of the modern Uzbek literature. The main theme in his work is love of country and faith in its future. The poet Robert Rojdestvenskiy admired Erkin Vakhidov and talked about the sincerity of his work. In addition to writing his own poems, E. Vahidov also translated works of foreign authors into the Uzbek language. In 1999, the poet was awarded the title Hero of Uzbekistan.

The living legend of Uzbek pop, "Yalla" band, which in 2010 celebrated its 40th anniversary is also deserves to be mentioned. Widely known among the people of Uzbekistan and the CIS countries were the songs of the ensemble, created based on the popular Uzbek songs. Farrukh Zakirov and the band created songs like “Majnuntol” (“Weeping Willow”), “Boychechak” (“Snowdrop”) and “Uchkuduk” (“Three wells”). Over the period of the music, the band recorded and released nine albums. Zakirov is the winner of the State Prize of Uzbekistan and People's Artist of seven republics-states. From 2002-2004 he held the post of Deputy Minister of Culture and Sports of Uzbekistan.

In the sphere of sport, I would like to mention the most promising arbiter of the football world - Ravshan Irmatov. In 2014, he set a record for the number of matches in the Championships served worlds, having seized nine matches. For these achievements, President Islam Karimov awarded him with the medal "El-yurt ҳurmati". He was announced as the best referee of the world in 2011 by FIFA, which is a record, as a title win no one could in 34 years. He became the owner of the title of the best soccer referee of the year in Asia 5 times. There are also many other international and domestic awards. Experts note that Irmatov can read the game very well, he has a steel will and resistance - "stir" or could not deceive anyone yet, and so even the players are afraid of him.

The prizewinner of international film forums Zulfikar Musakov is widely known to the public as we have in the country and abroad. His director's work is appreciated and recognized not only in Uzbekistan, where he is one of the most venerable producers of the modern period. In 2002, his film "The Boys in the Sky" was nominated for film award "Nika". In 2006, his achievements were marked by awarding the Order "Mehnat shuhrati". In the same year he was awarded the title of Honored Artist of Uzbekistan. Another recognized artist of Uzbekistan Akmal Nur is known for his originality and distinctive style of painting. His works are in museum collections of Uzbekistan, the United States (gallery "Davidson"), India (Gallery of Art Heritage), Yugoslavia (Museum of Modern Art) and other museums and private collections. Exhibitions of his paintings are also held in different cities around the world. He is a head of Academy of Arts since 2012.

Undoubtedly I can say that all of the people we can consider as an example of the people, who have made a great contribution to the development of Uzbekistan.

In conclusion, I would like to note that in addition to the above-mentioned people in Uzbekistan there are people, who are trying to do everything to make our country prosperous, developed and had its rightful place in society, in the world with all their heart. We are the youth, we love our Motherland and we are ready to make great contributions to the evolvement of Uzbekistan in continuation of our great ancestors like Al-Kharezmi, al-Bukhari, Ibn Sina (Avicenna), Al-Beruni, Amir Temur, Alisher Navoi, Babur and many others.

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PEOPLE WHO MADE A GREAT CONTRIBUTION FOR THE DEVELOPMENT OF UZBEKISTAN

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Summary: *The role and importance of Islam Abduganievich Karimov's activity in being the sovereign republic, strengthening peace, stable development and prosperity of multi-ethnic Uzbekistan in the new century are considered in this article.*

Key words: *contribution, national sovereignty, civil society, prosperity, multi-ethnic, leadership, initiative, hi-tech industry, world-scale, refinery, profound, assembly, unique, rural, urban, national accord*

Uzbek people is one of the oldest nations in the world and has almost 3000 years old history of statehood. So there are many famous people who made a great contribution for the development of Uzbekistan such as Al-Khorezmi, Al-Farobiy, Amir Temur, Beruniy, Abu Ali Ibn Sino and so on.But The First President of Uzbekistan made considerable contribution in hard time for Uzbekistan.

I would like to write about the great contributor Islam Karimov to the basis of national sovereignty and civil society, as well as conditions for strengthening peace, priorities for stable development and prosperity of multi-ethnic Uzbekistan in the new century.

Under his leadership and initiative, Uzbekistan has undergone extensive structural reforms, including the construction of brand new hi-tech industries, such as petrochemical, chemical, automotive, agricultural and railway engineering, pharmaceutical, electrical, textile industry, production of modern construction materials.

Islam Karimov is the organizer of the profound changes in agriculture, the formation of a new class of real land owners – farmers. His initiative has no analogues in the world practice program to radically transformation of villages, construction of rural houses, ensuring the quality and standards of living of the rural population at a level not inferior to the urban.

A number of unique world-scale industrial facilities were built, like the Ustyurt and the Shurtan gas and chemical complexes, Bukhara oil refinery plant, Kungrad soda plant, Dehkanabad potash fertilizer plant, auto assembly plants in Andijan, Samarkand, Tashkent and Khorezm regions.

The Republic has created a modern road-transport and engineering-communication infrastructure, including the recently commissioned railway line Angren-PAP with the unique tunnel through a mountain pass Kamchik, Tashguzar-Baysun-Kumkurgan.

He developed and implemented the Foreign policy concept of the Republic of Uzbekistan, the cornerstone of which is peace based on non-interference in the internal affairs of other states and resolving emerging contradictions and conflicts only by peaceful political means. Islam Karimov made a great contribution to maintaining peace and stability in the region and around the world.

Completely abandoning the old dogmas and stereotypes, a large-scale national program on personnel training was practically implemented on the initiative of Islam Karimov, the education system undergone radical reforms based on the latest international standards.

Islam Abduganievich Karimov directly supervised the work on creating and implementing a radically new system of education of the younger generation, radically changed the thinking and outlook of our youth, which is becoming a decisive force of today and tomorrow of the country. He raised the respectful relations to the spiritual values of our people, preservation and development of our sacred religion, traditions and customs, the priceless heritage to the level of state policy; he made a great contribution to raising the authority of Uzbekistan in the international arena. Islam Karimov initiated the formation of civil society institutions, first and foremost, of

increasing the authority of mahalla in government and public administration, expanding its rights and powers.

For outstanding contribution to the formation of a sovereign and independent Uzbekistan, creation of a democratic state of law, civil peace and national accord, and for his firmness and courage, Islam Abduganievich Karimov was awarded the title "Uzbekiston Qahramoni". He was awarded the order "Mustaqillik" and "Amir Temur". He was a member of the Academy of Sciences of Uzbekistan for his great contribution to the development of the economy, science and education, honorary doctor of several universities and academician of the academies of sciences of many foreign countries, awarded honorary titles, orders and medals of a number of states and authoritative international organizations. He was the initiator and leader of historic transformations in our country. He had directly contributed to:

- a program of independent development of the country, and the Constitution, meeting democratic demands and international criteria;
- a new program of state and social construction, reform of administration, both central and locally, the realization of principles harmonizing the interests of the state, society and the individual;
- a new respected model of economic development based on five principles: de-ideologization of the economy, supremacy of laws, step-by-step reform, state regulation during the transition period and strong social policy;
- reform of the armed forces, border forces.

Summing up, our nation knows well and highly appreciates the merits of Islam Karimov in conducting large-scale creative work to transform radically the appearance of our capital city – the Tashkent city, cities and villages throughout the country in accordance with the requirements of modern urban planning and architecture.

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TELECOMMUNICATION THEN AND NOW

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Summary. *This text is about the past and nowadays of telecommunication. About the people who contributed the developing telecommunication is given in this text. The main role of telecommunication in our life is considered in this text.*

Key words: *signal, channel, fiber optics, network, coaxial cable, shortcoming, countries, postal operator.*

Telecommunication is the transmission of signs, signals, messages, writings, images and sounds or intelligence of any nature by wire, radio, optical or other

electromagnetic systems. Telecommunication occurs when the exchange of information between communication participants includes the use of technology. It is transmitted either electrically over physical media, such as cables, or via electromagnetic radiation. Such transmission paths are often divided into communication channels which afford the advantages of multiplexing. The term is often used in its plural form, telecommunications, because it involves many different technologies.

Early means of communicating over a distance included visual signals, such as beacons, smoke signals, semaphore telegraphs, signal flags, and optical heliographs. Other examples of pre-modern long-distance communication included audio messages such as coded drumbeats, lung-blown horns, and loud whistles. 20th and 21st century technologies for long-distance communication usually involve electrical and electromagnetic technologies, such as telegraph, telephone, and networks, radio, microwave transmission, fiber optics, and communications satellites.

A revolution in wireless communication began in the first decade of the 20th century with the pioneering developments in radio communications by Guglielmo Marconi, who won the Nobel Prize in Physics in 1909. Other notable pioneering inventors and developers in the field of electrical and electronic telecommunications include Charles Wheatstone and Samuel Morse (inventors of the telegraph), Alexander Graham Bell (inventor of the telephone), Edwin Armstrong and Lee de Forest (inventors of radio), as well as Vladimir K. Zworykin, John Logie Baird and Philo Farnsworth (some of the inventors of television).

A telecommunications network is a collection of transmitters, receivers, and communications channels that send messages to one another. Some digital communications networks contain one or more routers that work together to transmit information to the correct user. An analog communications network consists of one or more switches that establish a connection between two or more users. For both types of network, repeaters may be necessary to amplify or recreate the signal when it is being transmitted over long distances. This is to combat attenuation that can render the signal indistinguishable from the noise. Another advantage of digital systems over analog is that their output is easier to store in memory, i.e. two voltage states (high and low) are easier to store than a continuous range of states.

The term "channel" has two different meanings. In one meaning, a channel is the physical medium that carries a signal between the transmitter and the receiver. Examples of this include the atmosphere for sound communications, glass optical fibers for some kinds of optical communications, coaxial cables for communications by way of the voltages and electric currents in them, and free space for communications using visible light, infrared waves, ultraviolet light, and radio waves. This last channel is called the "free space channel". The sending of radio waves from one place to another has nothing to do with the presence or absence of an atmosphere between the two. Radio waves travel through a perfect vacuum just as easily as they travel through air, fog, clouds, or any other kind of gas.

The other meaning of the term "channel" in telecommunications is seen in the phrase communications channel, which is a subdivision of a transmission medium so

that it can be used to send multiple streams of information simultaneously. For example, one radio station can broadcast radio waves into free space at frequencies in the neighborhood of 94.5 MHz (megahertz) while another radio station can simultaneously broadcast radio waves at frequencies in the neighborhood of 96.1 MHz. Each radio station would transmit radio waves over a frequency bandwidth of about 180 kHz (kilohertz), centered at frequencies such as the above, which are called the "carrier frequencies". Each station in this example is separated from its adjacent stations by 200 kHz, and the difference between 200 kHz and 180 kHz (20 kHz) is an engineering allowance for the imperfections in the communication system.

In the example above, the "free space channel" has been divided into communications channels according to frequencies, and each channel is assigned a separate frequency bandwidth in which to broadcast radio waves. This system of dividing the medium into channels according to frequency is called "frequency-division multiplexing". Another term for the same concept is "wavelength-division multiplexing", which is more commonly used in optical communications when multiple transmitters share the same physical medium.

Another way of dividing a communications medium into channels is to allocate each sender a recurring segment of time (a "time slot", for example, 20 milliseconds out of each second), and to allow each sender to send messages only within its own time slot. This method of dividing the medium into communication channels is called "time-division multiplexing" (TDM), and is used in optical fiber communication. Some radio communication systems use TDM within an allocated FDM channel. Hence, these systems use a hybrid of TDM and FDM.

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FATHER OF MEDICINE – ABU ALI IBN SINA

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Summary. *Abu Ali Ibn Sina is known around the world as the founder of modern medicine. His works in this area are appreciated all over the world to this day. He has made significant contribution also to science and philosophy. For 57 years of his life, he wrote more than 450 works in 29 fields of science. In this paper we tried to see his life from different angles.*

Key words: *Arithmetic, philosophy, medicine, astronomy, philology, logic*

Early life

The life of Abu Ali Ibn Sina was not smooth and comfortable. He was an archi- t ect and adviser to the rulers, and sometimes he was imprisoned because of the change

of power.

Ali was born in the year 980 in Afshana, a village near Bukhara, the capital of th e Samanids, a Persian dynasty in Central Asia and Great Khorasan. His mother, Setar a, was from Bukhara, his father, Abdullah, was a respected Ismaili scholar from Balkh , an important town of the Samanid Empire, which is in Afghanistan. His father worke d in the government of Samanid in the village Kharmasain, a Sunni regional power . A fter five years his younger brother Mahmoud was born.

According to his autobiography, Ali had memorized the entire Quran by the age of 10. He learned Indian arithmetic from an Indian greengrocer Mahmoud Massahi and began to learn more from a wandering scholar who gained a livelihood by curing the sick and teaching the young.

He turned to medicine at 16, and not only learned medical theory but discovered new methods of treatment. The teenager achieved full status as a qualified physician at age 18 and found that "Medicine is no hard and thorny science, like mathematics and metaphysics, so he soon made great progress; he became an excellent doctor and bega n to treat patients, using approved remedies." The youthful physician's fame spread qu ickly, and he treated many patients without asking for payment.

When Ibn Sina was 22 years old, he lost his father. The Samanid dynasty came to its end in December 1004. Ibn Sina seemed to have declined the offers of Mahmud of Ghazni, and proceeded westwards of Urgench in modern Turkmenistan, where the vizier, regarded as a friend of scholars, gave him a small monthly stipend.

Ibn Sina wrote his numerous scientific works in all circumstances, we can say th at he could not live without writing. The knowledge that filled him, flowed to thousa nds of paper pages. Among the most important of his works are “The Book of Kno w ledge”, “The Book of Healing”, “The Book of Medication”, “The Canon of Medici ne (5 books), the latter is considered one of the most famous books in the his- tory of medicine. Along with this Ibn Sina wrote collections of poetry and theology- cal tre atise.

The Canon of Medicine consists of five books:

1. The theoretical basis of medicine.
2. Drugs used in medicine in the same period.
3. The beginning of heeling of the human body.
4. People are not specific to any of the “common” diseases. Such as fever, edema , rash, fracture.
5. Pharmacopoeia, which has the preparation and usage of drugs.

Philosophy

Ibn Sina extensively wrote about early Islamic philosophy, especially the subjects like logic, ethics and metaphysics, including treatises named Logic and Meta-physics . Ibn-Sina's philosophy was expounded in the "Kitab ash-Shifa" ("The book of healin g") which is a whole epoch in the history of oriental philosophy. However his classic consolidated work on medicine, "Kitab al-Kanun fit-Tib" (The canon of medical scien ce) has gained him a world reputation. The translation of this work into the Latin langu age was made at the end of the 15th century. In one hundred years, in 1593, its Arabic

edition was published in Rome. Afterwards, it was published many times up to the 17 th century, and became one of the most popular works on medicine in the West. West ern medicine was directly impacted by the Canon.

Argument of God's existence

Avicenna made an argument of the existence of God which would be known as th e "Proof of the Truthful" (Arabic: al-burhan al-siddiqin). Avicenna argued that there m ust be a "necessary existent" (Arabic: wajib al-wujud), an entity that cannot exist, and t hrough series of arguments, he identified it with God of Islam. Present day historian o f philosophy Peter Adamson called this argument one of the most influential mediev al arguments of God's existence and Avicenna's biggest contribu-tion to the history of philosophy.

Theology

Avicenna was a devout Muslim and sought to reconcile rational philosophy with I slamic theology. His aim was to prove the existence of God and His creation of the wo rld scientifically and through reason and logic. Avicenna's views on Islamic theology (and philosophy) were enormously influential, forming part of the core of the curriculu m at Islamic religious schools until the 19th century. Avicenna wrote a number of sh ort treatises dealing with Islamic theology. These included treatises on the prophets (whom he viewed as "inspired philosophers"), and also on various scientific and philos ophical interpretations of the Quran, such as how Quranic cosmology corresponds to h is own philosophical system. In general these treatises linked his philosophical writ ings to Islamic religious ideas; for example the body's after life.

Avicenna died in 1037, leaving behind a huge legacy, which is still being used by his descendants today.

In 1980 the Soviet Union which then ruled his birthplace Bukhara, celebrated th e thousandth anniversary of Avicenna's birth by circulating various commemora -tiv e stamps with artistic illustrations, and by erecting a bust of Avicenna based on anth ropological research by Soviet scholars. Near his birthplace in Qishlak Afshona, som e 25 km north of Bukhara, a training college for medical staff has been called by his name. There is also a museum dedicated to his life, times and work..

In March 2008 it was announced that Avicenna's name would be used for new D irectories of education institutions for health care of professionals worldwide. The Av icenna Directories will list universities and schools where doctors, public health practi tioners, pharmacists and others, are educated. The project team stated "Why Avicenna ? Avicenna .. was . noted for his synthesis of knowledge from both east and west. He has had a lasting influence on the development of medicine and health sciences. The use of Avicenna's name symbolises the worldwide partnership that is needed for the promotion of health services in high quality.

Abu Ali Ibn Sina’s most popular and one of the great books is “Kitab al-la fit”. This is his own medicine as the basis of his detailed knowledge of human health a nd disease which collects all the problems in a logical manner.

Conclusion

In honor of great ancestor Abu Ali Ibn Sina, the famous Swedish naturalist Carl

Linney (1700 -1778) gave to evergreen tree the name of Avicenna.

In 1956, the scientists found a new mineral and named it Avicennia in honor of the great ancestor.

It was celebrated the 1035 anniversary of East's great scientist Abu Ali Ibn Sina i n Tashkent National Library and opened" Book-Picture Exhibition" named after "Buy uk alloma - qomusiy olim". In this paper we tried to look our ancestor`s life and work from different angles. We are proud that we are generations of the world known scient ist.

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MOHAMMED BEN MUSA AL-KHOREZMI IS ONE OF THE GREATEST SCIENTISTS OF ALL TIME

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Summary: *Khorazmi enriched over five fundamental science new ideas. Therefore, in the history of science it is considered the first scholar and lexicographer. Launched by al-Khorizmi continued the tradition of Ibn Sina, Beruni, Leonardo da Vinci, Leibniz, Lomonosov and others. Mohammed ben Musa al-Khorezmi's rich scientific heritage of the article being studied by European researchers, is shown in this area, scientists have achieved major results.*

Keywords: *algorithm, Baghdad academy, Academy of Sciences.*

The homeland of the scientist was Khorezm - a vast region of Central Asia, to which modern Khorezm region of Uzbekistan (center - Urgench), part of the Republic of Karakalpakstan and Tashauz region of Turkmenistan.

There is also information about the work of al-Khorazmi on history. It was entitled "The Book of History" or "Book of the chronology" and was mentioned in several medieval works. Therefore al-Khorazmi is included in the earliest historians who wrote in Arabic.

"The book is a picture of the Earth" ("Kitob surat al-art"), which was discovered in Cairo in the 11th c. , Now stored in the library of Strasbourg and is the only book in Arabic. According to the ancient tradition al-Khorezmi subdivided part of the Earth, then considered inhabited by 7 "climates". "Climates" are latitudinal belts that differ from each other by the length of a summer day. Scientists for each "climate" are given

tables of coordinates of cities, descriptions of more than 200 mountains, seas, islands and rivers. They indicated the latitudes and longitudes of 537 settlements, some of which were borrowed from Ptolemy, but many are presented in a refined form. This work of the great scientist aroused great interest of researchers - Italian K. Nallino, Czech Hans Mzhiko, Hungarian K. Segledi, Russian scientist I.Yu.Krachkovsky. Academician I.Yu.Krachkovsky gave this book a high rating: "The book is a picture of the earth Is an ancient monument of Arabic cartography that has reached us. "

Of these works, only seven came to us - in texts belonging to either al-Khorezmi himself, or his medieval commentators. The well-known historian of science J. Sarton called al-Khorezmi "the greatest mathematician of his time and, if we take into account all the circumstances, one of the greatest of all time."[2]

Abu Rayhan al-Beruni in the book "Monuments of past generations" told about this hard time in the history of his homeland - Khorezm. He wrote that the Arab governor in Central Asia, Kuteyba ibn Muslim destroyed "the people who knew the Khorezmian script well, they knew them by legends and taught the sciences that existed among the Khorezmians, and subjected them to all sorts of torments. "According to al-Beruni, the conqueror of Kuteib" killed the Khorezm scribes, killed clerics and burned their books and the scrolls after which "the Khorezmians remained illiterate and relied on what they needed, in memory."

Ruler al-Mamun, referring to the scholars of the House of Wisdom, instructed to create a map of the Universe and Earth. At the head of these scientists was Al-Khorezmi. Traveling by land and sea requires accurate knowledge route and the ability to navigate the terrain of each waypoint. You need to know the distances between geographical locations and directions in which it is necessary to move in order to achieve the marked goal. Based on mathematical geography, developed in the period of antiquity, relied medieval scholars of the Near and Middle East. Among them, the author of the first geographical work, which laid the foundation for their activity, in this field of science was Muhammad ibn Musa al-Khorezmi.

That's why so few written monuments of ancient Khorezm reached us. However, cultural the traditions that were formed in Khorezm many centuries ago were not destroyed. Wounds caused by wars gradually healed. Conditions began to take shape for a new upsurge in the spiritual life of the people is he began in Central Asia in the IX century. This period was marked by great achievements in the field of precise sciences. Among those Khorezmians who glorified their homeland by their labors, first of all they should be named Muhammad ibn Musa al-Khorezmi. A decisive role in the formation of him as a scientist, no doubt, played ancient traditions of the Khwarezmian science, which found a remarkable continuation in his work.

The study of these works, as well as the analysis of the works of his contemporaries and followers of al-Khorizmi, make it possible to make enough poured dipolar understanding of the scientific heritage of the great scientist. well known now the fate of this heritage in European countries, where it was seen in the XII century. And active impact on the development of mathematics in the world.

In 1983, according to the decision of UNESCO, the 1200th anniversary of the great scientist Al-Khorezmi was held. At present, the Institute of Algorithms is established in our republic under the Academy of Sciences, and in the capital the plant "Algorithm" is functioning. As stressed by the famous teachings of Yusuf Khos Khozhib:

All the past in the darkness of ages would have gone,
Do not save it for ever, a wise pen.

The Tashkent University of Information Technologies was named after Muhammad al-Khorazmi. This is stipulated by the presidential decree of March 15.

The document was adopted for "careful preservation of the invaluable heritage of the great scientist Muhammad al-Khorazmi and creating conditions for the upbringing and successful conduct of scientific activities of youth," the commentary to the resolution says.

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THE FATHER OF UZBEK NATION

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Summary. *Uzbekistan is a unique country with a rich history that teems with worldwide known scientists, leaders who contributed immensely to the development of our motherland. Among them, Islom Karimov stands out because he led the country to independence and opened a new chapter in our history.*

Key words: *history, contribution, our first President, independence, development.*

There is no gainsaying the fact that, a plethora of scientists, politicians, philosophers, writers considerably contributed for the development of Uzbekistan and throughout its history thus making an irremovable mark on the world history. For instance, Alisher Navoi is the founder of literary Uzbek language whose immortal masterpiece «Hamsa» convincingly proved that Uzbek is one of the richest among all the languages in the world. Mirzo Ulugh Beg deserves the title "father of modern astronomy" owing to his research and defining the characteristics of 994 stars with outstanding comprehension. Even modern computers can hardly compete with him in accuracy. Amir Timur is admitted as the greatest emperor and politician in our history because he created a powerful and centralized empire. Moreover, he destroyed the Golden Horde, the major threat of independence of not only his empire but also of

European countries, which expressed their gratitude for A. Timur by sending their ambassadors.

We can continue this list for a long time but here we will talk about the first president of Uzbekistan, the great politician who fought for independence thus enabling our Motherland to embark its journey in order to be a prosperous country, Islom Karimov. One major point significantly magnifies his contribution to the development of Uzbekistan. As we know, he came to power when political crisis peaked in the beginning 1990s, when centrally planned economy failed to fulfill the needs of our nation leading country to the brink of disaster. He managed to cope with difficulties totally reconstructing political and economic system. How did he do it? We will discuss it now!

Islom Karimov was born on January 30, 1938 in Samarkand in the family of civil servants. He graduated from high school in 1955. 5 years later, he graduated from the Central Asian Polytechnic Institute (Tashkent State Technical University) with a degree in mechanical engineering. In 1967, he graduated from Tashkent State University of Economics.

He started his political career in 1966 when he started work at the State planning office of the UzSSR as chief specialist and later as first deputy chairman of the State planning office. He was a persistent and ambitious worker so he began moving up the ladder. Eventually, on March 24, 1990, he was elected as a President of the Uzbek SSR. The next year he declared the independence of the Republic of Uzbekistan starting a new period in our history. Immediately after declaration, he started cooperating with international organizations and neighbor countries. Owing to his efforts, in 1992 Uzbekistan became a member of the Organization of the United Nations (UN). It was the first time when all countries in the world admitted Uzbekistan as an independent country.

Moreover, our first President Islom Karimov had:

- a strong will, self-confidence and courage, defending the honor and dignity of the Uzbek people. When he headed the Central committee of the Communist Party, others tried to blacken his name, producing lawlessness and persecution;
- raised to the level of state policy respectful relations to the spiritual values of our nation, renewal and development of our sacred religion, traditions and customs, the priceless heritage of the people;
- raised the international respect for Uzbekistan;
- contributed to the formation in social awareness of the basis of national ideology and the value of traditions;
- made a great contribution to establishing, preserving and strengthening peace and national accord;
- been the author and initiator of ideas to create and execute the National program for preparing specialists;
- been the initiator of construction of large enterprises, cultural buildings, communications networks, giving a strong impulse to economic development,

transforming the face of many cities and villages, above all the capital Tashkent, and providing respectful places dedicated to the dignity of our great ancestors.

To sum up, the purpose of this article was not to belittle achievements and contributions of other scientists, writers, politicians in our history listed above. In fact, their significance and mark in history should not be forgotten nor distorted and another article should be written and another research should be made in order to understand deeper their journey of life. Here I wanted to explicate how our first President contributed to the development of our motherland and why we should immortalize him. Looking back, we can assert that Uzbekistan in the late 1980s needed a powerful and ambitious leader who was able to create a new country, to protect bravely the dignity of new nation, to reorganize economy, political and social life prudently to move out of crisis, to construct a basis for further development to build a well-developed and prosperous country. Fortunately, for our motherland, Islom Karimov was the very right person who met all these requirements with an excess.

We should do our best to pass on to future generations our heritage so that they remember our first president with the sense of pride and gratitude. We will never forget Islom Karimov!

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ISLAM ABDUGANIEVICH KARIMOV

(1938-2016)

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Summary: *We talked about our first president Islam Abduganievich Karimov's life. So, we take a lot of information about him.*

Key words: *Islam Abduganievich Karimov, Uzbek, Uzbekistan*

Islam Abduganievich Karimov was born on January 30, 1938 in Samarkand into a family of civil servants. He was Uzbek by nationality and had a higher degree. He finished the Central Asian Polytechnic and the Tashkent Institute of national economy, receiving degrees as an engineer-mechanic and economist. He began work in 1960 at Tashselmash. From 1961-66 he worked as an engineer, a leading engineer-constructor at the Chkalov Tashkent aviation production complex. In 1966 he started work at the State planning office of the Uz SSR where he worked as chief specialist and later as first deputy chairman of the State planning office.

In 1983 I. Karimov was appointed Minister of finance of the Uz SSR, in 1986 – deputy chairman of the Council of Ministers of the Uz SSR and chairman of the State planning office. In 1986-89 he was first secretary of the Kashkadarya provincial party committee. From June 1989 – first secretary of the Central committee of the Communist Party of Uzbekistan. On March 24, 1990, he was elected President of the Uzbek SSR.On August 31, 1991, he declared the independence of the Republic of Uzbekistan.On December 29, 1991 he was elected President of the Republic of Uzbekistan in multi-candidate elections.On March 26, 1995, in accordance with a national referendum, his period in office was extended to 2000.On January 9, 2000, in elections that included choice, Islam Abduganievich Karimov was reelected as head of state.On December 23, 2007, in elections that included choice, Islam Abduganievich Karimov was reelected as head of state. On March 29, 2015, Uzbekistan held a multi-candidate presidential election. According to its results and amendments adopted to the Constitution of the Republic of Uzbekistan, Mr Islam Karimov was elected to the highest post in the country for the next 5 years. I. Karimov was married. He had two daughters and five grandchildren. His wife T.A. Karimova is an economist and scientific worker.

For his outstanding contribution to education in Uzbekistan, creation of a state based on democratic laws, guarantee of civil peace and national accord, and for courage, I. Karimov was awarded the title Hero of Uzbekistan and the awards Mustakillik (Independence) and Amir Temur. He had received awards from foreign states and international organizations.He was a member of the Academy of sciences of Uzbekistan. For his contribution to economics, science, and education he was awarded honorary doctorates from 9 foreign institutions.He was the initiator and leader of historic transformations in our country. He had directly contributed too a program of independent development of the country, and the Constitution, meeting democratic demands and international criteria a new program of state and social construction, reform of administration, both central and locally, the realization of principles harmonizing the interests of the state, society and the individual a new respected model of economic development based on five principles: de-ideologization of the economy, supremacy of laws, step-by-step reform, state regulation during the transition period and strong social policy- reform of the armed forces, border forces.

Karimov had: a strong will, self-confidence and courage, defending the honor and dignity of the Uzbek people. When he headed the Central committee of the Communist Party, others tried to blacken his name, producing lawlessness and persecution, raised to the level of state policy respectful relations to the spiritual values of our nation, renewal and development of our sacred religion, traditions and customs, the priceless heritage of the people, raised the international respect for Uzbekistan;

contributed to the formation in social awareness of the basis of national ideology and the value of traditions, made a great contribution to establishing, preserving and strengthening peace and national accord ,been the author and initiator of ideas to create and execute the National program for preparing specialists, done much to raise the authority of the makhalla (community) in social-political life, increasing its rights and authority been the initiator of construction of large enterprises, cultural buildings, communications networks, giving a strong impulse to economic development, transforming the face of many cities and villages,

above all the capital Tashkent, and providing respectful places dedicated to the dignity of our great ancestors.

Under his leadership, the basis of national sovereignty and civil society had been created, as well as conditions for strengthening peace, priorities for stable development and prosperity of multi-ethnic Uzbekistan in the new century. . He is very wide thinking person in every situation. All the time he can found right solution for all problems. He was the best leader in every young generation's life like a hero!

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II-SECTION

TECHNOLOGICAL REVOLUTION OF UZBEKISTAN

WHAT IS LI-FI?

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Summary. *This article discusses the recent LI-Fi technology invention advancements in the world and the growing importance of mobile communications, internet services and video surveillance (for round observations), and the prospect of IT in State services.*

Key words: *information technologies, mobile communication, transport sector, virtual reception, source of entertainment*

Light Fidelity or Li-Fi is a Visible Light Communications (VLC) system running wireless communications travelling at very high speeds.

Li-Fi uses common household LED (light emitting diodes) lightbulbs to enable data transfer, boasting speeds of up to 224 gigabits per second**.**

The term Li-Fi was coined by University of Edinburgh Professor Harald Haas during a TED Talk in 2011. Haas envisioned light bulbs that could act as wireless routers.

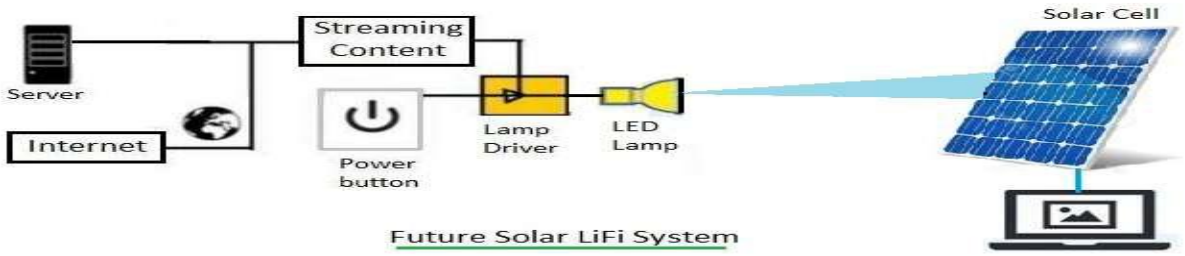
Subsequently, in 2012 after four years of research, Haas set up company pure Li-Fi with the aim 'to be the world leader in Visible Light Communications technology'**.**

How it works

As we now know, Li-Fi is a Visible Light Communications (VLC) system. This means that it accommodates a photo-detector to receive light signals and a signal processing element to convert the data into 'stream-able' content.

An LED light bulb is a semi-conductor light source meaning that the constant current of electricity supplied to an LED lightbulb can be dipped and dimmed, up and down at extremely high speeds, without being visible to the human eye.

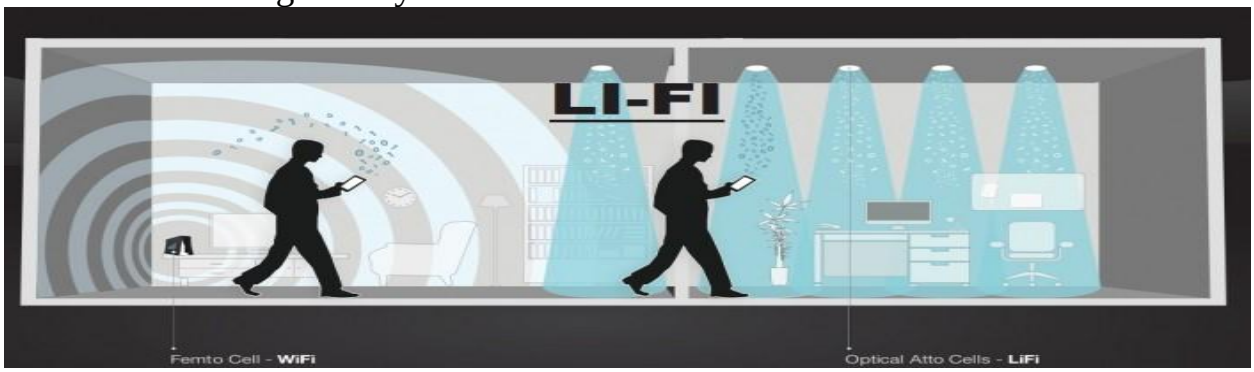
For example, data is fed into an LED light bulb (with signal processing technology), it then sends data (embedded in its beam) at rapid speeds to the photo-detector (photodiode).



Li-Fi vs Wi-Fi

While some may think that Li-Fi with its 224 gigabits per second leaves Wi-Fi in the dust, Li-Fi's exclusive use of visible light could halt a mass uptake.

Li-Fi signals cannot pass through walls, so in order to enjoy full connectivity, capable LED bulbs will need to be placed throughout the home. Not to mention, Li-Fi requires the lightbulb is on at all times to provide connectivity, meaning that the lights will need to be on during the day.



.What's more, where there is a lack of lightbulbs, there is a lack of Li-Fi internet so Li-Fi does take a hit when it comes to public Wi-Fi networks.

This new project claims to double the range of connectivity while using less power. Due to this, Wi-Fi HaLow is reportedly perfect for battery powered devices such as smartwatches, smartphones and lends itself to Internet of Things devices such as sensors and smart applications.

But it's not all doom and gloom! Due to its impressive speeds, Li-Fi could make a huge impact on the internet of things too, with data transferred at much higher levels with even more devices able to connect to one another.

What's more, due to its shorter range, Li-Fi is more secure than Wi-Fi and it's reported that embedded light beams reflected off a surface could still achieve 70 megabits per second.

The future of Li-Fi

In November 2014, Li-Fi pioneers pureLiFi joined forces with French lighting company Lucibel aiming to bring out Li-Fi enables products, by the end of 2015.

Li-Fi is reportedly being tested in Dubai, by UAE-based telecommunications provider, du and Zero1. Du claims to have successfully provided internet, audio and video streaming over a Li-Fi connection.

What's more, reports suggest that Apple may build future iPhones with Li-Fi capabilities. A Twitter user found that within its iOS 9.1 code there were references to Li-Fi written as 'LiFiCapability' hinting that Apple may integrate Li-fi with iPhones in the future.

How does Li-Fi work?

While that all sounds well and good, how does Li-Fi actually work? Standard LED lightbulbs use a constant current, which emits a constant stream of photons perceived by us as visible light. Li-Fi is different because the current it uses varies, meaning that the output intensity of the light fluctuates.

Is Li-Fi secure?

So it’s like Wi-Fi, but faster and uses lights instead of radio waves to transfer data. But light-based communication isn’t very secure, is it? Surprisingly so – in the case of Li-Fi anyway. Li-Fi is short range, which usually wouldn’t be a feature to boast about, but a smaller range means you’ll have to be much closer than Wi-Fi to use it, making it more secure.

It doesn’t work through walls either, providing a much higher level of security ideal for use in offices. Basically, if someone was going to hack your Li-Fi network, they’d have to be stood underneath/near a light source in order to do so – which we doubt will happen very often.

When will I be able to use Li-Fi?

Li-Fi sounds great – but when will we be able to use it in our homes and businesses? Even though Li-Fi was only a concept in 2011, it seems as if Li-Fi will become common place sooner rather than later. Well maybe not *common* place, but it pure Li-Fi announced recently that it has partnered with a French industrial-lighting company and confirmed that it’ll be rolling out Li-Fi technology in its products by Q3 of 2016.

THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE ECONOMIC GROWTH OF OUR REPUBLIC

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Summary. *Information systems of developed countries is the main elements of an economy structure. This article reflects the importance of information and communication technologies and global information infrastructure and the importance of "internet" information branch in the economic growth of our independent Republic.*

Keywords*: technological change, information systems, communicated society, research grants.*

The basic economic analysis—starting with Adam Smith and certainly with Malthus, who came afterwards—was an economics based on physical objects, notions of scarcity. If you have a plot of land or a piece of wood, only one person can use it and there is a finite number of those pieces of wood and plots of land. Economists recognized that there were other things out there besides physical objects—things like ideas, a formula or a recipe for how to rearrange physical objects and make them more valuable. So economists said, "Let's just set aside the question of where technology comes from," and they made up this highfalutin jargon to cover up for their ignorance in this area. They said, "Let's treat technological change as exogenous. It comes from outside the economic system. We don't know where it comes from and why, but given that there's technological change, let's study how an economy transforms scarce resources like iron ore into tractors and forklifts and structures and so forth." So we studied capital. We studied labor. We didn't pay much attention to the underlying process of technological change.

In recent years, the most of information systems of developed countries was the main elements of a market structure. The formation of market structure of information communication technologies begun in 50 years of last century. Nowadays, this market formation is considered as the basic element of each national economics. Because to organize global economic, the infrastructure of modern information communication technologies is requesting. We are achieving to take different information and analyzed materials, which should be take form accepted environment of expertise activity, in payment for developing information communication technologies. It is known as being communicated society on basis of global information infrastructure and the importance of "internet" information branch is increasing day by day. Especially:

a) personal computers which connected to international information divisions are coming to every family;

b) new activity types in information branches are existence.In sum: working, resting, inventing a new idea, making happy, education and training;

c) every one of society have opportunity to take quickly and completely information in different topics and directions from any country absolutely where he is;

d) geographic and geopolitical border among countries in information branch sphere is disappearing.

In communicated society, not only production process will completely be changed, but also life, especially, the importance of cultural rest according to material wealth. In communicated society, intellect, information and improved mental knowledge are more manufacturing and consuming than industrial society . The basic goods in information communication market are information products and services. In other words, more information service based on information communication technologies should demonstrate. Information services – providing to access to information products, look for the necessities and proposal.

Now how did we get more and more people pitching in on discovery? Some of that has come purely from population growth. There are just more people around. But the most important part of it has come from changes in our institutions. We have things like universities, and we have things like patent laws, and we have things like research grants which have created incentives for those individuals to engage in more discovery. The institutions—again, the rules of the game—create incentives. In addition, we have found ways to create incentives for people to do more discovery. So a meta-idea would be something like the modern research university.

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DIGITAL JEWELRY MADE POSSIBLE USING WIRELESS COMMUNICATIONS

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Summary: *In this article there is an interesting information, dedicated to "Digital jewelry" can help you solve problems like forgotten passwords and security badges. "Digital jewelry" is a nascent catchphrase for wearable ID devices that contain personal information like passwords, identification, and account information.*

Keywords: *display, device, digital, jewelry, basic, board, card, wireless*

Mobile computing is beginning to break the chains that tie us to our desks, but many of today's mobile devices can still be a bit awkward to carry around. In the next age of computing, there will be an explosion of computer parts across our bodies, rather

than across our desktops. Basically, jewelry adorns the body, and has very little practical purpose. The combination of microcomputer devices and increasing computer power has allowed several companies to begin producing fashion jewelry with embedded intelligence i.e., Digital jewelry**.** Digital jewelry can best be defined as wireless, wearable computers that allow you to communicate by ways of e-mail, voicemail, and voice communication. This paper enlightens on how various computerized jewelry (like ear-rings, necklace, ring, bracelet, etc.,) will work with mobile embedded intelligence.

Even the devices we use are protected by passwords. It can be frustrating trying to keep with all of the passwords and keys needed to access any door or computer program. This paper discusses about a new Java-based, computerized ring that will automatically unlock doors and log on to computers.

Introduction

The latest computer craze has been to be able to wear wireless computers. The Computer Fashion Wave, "Digital Jewelry" looks to be the next sizzling fashion trend of the technological wave. The combination of shrinking computer devices and increasing computer power has allowed several companies to begin producing fashion jewelry with embedded intelligence. The whole concept behind this is to be able to communicate to others by means of wireless appliances. The other key factor of this concept market is to stay fashionable at the same time.

By the end of the decade, we could be wearing our computers instead of sitting in front of them.

What is digital jewelry?

Digital jewelry is the fashion jewelry with embedded intelligence. "Digital jewelry" can help you solve problems like forgotten passwords and security badges. "Digital jewelry" is a nascent catchphrase for wearable ID devices that contain personal information like passwords, identification, and account information. They have the potential to be all-in-one replacements for your driver's license, key chain, business cards, credit cards, health insurance card, corporate security badge, and loose cash. They can also solve a common dilemma of today's wired world – the forgotten password.

Digital jewelry and its components

Soon, cell phones will take a totally new form, appearing to have no form at all. Instead of one single device, cell phones will be broken up into their basic components and packaged as various pieces of digital jewelry. Each piece of jewelry will contain a fraction of the components found in a conventional mobile phone.

Together, the digital-jewelry cell phone should work just like a conventional cell phone. The various components that are inside a cell phone: Microphone, Receiver, Touch pad, Display, Circuit board, Antenna, and Battery.

IBM has developed a prototype of a cell phone that consists of several pieces of digital jewelry that will work together wirelessly, possibly with Blue tooth wireless technology, to perform the functions of the above components.

Cell phones may one day be comprised of digital accessories that Work together through wireless connections.

Here are the pieces of computerized-jewelry phone and their functions:

– **Earrings** - Speakers embedded into these earrings will be the phone's receiver.

– **Necklace** - Users will talk into the necklace's embedded microphone.

– **Ring** - Perhaps the most interesting piece of the phone, this "magic decoder ring" is equipped with light-emitting diodes (LEDs) that flash to indicate an incoming call. It can also be programmed to flash different colors to identify a particular caller or indicate the importance of a call.

– **Bracelet** - Equipped with a video graphics array (VGA) display, this wrist display could also be used as a caller identifier that flashes the name and phone number of the caller.

With a jewelry phone, the keypad and dialing function could be integrated into the bracelet, or else dumped altogether - it's likely that voice-recognition software will be used to make calls.

Technical specifications of digital jewelry

Digital jewelry devices consist of a screen or display for information, most likely consisting of 7-16-segment, or dot matrix LEDs, LCDs, or other technologies such as electroluminescent material (EL) or others, which could become an optional display. So too, an audiovisual or other 'display' could consist of a speaker, a single flashing light, a sensor of some kind (such as a temperature driven EL display), or other informational aesthetic. A micro controller that is a surface mounted device (SMD) on a printed circuit board (PCB) with resistors (R) and capacitors (C) are the internal 'guts' of the jewelry.

Display technologies

The digital jewelry display, for instance, every alphabet and number system has found representation within the electronics realm and 'dot-matrix' (a matrix of single LEDs) is used to display Chinese and Japanese and other character sets, as can the alternative display for LCDs (liquid-crystal-displays) also be used, as often found in watches.

Digital Jewelry can be made in many different sizes and shapes with a variety of materials ranging from plastic and metal to rubber and glass. They utilize electromagnetic properties and electronics to display information through a screen or display of some kind. This could range from LED 7-segment, 16-segment, dot matrix, and other programmable LEDs devices to LCDs, OLEDs, and other displays, which are all driven by the self-contained jewelry devices themselves.

The java ring

It seems that everything we access today is under lock and key. Even the devices we use are protected by passwords. It can be frustrating trying to keep with all of the passwords and keys needed to access any door or computer program. Dallas Semiconductor is developing a new Java-based, computerized ring that will automatically unlock doors and log on to computers.

The Java Ring can be programmed to give you access to every door and device.

Blue Dot receptor

The Java Ring is snapped into a reader, called a Blue Dot receptor, to allow communication between a host system and the Java Ring. The Java Ring is a stainless-steel ring, 16-millimeters (0.6 inches) in diameter, which houses a 1-million-transistor processor, called an iButton**.** The ring has 134 KB of RAM, 32 KB of ROM, a real-time clock and a Java virtual machine, which is a piece of software that recognizes the Java language and translates it for the user's computer system. Digital jewelry, (designed to supplement the personal computer,) will be the evolution in digital technology that makes computer elements entirely compatible with the human form.

Conclusion

The basic idea behind the digital jewelry concept is to have the convenience of wireless, wearable computers while remaining fashionably sound. It is hoped to be marketable soon, however, several bugs remain. Charging capabilities and cost are just a sample of the problems that lurk.

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5G (FIFTH GENERATION)

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Summary. *Everyone who has an internet connection wants great amenities. The 5G will run at very high speeds (up to 10 Gb / s). Also 5G assumes a global change in the architecture of the operator's network, and unlike previous technologies (2G, 3G, 4G), where we observed evolutionary development, 5G is rather a revolution. One of the drivers for changing the architecture of carrier networks is the concept of the Internet of things.*

Key words*: 5G, communication, generation, technology, connection, network.*

Around us appears a huge number of small devices (various gadgets, household appliances, etc.), which ideologists of the Internet of things want to "make friends" among themselves through, for example, chips embedded in them. These devices, whether mobile phone or coffee maker, using a single communication standard 5G, will be in the same communication space and will be able to interact with each other. Therefore, 5G is a new reality that will allow to connect all existing gadgets thanks to a unified management system. For example, at the domestic level, while on the way

home from work, a person can remotely unfreeze food and warm up his dinner, fill a hot bath and so on. Everything depends only on the imagination.

What is 5G?

Now, there are four generations of mobile communication in the world. It is believed that the fifth generation of mobile communications will appear by 2020. To explain this is quite simple: there is a so-called ten-year rule. If you look a bit into the past, you can see that each new generation of mobile communications appeared about 10 years after the appearance of the previous one: the first generation appeared in the early 80's, the second in the early 90's, the third at the beginning of the 00's, the fourth in 2009 Year. The conclusion is that the first 5G networks will appear around 2020.

Currently, programs are underway to develop the basic outline of the fifth-generation standard. That is why it is impossible to give an exact definition of 5G, we can only predict what the networks will become after 2020.

Obviously, in the future, many more devices will be connected to the network, most of which will operate on the principle of "always online". At the same time, a very important parameter will be low power consumption.

Requirements for 5G networks

The network capacity is more than 10 Gbit / s.

Support for simultaneous connection of up to 100 million devices / km2.

Delay of data transmission on the air interface is not more than 1 ms.

Services in networks 5G

Ultra-wideband mobile communications (Extreme Mobile Broadband, xMBB) - the implementation of ultra-broadband communication to transmit "heavy" content;

Mass communication machine (Massive Machine-Type Communications, mMTC) - support of the Internet of things (ultra-narrowband communication);

Ultra-reliable inter-machine communication (Ultra-reliable MTC, uMTC) - providing a special class of services with very low latencies.

How does 5G work?

To start 5G, three essential components are required: first, the creation of a fundamentally new infrastructure; Secondly, the formed demand for 5G technology among users (creation of new devices and, accordingly, services); Third, standardization (development of unified communication standards and interaction algorithms), so that all manufacturers have the same understanding of the standard.

The future of the Internet?

Networks 5G will accelerate the process of transition to the "Internet of things" - IoT. It is difficult to imagine the Internet at such a speed and how the world will be using the new standard. It is necessary to expect self-controlled cars, it is possible that there will be devices that will catch human biorhythms. The possibilities of the new network are so far unlimited.

With the advent of the new network, we should expect the emergence of new services, as well as the evolution of existing ones. Technology will be developed that relate to the transfer of video, its quality will grow, and the cost of its delivery will

decrease. Most likely, video content will become as 3D, and for this you need a very high speed.

The number of devices that can be connected to the Internet will increase, you should expect to connect everything that can be connected, from home appliances to vehicles. The number of simultaneous connections will reach 100 billion. And maybe more. Traffic will be consumed several thousand times faster.

A unique feature of the new communication standard is called tactile Internet. There will be an opportunity to interact with web resources in augmented reality. It should also be said about "Service Intelligence" (SI), the technology will handle a large number of incoming data, it will take into account not only the individual data of each user, but also his public opinion, habits, everything that surrounds the user, will be constantly analyzed .

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MAJOR ROLE OF "NEXT GENERATION NETWORK" IN UZBEKISTAN

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Summary: *In article proposed the Next Generation Networks are being implemented globally as a means to radically change the cost base, agility and service capabilities of telecoms providers. In the proposed NGN is a packet-based network able to provide services and able to make use of multiple broadband, Quality of service via Internet and optical cables.*

Keywords*: NGN-next generation network, packet-based, multiple broadband, quality of service, optic cable.*

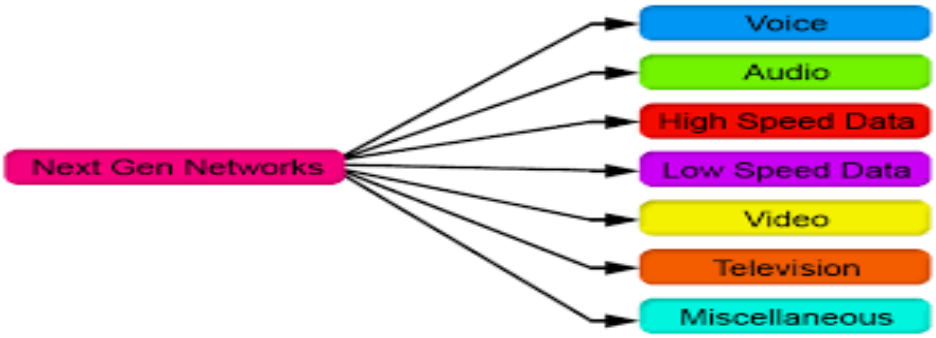
In the modern world, telecom engineers undertake to deal with the issue of telecommunication service is essential. One of the ways to improve telecommunication service is the implementation of NGN tools such as optic cable, Wi-Fi router, IP-telephone, ADSL, MPLS, SIP, IPTV,

The **next-generation network** (**NGN**) is a body of key architectural changes in telecommunication core and access networks. The general idea behind the NGN is that one network transports all information and services (voice, data, and all sorts of media such as video) by encapsulating these into IP packets, similar to those used on the Internet. NGNs are commonly built around the Internet Protocol, and therefore the

term **all IP** is also sometimes used to describe the transformation of formerly telephone-centric networks toward NGN.

NGN key components

As was mentioned above, Next Generation Networks are packet-switched and use IP at the network layer. The center of the network is the **IP multimedia service** (IMS). This provides an independent platform through which access services such as 4G can use the network. The principle idea is to have seamless communication; people can be connected anywhere and anytime. A key component of this is the **Session Initiation Protocol** (SIP). SIP acts as a signaling protocol. It differs from other protocols such as H.323 in that the Internet Engineering Task Force (IETF) designed it specifically for IP. SIP is an enabling protocol that allows applications such as IPTV, VoIP and messaging to be easily integrated.

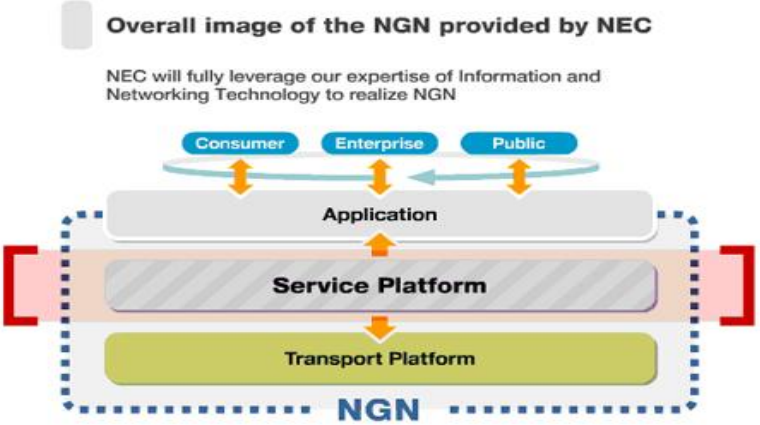


NGN is improved our network capable of today`s and future technologies.

The Office of Information Technology (OIT) received approval to move forward with a major university technology transformation project - the implementation of the Next Generation Network (NGN). The NGN will be an improved network capable of today's and future technologies, while delivering better service in areas such as Mobile Apps and Data, Phone Services, and Streaming Media and Video Chat.

Next Generation Networks represent a significant departure from the older style of networks

We are developing and commercializing next-generation SIP servers as IMS platform products cored on next-generation networks.



NGN will have a positive and powerful influence on consumer lifestyles and corporate business models.

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ATMOSPHERIC OPTICAL COMMUNICATION AND ITS ADVANTAGES

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Summary. *This article is dedicated to the usage of atmospheric optical communication and its advantages. This technology can be considered a wireless equivalent of a wired optical link carried out over an optical fiber. The article considers how this technology can be used and what its advantages are.*

Key words: *Atmospheric optical communication, optical fiber, cable lines, bandwidth, channels, point-to-point.*

Atmospheric optical communication makes it possible to transfer data (internet, voice, video, telephony, television) between objects in the atmosphere, providing an optical connection without the use of optical fiber or radio ether. In FSO systems for broadband data, voice and video transmission from one access point to another, a laser beam is used, distributed in the line of sight through the air. This technology can be considered a wireless equivalent of a wired optical link carried out over an optical fiber. FSO modules are connected to the local computer network using copper or fiber optic cable lines that meet the requirements of the TIA and EIA standards. Any application whose data can be transmitted over the Internet, namely speech, data and video, can use the FSO system. Let us consider advantages of the FSO system usage. They are the followings:

- AOL does not require permission to use frequencies;
- Work at the speed of modern cable network up to 1 Gbit / s;
- Increase the bandwidth of existing communication channels (Gigabit Ethernet / Fast Ethernet);
- Reservation of existing communication channels;
- AOLS provides high security of the channel without the possibility of interception of information;
- Point-to-point connection through hard-to-overcome barriers (railway tracks, highways, power objects creating strong, electromagnetic interference, dense urban development, industrial zones, sewerage, water barriers, inhospitable land, mountains, etc. .) when laying fiber (FOCL), WiFi, WiMax;

• There are no delays in information transfer (ping <1ms) as at radio links;
• AOLS quickly and easily deployed - the entire start-up cycle per a day;
• Quickly and easily curtailed - dismantling for several hours;
• Creating an emergency communication channel when prompt deployment is necessary;
• Combining several local computer networks;
• AOLS are immune to radio interference and do not create them themselves;
• There is no monthly fee;
• Longer distance and high speed in the channel due to the implementation of a fundamentally new solution within the framework of AOLS technology - adaptively variable speed and power, depending on the state of the optical path;
• Provide flexibility: rapid restructuring, reconfiguration and network size;
• Connections of base stations WiFi, WiMax, UMTS, LTE.

So, FSO system can be used by any application the data of which can be transmitted over the Internet. The FSO technology is considered to be a wireless equivalent of a wired optical link. Deployment of atmospheric optical communication systems that are revealed in this article is quick and easy.

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BENEFITS OF DISTANCE EDUCATION

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Summary. *This article is about the role of distance education and its benefits. As we know the technologies has been developed significantly in the 21st century. Since the developing the Internet, distance learning makes the communication much easier between students and professors (teachers) than ever before. Moreover, this article represents synchronous and asynchronous categories of distance learning.*

Key words*: distance education, traditional education, teacher, student, synchronous, asynchronous, real time.*

The distance education is playing important role at the universities and students life nowadays. Because the technology has been advanced to teach and to learn. For instance, students have to spend certain amount of time and money on the way to the colleges and universities. Instead, distance education can save the time and put it on learning more information. As we know the technologies has been developed significantly in the 21st century. Since the developing the Internet, distance learning

makes the communication much easier between students and professors (teachers) than ever before. Attending a distance course, learners can study at their own place, time and speed, choose individual and flexible schedules and combine different activities simultaneously. For example, it is more comfortable and preferable to study in the parks for some people, others cannot concentrate when they are around a lot of people, these type of learners could study more quiet places such as libraries and coffee shops. In short, they will be able to learn anything at anywhere as long as there is internet connection. In other words, the facts has been mentioned above can make the distance learning much stronger and more effective than traditional education.

There are two main categories of distance learning synchronous and asynchronous. Synchronous type is accomplished in real time, which looks like the traditional education. The only difference the learner and teacher are not be in the same room like typical classes, but there is far distance between them. On the other hand, asynchronous type is much more flexible, as the student will be responsible to find, learn and digest the information related to the topic he is learning. It can be done with a help of portable devices for example flash cards, CDs and DVDs. This way, would help improve the self-study skills and the student will be independent and decision-maker.

Today there is much need for the specialists with computer skills in the labour market. Though majority of high education institutions of the country prepare corresponding qualified staff, the content and type of this issue needs to be re-considered. It is necessary to raise percentage of the professions connected with information technologies for different fields in the student's admission plans. Firstly, IT specialists should be prepared covering areas of the economy and production. Preparation of specialists on the basis of training programs for the priority fields, such as banking services, medicine, information security, e-commerce, network administration, information economy, applied informatics that meet the international requirements are one of the main demands of the information society.

Application of the distance education form will also necessitate changing structures and methods of the training process:

1. Transition from the traditional education buildings to the cyber space;
2. Transition from the classic lecture halls and classes to the computer classes and virtual lectures;
3. Transition from the teacher's control to the self-control;
4. Transition from the classical libraries to the general or shared e-libraries;
5. Transition from the ordinary laboratories to the virtual research groups;
6. Transition from the ordinary meetings to the video and tele-conferences.

There are some advantages of distance learning:

-No relocation is required. You and your school can be half a world apart and still be able to connect with each other for the purpose of instruction. You may not ever see your teacher, or classmates, but you can still interact with them at scheduled intervals.

-Work from anywhere using an internet connection. The fastest possible connection is recommended if you participate in a course that requires you, your

classmates, and your teacher to be online at the same time, because you will probably need to keep up with streaming video or live chat.

-Flexible class schedules. The instant accessibility afforded by the internet, when used in a distance learning program conducted by e-mail or some other method that you can use at any time, means you can interleave your learning time with your other activities in the way most convenient to you.

-Save time and money by not traveling to and from physical classrooms.

-Tuition may be cheaper. That is not always the case, because when you study in the online division of a traditional university, you often take the same courses and pay the same tuition. However, the value you receive is clear, and such a degree (for example, a B.A. from Penn State as opposed to one from University of Phoenix) is worth more in the job market.

-No fear of asking questions. Many students are timid when it comes to classroom participation for fear of seeming slow or asking obvious questions. When you communicate with a professor individually, you can explain your query more fully, unhampered by self-consciousness.

In general, effectiveness of the education system is estimated through unity of three parameters: quality-expense-coverage. From this viewpoint, distance education is considered the most suitable education form in the developed countries.

Everything has own defects for other things. So there are some drawbacks of the distance education for the developing countries:

1. Probability of loss of the student contingent. Thus, young generation prefers western education system and inclines to cheaper sources.

2. Probability of loss of the real job places in the labour market. Faculty staff of the education institutions in the developed countries fights for the student team that desires to get paid study via electronic facilities.

3. Dependence on western education system. Developing countries are not competitive compared to these countries.

To sum up, students don’t lose valuable time through distance education. Students don’t spend certain amount of time and money on the way to the colleges and universities through distance education. Their energy doesn’t spend on the way to the universities. Usually a quiet place that is a library, a park is useful to learn. Because people are different. They have different goals, different ideas. Some people like silence but others do not. These two different types of people cannot sit and learn together in one room. In this situation, distance should be implemented. Because environment plays a great role for students and pupils. If studying conditions are not good, they will not do their best to achieve their goals, because they are not satisfied with the environment. It is only waste time, energy and power. That’s why distance learning must be improved and implemented everywhere as many as possible and I am convinced that it will help to improve students’ knowledge and abilities.

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MODEL OF VIDEO SURVEILLANCE SYSTEM TO ENHANCE SAFETY OF AIR TRANSPORT

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Summary: *In article proposed the model of on board automated video surveillance system to enhance safety of air transport, with data transmission via satellite channels. In the proposed model considered use of audio and video analysis for better situation control*.

Keywords: *onboard video surveillance system, video and audio analysis, safety improvement.*

In the modern world the issue of security of people during long flights is important. One of the ways to improve security on board of the aircraft is the implementation of video surveillance systems with data transmission via satellite links.

The specific use of video surveillance systems to ensure the safety of the passengers of the airliner is that in the absence of alarm conditions, the situation remains practically unchanged, therefore the video stream has a high statistical redundancy. Eliminating statistical redundancy and ensuring timely notification of security services on the occurrence of events requiring attention can be achieved through the use of audio and video analysis of modern digital video surveillance systems [1]. Analysis systems provide opportunity to increase the resolution of cameras to provide more detailed control on situation, especially combined audio and video analysis [2].

In design process of an onboard video surveillance system it is necessary to consider features of different aircraft models to provide a complete overview of the cabin. A generalized diagram of the proposed automated video surveillance system on the example of aircraft Boeing-757-200 of NAC «O’zbekiston Havo Yo’llari» is shown in Fig. 1 [3].

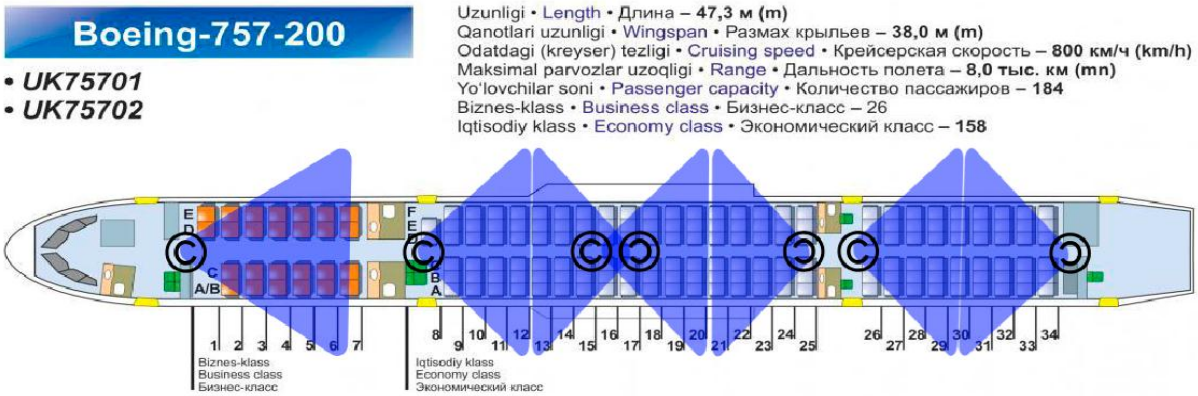

Fig. 1. Diagram of proposed video surveillance system for aircraft Boeing-757-200

An automated on-board video surveillance system includes the following elements (Fig. 2):

- digital video cameras (C);
- data storage device (DS);
- video analysis server, controlling module (CM);
- monitor in the cockpit (M);
- interface with Satellite Data Transmission System (SDTS);

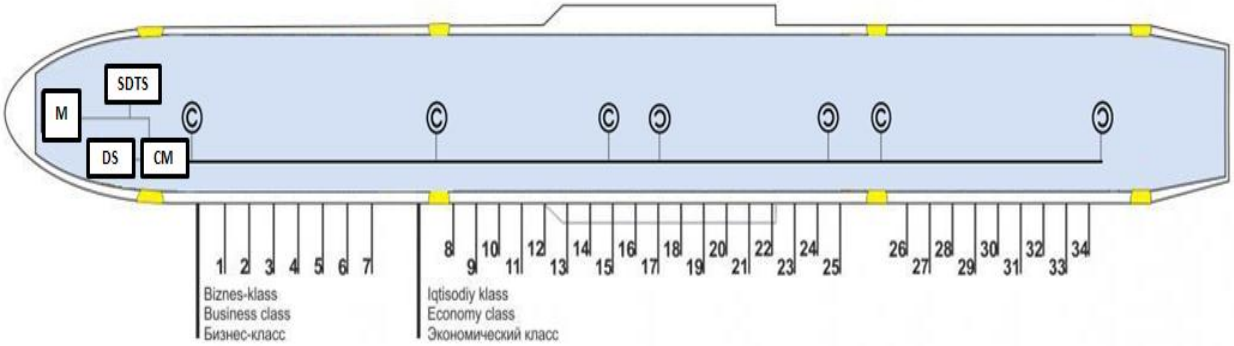

Fig. 2. The communication structure between the elements of proposed video surveillance system

Fig. 3 provides a generalized algorithm of the system. After initial gathering of video stream parameters system starts to operate in work mode. Upon detection of alarm events video from the corresponding camera is displayed on the monitor in the cockpit and transmitted via the satellite communication channel to security services. In normal situation, video data is stored.

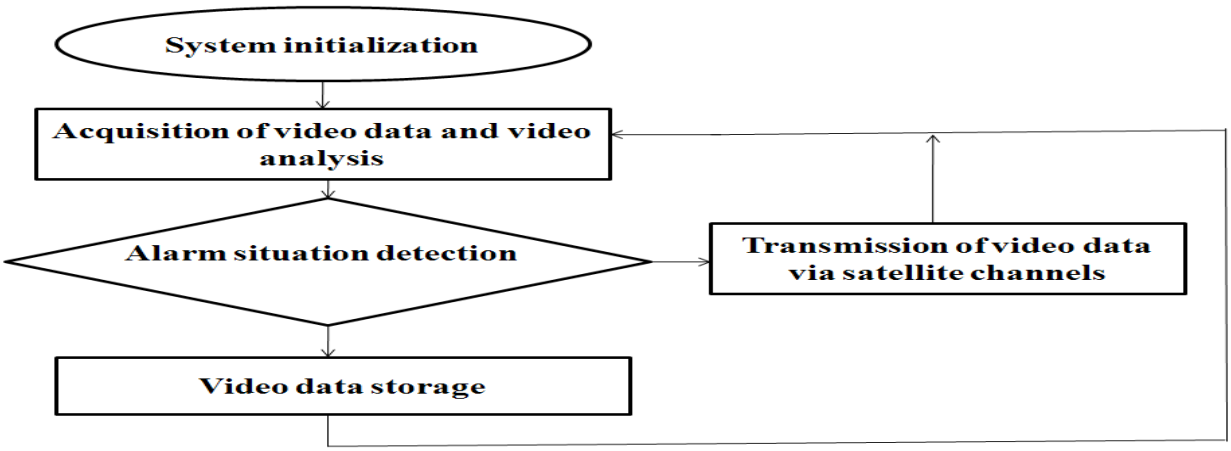

Fig. 3. The communication structure between the elements of proposed video surveillance system

Thus, implementation of proposed video surveillance system will improve safety of passengers during air flights due to the timely notification of the security services in case of any alarming situations.

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IMPACT OF MASS *MEDIA MEANS ON UPBRINGNING OF YOUTH*

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Summary: *In this paper the crucial role of mass media means and different programs is considered. Influence of qualities and educational programs on upbringing of harmonically developed youth is also regarded. Some programs and their contents are discussed.*

Key words: *means of mass media, talk shows, channels, educational programs, producing programs, organization of spare time of youth, upbringing of harmonically developed generation.*

Social- politic and social- economic reforms in our country are focused on the development of independent mass media means and especially on broadcasting, performing special role in the democratic renewal and modernization of the country in building open civil society, in the formation of democratic values in the insight of

people. Telecasting today is performed through the governmental and nongovernmental mass media means including 50 studios, 13 radio stations, 36 cable broadcasting studios. Professionalism, quality, ideological and artistic levels of programs are desirable to be improved. The main task of our TV channels is producing programs and shows which meet the requirements of the society today. Their aid is vital to the success in upbringing of youth in our country.

The problems of youngsters and youth are crucial for any society, as our president states: «youth are future of the country and the prosperity of the society of the country is in their hands".

Everybody was young, that's why everybody can say that it's very difficult to be adolescent. Everyone has different problems, but adolescent problems are special. One of the worst youth problem is schooling. Sometimes you feel bad because of teachers' or classmates' attitude to you. You are tired of studying, that's why you don't have energy and time for doing other things. Also I'd like to say that a lot of youths like to look older, that's why they obtain bad habits like smoking, drinking, taking drugs, etc. The man, who use alcohol or drugs lose his strength for the will, he brings suffering to his members of the family. Admittedly, every year three million people die of smoking and life is 25% shorter if someone smokes. Loneliness, lack of pocket money or parents' misunderstanding can inspire youth, that his best friend is a bottle or a cigarette. If we want our future generation to be healthy and strong we should produce such programs which can motivate and inspire vigor to be creative and also direct our peers to give up their bad habits.

Moreover, a youth can have bad habit because of problems in private life. None should be angry because of youth's feelings, because the boy or the girl often doesn't control his or her feelings. Streets and street bands can make a youth ruder and crueler, that's why parents shouldn't allow their children to have such interests. I know a lot of boys and girls, who think that cleaning their room is the most important problem of humanity. They think it's boring and useless, because the room will become dirty 5 minutes later. I think, youths who have mania to comps are very boring and uninteresting. You can't speak with them about something besides of «Sims» or «GTA». It's a real problem, to my mind. Every youth has a favorite singer, writer or sportsman. But no one should become a fan, because we can kill our individuality and become clones. Sometimes a quarrel between youths can lead to serious law's violations. It's very dangerous! Also bad relationships between members of the family make the youth very emotional. The youth doesn't get along with parents and relatives. Parents press on their child, they think he is iron and he doesn't feel soul ache. Parents want us to study very well; they don't understand that we do everything as good as we can. They don't respect our interests thinking that we become strange because of music or sporty.

Youth today has a lot of really difficult problems to solve. Any other problem is education. Now, when the education is fee-paying the parents must pay money if they

want their children will get higher education. So many youngsters have to work but it is difficult for them to find a job. Only skilled specialists are needed everywhere, so many youth become unemployed. They work as waiters, barmen, sellers and etc. As a rule most of the youth and youth don't read serious classical literature. We can continue the list of problems which our youth can face and the following tasks have to be solved:

- first of all, widely information of the youth about democratic transformation in political, economic, social and cultural life of our country, directed to the formation of law democratic government, open civil society, development of independent mass media means, protection of citizens' rights and freedoms;
- provision of high quality, professional and artistic level of TV and radiobroadcasting, directed to the enhancement of education and cultural level of the population, preservation of national traditions, historical and cultural heritage, the formation of democratic value in the insight of citizen, education of youth and rising generation in the spirit of patriotism, love for the motherland and respect to universal values;
- definition of the prior directions in the activity of channels, provision of their economic independence, compatibility in the market information services, implementation of market mechanism in the process of broadcasting;
- elaboration and realization of measures on further development of forms;
- media technologies in producing programs according to the modern requirements and standards;
- extensive media coverage of problems concerning participation of youth in the process of democratic renewal of the country, in holding socio-political and socio-economic reforms;
- organization of broadcasting, directed to the propagation of universal values, spiritual and patriotic education, enlightenment, education of boys and girls on the base of historical traditions of people, intellectual values, national culture, achievements of the world civilization, preparation of programs exposing inner spiritual world of the young people today;
- organization of different youth republic, international programs, festivals, acts of charity and contests directed to the formation of different active vital stand of young generation in cooperation with civic youth organization "Kamolot" and other organizations; necessity of the development of free competition of programs and creative ideas among channels directed to the improvement of the quality, artistic and professional level of TV and radio products, satisfaction of people's needs with diversified and reliable information and so on.

Of course we have a lot of programs and talk shows such as "Qorachiq", "Nuqtai nazar", "Orasta qizlar", "Bilimdon", "Nuqtai nazar" where youth can expres their ideas and initiatives and other educational programs, especially language learning programs for children for adolesens such as " English for you", "Kid's English", " Easy English" and others . Certainly these programs are very useful in solution of some youth problems, but still they are not enough to cover all problems which our youth face, as

our president states, we should focus on acquisition of information immunity in our youth as they can be able to distinguish between useful and harmful for them information. Sometimes programs proposed with the purpose of call against something can cause advertising of this negative thing or idea, and that's why programs should be selected and prepared carefully and cover the sorest points of youth. It is desirable to organize shows and programs for those who are interested in reading books and writing poems as well as those who are interested in different types of art such as painting and sculpturing. We should think how efficiently organize our children's spare time and make them more exiting and useful.

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THE REVOLUTION OF ICT IN DIFFERENT SPHERES IN UZBEKISTAN

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Summary. *This article discusses the recent ICT advancements in Uzbekistan and the growing importance of mobile communications, internet services and video surveillance (for round observations), and the prospect of IT in State services.*

Key words: *Information technologies, Mobile communication, transport sector, virtual reception.*

With the development of new technologies, Uzbekistan is also developing. Today, we can observe development in any sphere of the country.

For example, in the transport sector, new technologies such as buses with free Wi-Fi Internet, video surveillance of transport on roads were introduced. The project Wi-Fi Bus is implemented in conjunction with the national mobile operator UZMOBILE. JSC "Toshshahartranshizmat" introduces a new 4G technology in the infrastructure of urban public transport. Wireless data transfer via Wi-Fi is available on six city bus routes No: 10, 14, 24, 28, 51, 95 and operates at a specific time. During the trip, public transport passengers on specially designated metropolitan buses with a sign on the doors of "Wi-Fi BUS" have the opportunity to access and use the free high-speed 4G Internet from UZMOBILE. In the future, it is planned to equip Internet equipment with Wi-Fi with most shuttle buses to improve the quality of urban transport and create comfortable conditions for residents and visitors of the capital. Also on the roads, video surveillance of law enforcement and traffic lights was installed to eliminate traffic jams. A computerized road safety management system (the so-called project) consists of three

links: 1. CCTV cameras; 2. The dispatching center; 3. Patrol cars. CCTV cameras in Tashkent will perform three main functions:

1. Determination of the speed of the car (auto-radar);
2. Recognition of the license plate of the car;
3. Determination of the car's passage to the red light.

Important innovations were made in the medical field. Among them - a new way of surgical treatment of congenital glaucoma, developed at the Tashkent Pediatric Medical Institute of the Ministry of Health of the Republic of Uzbekistan. The result is simplification of the operation, increasing its availability, as well as reducing postoperative complications and relapses. It is also important to note that CT is widely used in medicine (computed tomography), MRI (magnetic resonance imaging), MSCT (Multispiral Computed Tomography), Ultrasoudscan are various Dopplers, Echocardiograms, etc.

Mobile communication in Uzbekistan was established in August 1991 under the foundation of the Ministry of Communications and with the support of the Government of the Republic of Uzbekistan, a joint Uzbek-American enterprise for the provision of cellular communication services - Uzdunrobita. After the solemn opening of commercial operation of cellular communication network of Uzdunrobita JV in August 1992, the first call was made President of Uzbekistan Islam Karimov. The first mobile standard of the only mobile operator in Uzbekistan was the analogue standard NMT 450. In 1997 there were 6 cellular operators. Which worked with the standard Digital AMPS (IS-136) and GSM. In September 2001, the cellular network Perfectum Mobile JV "Rubicon Wireless Communication" standard CDMA was put into operation. In 2004, a branch of Uzbektelecom Mobile was established in the joint-stock company Uzbektelecom, which since 2005 started to provide wireless radio access services in the standard CDMA-450. Since 2005, the cellular network Perfectum Mobile has started to expand its network in the regions of Uzbekistan.

Cellular communication services in the market of Uzbekistan are offered by companies - UMS (former MTS-Uzbekistan FE Uzdunrobita), LLC Unitel (Beeline trademark), JV RWC (trade mark Perfectum Mobile), FE CoscomUcell trademark) and UzMobile branch of Uzbektelecom. Mobile communication services are provided in the standards CDMA-450, CDMA 2000 1X GSM-900, GSM-1800, as well as IMT-2000 / UMTS (WCDMA).

For today, mobile services are provided in the 4G (Long Term Evolution) standards. Widely used to save electricity, solar batteries are not only in the field of mobile cellular communications also in other areas and structures.

In the field of IT - revolutionary technology can be an example of cloud computing spaces that are being implemented by Huawei.

Currently drafts of relevant decisions of the President on further improvement of the mechanism for handling appeals to the Portals are being prepared. PM.gov.uz - Virtual reception of the President of the Republic of Uzbekistan ("PM" - "Prezidentgamurojaat", "Appeal to the President"). My.gov.uz - Unified portal of

interactive public services (Single portal) is a single point of access to interactive public services provided by state bodies, including on a fee basis.

Provision of interactive public services through the Unified Portal is carried out for applicants who have passed the registration and authorization procedure in accordance with the Regulations on the Single Portal for Interactive Public Services of the Republic of Uzbekistan.

An interesting discovery in the field of engineering and transport was made at the Institute of Energy and Automation of the Academy of Sciences of the Republic of Uzbekistan. Here, a method was found for the combined production of electricity, heat and cold.

Thus, as we see from the article, much has been done and we are further developing in different spheres and in various fields that are called upon to make our life better, easier and more comfortable. Let's hope that these innovations in their sphere of application will also benefit humanity in the country in the village.

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IPTV (INTERNET PROTOCOL TELEVISION)

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Summary. *Everyone who has a computer and a broadband Internet connection can watch IPTV, but most of us don't want to watch television on a crude laptop screen. That's why the future of IPTV is likely to involve viewers buying set-top boxes that receive input from your Internet connection (either via an Ethernet cable or Wi-Fi), decode the signal, and display a picture on your high-definition, widescreen TV.*

Key words: *Internet Protocol television (IPTV), Video on demand, Time-shift, broadcast, terrestrial, satellite signal, streaming media.*

Why should someone you've never met decide what you can watch on TV and when you can watch it? True, there's always a choice of channels, but the selection is still quite limited and unless you record programs in advance, you can only watch them when they're broadcast. Wouldn't it be better if watching TV were more like browsing the Web, so you could pick the program you wanted to watch whenever and wherever you felt like watching it? That's one of the promises of IPTV (Internet Protocol Television), which uses Internet technology to deliver TV programs "on demand." How does it work? What benefits will it bring us? What challenges will the broadcasters and telephone companies face delivering these new services? Let's take a closer look!

What is IPTV?

Internet Protocol television (**IPTV**) is the delivery of television content using signals based on the logical Internet protocol (IP), rather than through traditional terrestrial, satellite signal, and cable television formats. Unlike downloaded media, IPTV offers the ability to stream the source media continuously. As a result, a client media player can begin playing the data (such as a TV channel) almost immediately. This is known as streaming media.

From a TV watcher's point of view, IPTV is very simple: instead of receiving TV programs as broadcast signals that enter your home from a rooftop antenna, satellite dish, or fiber-optic cable, you get them streamed (downloaded and played almost simultaneously) through your Internet connection. Not the kind of connection you have today, which can probably handle only 1–10 Mbps (million bits per second—roughly the amount of information in an average novel entering your computer every second!), but a broadband line with about 10 times higher bandwidth (information carrying capacity) of maybe 10–100Mbps. You watch the program either on your computer or with a set-top box (a kind of adapter that fits between your Internet connection and your existing television receiver, decoding incoming signals so your TV can display Internet programs).

From the viewpoint of a broadcaster or telephone company, IPTV is somewhat more complex. You need a sophisticated storage system for all the videos you want to make available and a web-style interface that allows people to select the programs they

want. Once a viewer has selected a program, you need to be able to encode the video file in a suitable format for streaming, encrypt it (encoding it so only people who've paid can decode and receive it), embed advertisements (especially if the program is free), and stream it across the Internet to anything from one person to (potentially) thousands or millions of people at a time. Furthermore, you have to figure out how to do this to provide a consistently high-quality picture (especially if you're delivering advertising with your programming—because that's what your paying advertisers will certainly expect).

IPTV services may be classified into three main groups:

- Video on demand (VOD): browse and view items in a stored media catalogue.
- Time-shifted media: e.g. catch-up TV (replays a TV show that was broadcast hours or days ago), start-over TV (replays the current TV show from its beginning);
- Live television and live media, with or without related interactivity;

The first kind—and the one you're probably using already—is called video on demand (VOD). With a service such as Netflix (an online movie website), you select a TV program or movie you want to watch from a wide range, pay your money, and watch it there and then. Some of the world's more enterprising TV broadcasters are offering a different kind of IPTV. In the UK, the BBC (British Broadcasting Corporation) makes its last week's programs available online using a web-based streaming video player called the BBC iPlayer. This kind of service is sometimes called time-shifted IPTV, because you're watching ordinary, scheduled broadcasts at a time that's convenient for you. The third kind of IPTV involves broadcasting live TV programs across the Internet as they're being watched—so it's live IPTV or IP simulcasting. All three forms of IPTV can work either using your computer and an ordinary web browser or (for much better quality) a set-top box and an ordinary digital TV. All three can be delivered either over the public Internet or through a managed, private network that works in essentially the same way (for example, from your telephone and Internet service provider to your home entirely through the provider's network).

What is the "Internet Protocol" in IPTV?

IPTV stands for Internet Protocol TV—but what does "Internet Protocol" mean? It's the essence of how the Internet works.

Send an email to a friend or download a web page and the information you set in motion doesn't travel in one big lump, as you might expect. Instead, it's broken up into lots of small pieces, known as packets, each of which may be "switched" (sent) to its destination by a different route. Packet switching, as this is known, is the basic principle of how any information travels over the Internet. The computers that link the Net together don't know what any given packet means or what it does. All they know is the IP address (a numeric "house and street name" given to every computer on the Internet) where the packet has to go—and they treat all packets equally.

How does IPTV work?

With traditional TV, programs are broadcast by being turned into radio waves and beamed through the air to a rooftop antenna on your home. The antenna converts the waves back into electrical signals and your TV set decodes them to make its sound and

picture (satellite TV works the same way, except the signal bounces into space and back, while cable TV sends the signal directly into your home without radio waves).

Viewing programs

Everyone who has a computer and a broadband Internet connection can watch IPTV, but most of us don't want to watch television on a crude laptop screen. That's why the future of IPTV is likely to involve viewers buying set-top boxes (sometimes called STBs) that receive input from your Internet connection (either via an Ethernet cable or Wi-Fi), decode the signal, and display a picture on your high-definition, widescreen TV. STBs are effectively standalone computers programmed to do only one thing: receive packets of streamed video, decrypt them, convert them back to video files (MPEG2, MPEG4, or whatever format they were in originally), and then display them as high-quality TV pictures. Apple TV works broadly this way, using a set-top box to run simple apps on a slimmed-down operating system (tvOS), which manages the process of streaming video via the Internet.

The future of broadcasting?

There's no great clamor from ordinary TV viewers for IPTV, although that's not unusual where new inventions and innovations are concerned; no-one can truly appreciate something they haven't yet experienced. But the huge popularity of VOD websites such as BBC iPlayer and time-shifting personal video recorders (PVRs) such as TiVO (and Sky+ in the UK) strongly suggest TV will move increasingly away from broadly defined channels and rigid schedules to more narrowly focused, pay-per-view programming.

Even so, consumer demand won't be the main driving force in the transition from 20th-century broadcast TV to 21st-century IPTV—at least, not to begin with. In the last decade or so, traditional telephone, companies, faced with competition from cable-based rivals, have had no choice but to redefine themselves as information service providers, offering Internet connectivity as well as phone services. The more powerful and enterprising among them now see a further business opportunity by redefining themselves so they offer telephone, Internet, and TV services simultaneously. Cable companies already offer all three services in attractive bundles; IPTV makes it possible for telephone providers and broadcasters to join forces and compete. In the longer term, who knows whether people will even regard TV, telephone, and the Internet as separate entities, or whether they will continue to converge and merge?

With luck, IPTV may take off in exactly the same way as broadband Internet did in the early 2000s: back then, as more people used the Internet, they felt hampered by the limitations of dial-up connectivity, demanded (and showed they were willing to pay for) higher-quality broadband, and provided enough revenue for the telecommunications companies to upgrade their networks. Once viewers start to experience the convenience, control, and interactivity of IPTV, higher bandwidth Internet connections that make it possible seem certain to follow.

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ELECTRONIC GOVERNMENT - DYNAMIC DRIVER OF THE FUTURE OF UZBEKISTAN

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Summary: *This article reflects the connection between government and human rights. It contains the revolution of e-government as well as the planned future strategies of this facet. The principal objective from all provided conditions implied is to bolster the welfare of society.*

Key words: *normative-legal acts, submission of tax, statistical reporting, democratization of society, virtual receptionist, electronic visa.*

Kim Nam Seok, the Korean ICT expert, who worked as the assistant of Minister of Information technologies and communications of the Republic of Uzbekistan, mentioned about the implementation of the Program for the development of a modern and based on best practices of e-government system for the period until 2020, which was adopted on the initiative of the first President Islam Karimov. It is reported that at this stage there have already been achieved positive results, including the functioning of the Single portal of interactive state services rendering over 300 modern services. It is noted that since the beginning of 2016 the number of applications increased by 2 times and amounted to 800 thousand. Previously, the state had to spend more resources to provide these services manually.

The publication reports that the electronic evaluation system of intervention of legislative acts has become another effective tool for citizens and business participation in public decision-making. So, through this system more than 1,400 publicly available comments and proposals have been received and more than 800 normative-legal acts half of which was taken into account when approving the regulations.

“Commissioning of the new national open data portal, which was used more than 630 thousand times, has become an important tool for the development of business start-ups. The portal includes 1750 sets of public data provided by 109 organizations”, - continues The Financial Times. The article notes that submission of tax and statistical reporting, processing of customs declarations, registration of businesses and trade names, running the system “Electronic visa” became the most popular online services. At the same time, it is effectively functioning single mechanism of electronic trading on public procurement, electronic filing of claims and applications from entrepreneurs in economic courts, by the country's “one-stop” centers for the collection of documents when applying for government services. Thus, citizens and business entities have access to the most relevant and popular public services through monitors or smart phones.

“Today, in the country with a population of over 32 million people, 60% of which are youth, cellular communication is used by 21 million, and the internet - by more than 13 million people, says the publication. As a result of large-scale measures, which were adopted in the country, Uzbekistan has significantly improved position in 2016 UN ranking of on the level of e-government development, entering the 40% of the most advanced countries of the world and took 80 place among countries that use e-government, as well as the 47th place for e-participation index which assesses the effectiveness of the government dialogue with their citizens and businesses. In Uzbekistan this indicator is on the 3rd place among the CIS countries and the first among the Central Asian countries.”

“September 25, 2016 to create a virtual desk of the Prime Minister (pm.gov.uz), which dramatically improved the interaction of the population with the state authorities and has been part of the progressive democratization of society in Uzbekistan, says the source. Now, the population and business entities may apply directly to the Prime Minister with the unresolved problems, statements, complaints or suggestions instantly without any costs and a digital signature. The call center does not require personal information such as passport number, only the phone number is enough.”

It is noted that the virtual desk allows you to promote gender equality among applicants, and enables people with disabilities to use the portal via the phone number and contact the call center orally. It is emphasized that the benefits of Virtual receptionist obvious. This increase in public trust and reliability, ensuring the national approach to solving problems, the implementation of reforms on the basis of “bottom-up”, transparency and prevention of corruption. These factors, in turn, contribute to the gradual openness and transparency at all levels of power.

The Financial Times also informs about the future plans for the development of virtual reception of the Prime Minister, which include the connection of regional and subordinate units of government agencies, as well as the regional prosecutor's offices. “This portal is intended to contribute to the improvement of institutional reform and should be a common platform for the public, as well as a friendly system for the population and businesses. With a commitment to the further development and innovation, Virtual Receptionist expects to be included in a UN report in 2018 as an exemplary model in terms of providing public services among the countries of the world,” the article says.

In conclusion the British edition emphasizes that e-government contributes to strengthening representative democracy and government transparency, and is an ongoing and dynamic driver of the bright future of Uzbekistan.

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ACQUAINTANCE OF KIDS WITH THE ANIMAL WORLD THROUGH PROGRAMS

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Summary. *Thesis focuses on theories and methods that explain the reasons for various learning difficulties and purpose activities with element of movement as a possible help. A training program for children has been developed.*

Key words: *Internet , mind, technologies, app, flashcards, action games, board games, word games, online games, pronunciation, photographs, domestic animals, forest animals, insects animals, under water animals, verification, incentive.*

Whether you are a teacher or a parent, you want the best for your child or student. This is true everything and so, of course, learning is no exception. Choosing the best sources for your kids or young student to use to learn from is of utmost importance.

Teaching children is not an easy task and it is a great responsibility. There are a few things to keep in mind, though. Kids learn and remember faster. The sooner they start learning a new language, the sooner they will become fluent.

If you want your children to have the best starting point when they are learning English, you need to use the best of the Internet and new technologies. There are a lot of apps designed especially for teaching kids English.

But there is a catch – if children learn something wrong from the start, chances are it will stick forever.

Brain Gym is a quite well known method of teaching, especially with younger students. The basic idea is that brain and body movement is interrelated and that the brain will function well if it is provided with certain movement patters.

Children learn naturally when they are having fun. Flashcards are a great way to teach and revise vocabulary and there are many different games which you can play with flashcards, such as Memory, Kim's game, Snap or Happy Families.

There are many other types of games you can play with your children to help them practice English.

- Action games
- Board games
- Word games
- Online games

Songs are a really effective way to learn new words and improve pronunciation. Songs with actions are particularly good for very young children as they are able to join in even if they are not yet able to sing the song. The actions often demonstrate the meaning of the words in the song.

There are many fun, songs on Animal for Kids which you can listen to with your children.Together with your child, you can watch wonderful images of different animals, all while learning their names and listen to the animals' unique sounds!

These carefully selected photographs allow your child to not only learn the names of the various animals, but also glimpse into the animal's beautiful world and everything it offers!

After your child looks over and experiences the animal flashcards, there is a fun game waiting for them, which tests how much they've understood. Regardless of the number of correct answers, the player earns stars and young talent is rewarded with thunderous applause and balloons!

In the app, the animals are divided into four groups: "domestic animals", "forest animals", "insects animals", "under water animals" (animals that live in Asia, Africa, the Arctic, and Antarctic).

A significant feature of this app is that there are no unrealistic drawings. Instead, full-length beautiful pictures are used that resemble actual animals (as they look in real life), which helps the child easily remember their names and features.

If you have older children in primary school. So, this educational game will also come in handy for them.

Playing these types of games with flashcards has been proven to aid students in quickly learning a foreign language. They can discover new words and are able to easily impress their teachers and classmates!

The principle of the game is very simple: select category and the kid looks at the real photos, pictures, animals of this category, listening to what they are called and what sounds they make. Also, the child will always be able to test their knowledge with an interesting verification system that allows playing, learn and consolidate the knowledge acquired in the course of the study. And the prize at the end, with the correct answers will be a great incentive!

Your child doesn't even need to know how to read with this app! Its simple interface and voice prompts allow even the youngest kid to play and learn the names of the animals by themselves! After playing the game, be sure to visit the zoo or pet store with your child – you'll be happy and impressed as they present their newly acquired knowledge of all the animals they see!

Experience has shown that for most children, viewing and learning from bright and vivid images becomes a favorite pastime and having them play this game often reinforces their knowledge. According to Glenn Doman, an American physical therapist and founder of the "The Institutes for The Achievement of Human Potential", training just 5 - 10 minutes a day stimulates the development of various parts of the brain. This allows for the development of a photographic memory, which means your could can develop faster than her or his peers, and become more open to the vast knowledge of the world.

Features:

- high quality game for toddlers and preschool kids from ages 0 to 7 years old with the cutest animals

- easy to use and control
- fun for children of all ages, babies, preschoolers, school children and pre-teens, designed for preschool boys and girls
- learn to recognize animals of the jungle and savannah and their sounds
- simple for toddlers and babies with increasing difficulty
- play with your child or let them play alone
- use it to keep your baby or toddler occupied

The program is developed in the environment Builder and the database is created in the Microsoft Access environment.

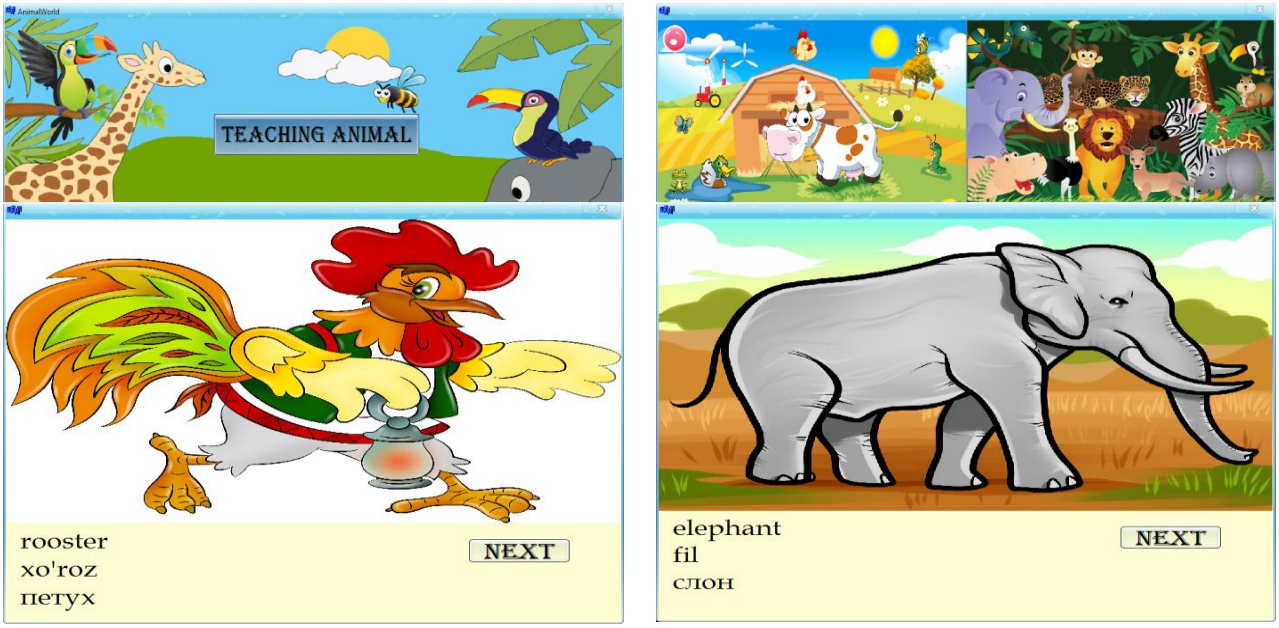
Application interface:

-main menu;

-teaching words;

-finding translation;

-finding photo animals;



Picture 1. Interface of program.

Children well remember the word with images, sounds and games. In kindergartens, lessons are held with books, if the lesson is taught with computers and smartphones, children are better able to remember the lessons. We offer a program in which children get acquainted with the animal world. The program is developed for computers in the future will be developed version for smartphones and phones. In the future, we will create an electronic version of all English books for kindergarten children.

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TECHNOLOGICAL REVOLUTION OF UZBEKISTAN

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Summary. *Study of the latest research reports shows dispute on the innovative potential in the IT industry. Although spending Uzbek companies on IT are growing steadily. At the same time, IT has grown enough in e-government that innovation in e-government should not be discussed without IT. The results obtained from researches allow establishing the modern requirements and expectations of the IT industry and indication of current, critical success factors of IT projects in Uzbekistan. On the basis, the directions of changes to boost the degree of success of IT projects are indicated in the article, thus giving a chance to restore the role of the IT industry as a leader of innovation for companies.*

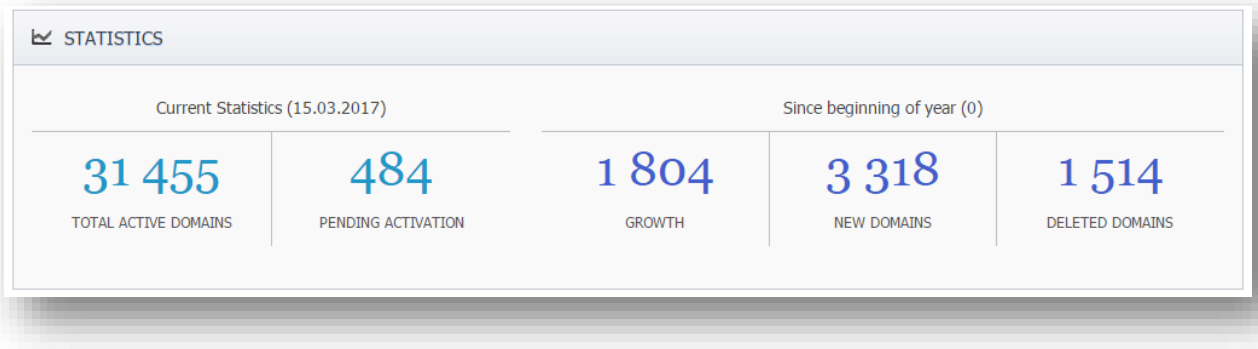
Keywords: *IT innovation, IT projects, development of IT, automated information system, role of IT.*

The last few years point to the inherent link between innovation activities in business and the development of information technology. IT products have become for many companies foundation on innovation processes, models of collaboration, customer service, information, etc. Entering conceptions, such as "Internet", "e-mail", "e-education", "e-managing", "e-government", "Distance education", "Open education", "Informated economy" to our lives are effecting intensively to inform our society. The key role in the globalization of our national economy plays IT. It is expected from IT staff to propose and create the latest IT projects in demand of company, in order to make it innovative.

In research reports in recent years, however, appears increasingly comprehending the necessity of IT programs. Majority of countries are developing their plans on basic of IT. Ever since was independent in 1991, Uzbekistan also has been at the forefront of computer development and IT revolution.

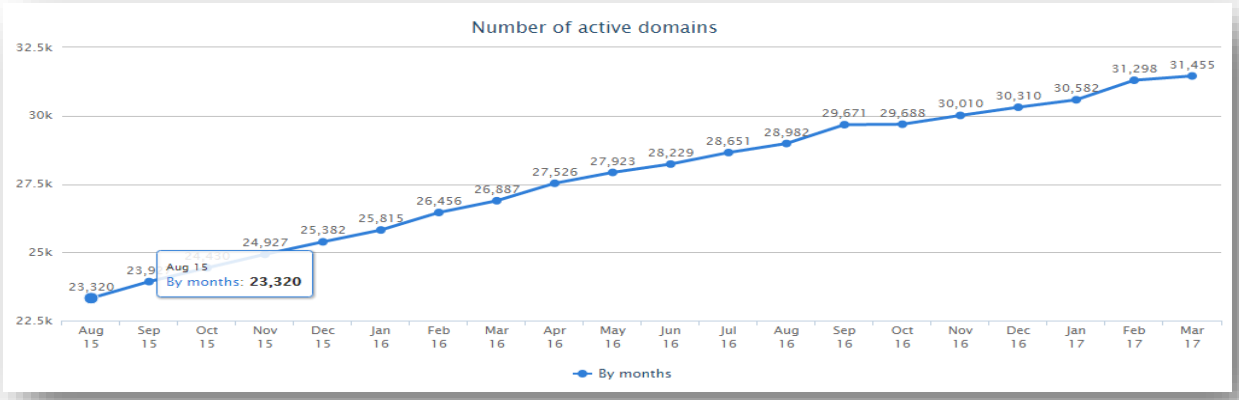
Nowadays, lots of work, measures are carrying out for development of Information Technologies and Communications in Uzbekistan. There are implemented

a lot of works to automate government works. Especially, amount of works are being implemented for automating that is simplifying their works in all spheres. We, youth with the aim of improving and contributing to the works of all spheres are trying to create our available and useful projects.

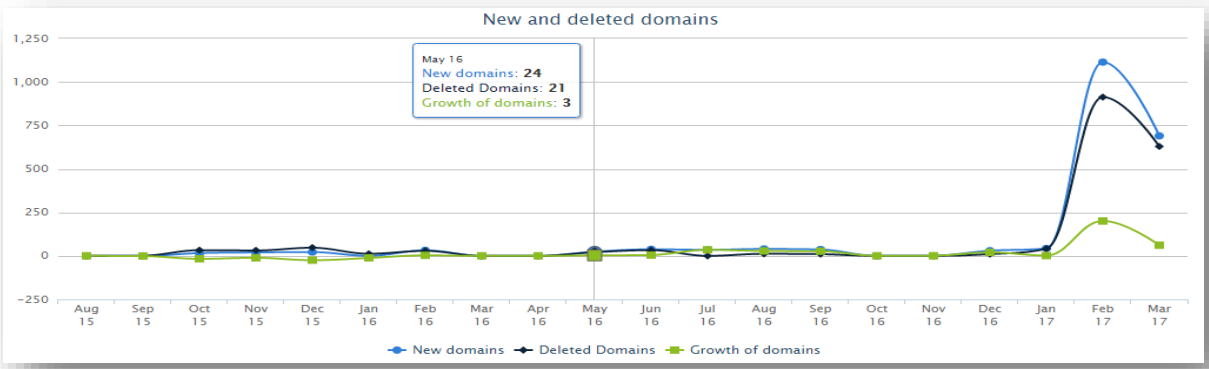


Picture №1 Statistics (resource: https://cctld.uz/?lang=eng)

The era of entrepreneurship closely related to innovation gives the dynamics of the IT market. Key factors in the development of the IT market in Uzbekistan in 2011 is nearly 20% increase in awareness of the needs of IT. Analysis of the results of numerous reports indicates a continuous increase in spending money on IT in Uzbek companies. The rate of this increase was a big because it was necessary nearly for all companies to have its own websites, databases, etc. This increase was mainly developed by the software market, not the hardware market, as it did in previous years. Companies increasingly recognize the need for software as a source of innovation and not only expansion of technical-hardware facilities. The result has been 11% increase in investment in this area.



Picture №2 Number of active domains (resource: https://cctld.uz/?lang=eng)



Picture №3 Statistics (resource: https://cctld.uz/stat/)

In opposition to these growth trends, presents the results of research on the success of IT projects. More than half of IT projects fail. Despite the growing trend of projects successfully completed, the percentage of IT projects completed with full success still is not satisfactory, only 35%. Among the reasons for this is given excess one of four basic parameters of the project: time, budget, scope or quality. These factors are only general guidelines. Detailed reasons are possible for disclosure through in-depth, qualitative research methods, for example from interviews, observations.

Analysis of the results of mentioned reports indicates the need for the emergence of a new trend going from building up in the direction of consulting. This phenomenon will result in the need for both the evolution of roles in IT, as well as the revaluation of the place and role of customer in the IT projects. Therefore, the investigations undertaken were divided into two parts connected with them in scheduled thematic are as:

– IT projects and staff,
– client and its place in IT projects.

In the face of modern growing demands and requirements for IT and rapidly changing market conditions, the approach to IT projects must constantly evolve. Today's business world in the era of innovation not only expects from IT technical innovations, but systems tailored to current needs. It needs inclusion in the rapidly changing market conditions and environment, which translates into the need for flexibility in the implementation of IT projects.

Today customers expect customization of IT products to the dynamically changing characteristics of their needs. Under these conditions, companies recognize the need to move away from templates and schematic in IT projects. Large individual scope, uniqueness and variability exclude repeatability of the IT projects.

The surveyed companies acknowledged explicitly that:

– use of proven methodologies for IT project management,
– continuous improvement of mechanisms and design technology of IT,
– technical training of staff,

not produce the expected results in the increased number of successful projects.

Identified the real causes of IT project failures. These include lack of: awareness of the role of the client, the main management support and clearly defined

requirements. Other factors were mentioned, but the three were found to be most significant. At the same time, observations showed that awareness of the role of the customer and the ability to create his proper place in the IT project is foreground, a critical success factor. Many times, it would prejudge the success of IT projects.

Summing up the above information obtained from research, you should understand that the key to success in IT innovation, it is no longer improving technologies, tools and methods, but a switch to the customer, enabling it to cooperate. This approach, however, will require a whole series of changes in the mentality of IT teams and their methods of work.

I step to my future aim with working on automatization the works which are developing day by day. And it is existed a plan to perfect IT in a top level. There a lot of constructions for making easy the people's life and it is important to create a suitable program. It means that we need a nesessity to these programs. It is considered that such kind of automatization is one of the most important factor of the development of country and society.

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THE ROLE OF SYNCHRONOUS AND ASYNCHRONOUS LEARNING STYLE

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Summary. *Interactive technology empowers students to discover their own resources and take control of their learning, choosing the way they investigate and present projects as well as developing essential research skills for the future.*

Key words: *Synchronous, asynchronous, hybrid, online courses, computer-based training, E-learning.*

A variety of descriptive terms has been employed (somewhat inconsistently) to categorize the extent to which technology is used. For example, 'hybrid learning' or 'blended learning' may refer to classroom aids and laptops, or may refer to approaches in which traditional classroom time is reduced but not eliminated, and is replaced with some online learning.['Distributed learning' may describe either the e-learning component of a hybrid approach, or fully online distance learning environments.

E-learning may either be synchronous or asynchronous. Synchronous learning occurs in real-time, with all participants interacting at the same time, while asynchronous learning is self-paced and allows participants to engage in the exchange of ideas or information without the dependency of other participants′ involvement at the same time.

Synchronous learning refers to the exchange of ideas and information with one or more participants during the same period. Examples are face-to-face discussion, online real-time live teacher instruction and feedback, Skype conversations, and chat rooms or virtual classrooms where everyone is online and working collaboratively at the same time. Since students are working collaboratively, synchronized learning helps students create an open mind because they have to listen and learn from their peers. Synchronized learning fosters online awareness and improves many students' writing skills.

Asynchronous learning may use technologies such as email, blogs, wikis, and discussion boards, as well as web-supported textbooks, hypertext documents, audio video courses, and social networking using web 2.0. At the professional educational level, training may include virtual operating rooms. Asynchronous learning is beneficial for students who have health problems or who have child care responsibilities. They have the opportunity to complete their work in a low stress environment and within a more flexible time frame. In asynchronous online courses, students proceed at their own pace. If they need to listen to a lecture a second time, or think about a question for a while, they may do so without fearing that they will hold back the rest of the class. Through online courses, students can earn their diplomas more quickly, or repeat failed courses without the embarrassment of being in a class with younger students. Students have access to an incredible variety of enrichment courses in online learning, and can participate in college courses, internships, sports, or work and still graduate with their class.

On the other hand, the technological convergence of the mass media is the result of a long adaptation process of their communicative resources to the evolutionary changes of each historical moment. Thus, the new media became (plural) an extension of the traditional media on the cyberspace, allowing to the public access information in a wide range of digital devices. In other words, it is a cultural virtualization of human reality as a result of the migration from physical to virtual space (mediated by the ICTs), ruled by codes, signs and particular social relationships, inside and outside classroom. Forwards, arise instant ways of synchronous and asynchronous communication, interaction and possible quick access to information, in which we are no longer mere senders, but also producers, reproducers, co-workers and providers. New technologies

also help to “connect” people from different cultures outside the virtual space, what was unthinkable fifty years ago. In this giant relationships web, we mutually absorb each other’s beliefs, customs, education, values, laws and habits, cultural legacies perpetuated by a physical-virtual dynamics in constant metamorphosis.

Computer-based training (CBT) refers to self-paced learning activities delivered on a computer or handheld device such as a tablet or smartphone. CBT initially delivered content via CD-ROM, and typically presented content linearly, much like reading an online book or manual. For this reason, CBT is often used to teach static processes, such as using software or completing mathematical equations. Computer-based training is conceptually similar to web-based training (WBT) which are delivered via Internet using a web browser.

Numerous types of physical technology are currently used:[75][76] digital cameras, video cameras, interactive whiteboard tools, document cameras, electronic media, and LCD projectors. Combinations of these techniques include blogs, collaborative software, ePortfolios, and virtual classrooms. The potential utility of technology to assist with facilitating perceptions of social presence in online learning environments has recently been noted

Radio offers a synchronous educational vehicle, while streaming audio over the internet with webcasts and podcasts can be asynchronous. Classroom microphones often wireless can enable learners and educators to interact more clearly.

Video technology has included VHS tapes and DVDs, as well as on-demand and synchronous methods with digital video via server or web-based options such as streamed video from YouTube, Teacher Tube, Skype, Adobe Connect, and webcams. Telecommuting can connect with speakers and other experts. Interactive digital video games are being used at and higher education institutions.

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VIRTUAL TRAVELLING WITH UNITY 3D

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Summary. *The paper is about advances of programming technologies. The use and application of different programming languages in different spheres according to the implementation of the program is described. Increasing demand to the development of variety number of software is mentioned. Some challenges in developing graphic*

programs as well as special software for the development of graphic programs are given. Organization of virtual travelling with 3D models are presented in details.

Key words: *3D, unity, 3ds Max, modeling, environment, software, graphic programs.*

Graphic programs might be of different forms, i.e. many directions exist in computer graphics. Generally, they can be divided into 2D and 3D graphical directions. Nowadays 3D graphics are getting more popular as 2D is far from reality.

In order to create 3D graphics, initially, the work should be started from 3D modeling. 3D modeling means creating 3D models of an object in computer.

In short, 3D modeling is using programming languages and software in elaboration of 3D modeling.

Ready made software are considered to be more efficient in developing 3D modeling. It facilitates creating objects and makes the procedure faster and easier.

Programs ”3ds MAX” and ”Maya” of Autodesk company are well-known examples of 3D modeling software. As this software programms have multitask capabilities they can be used in creatng of any 3D models.

After performing 3D modeling should be linked with the program and then programming language should be used to develop the program.

Common programming languages used in 3D modeling are C/C++, Java, Python, JavaScript, C# and others. Programming code must be written in translator in order to transform ready 3D models into the software.

However, it requires writing of many codes. Series of graphic software were developed for optimization of this procedure.

The most appropriate software in developing 3D software products and games is ”Unity 3D”, which was developed in 2005 .

Ready 3D models can be downloaded in ”Unity” and then combined with script codes created with programming languages C# or Javascript.

It is convenient to work with ”Unity 3D”: possibility to copy and store necessary materials automatically in one catalogue, writing script codes separately and then combining the with objects, easy observation of preparing software product, and what is more, it has a possibility to compile the program for many platforms.

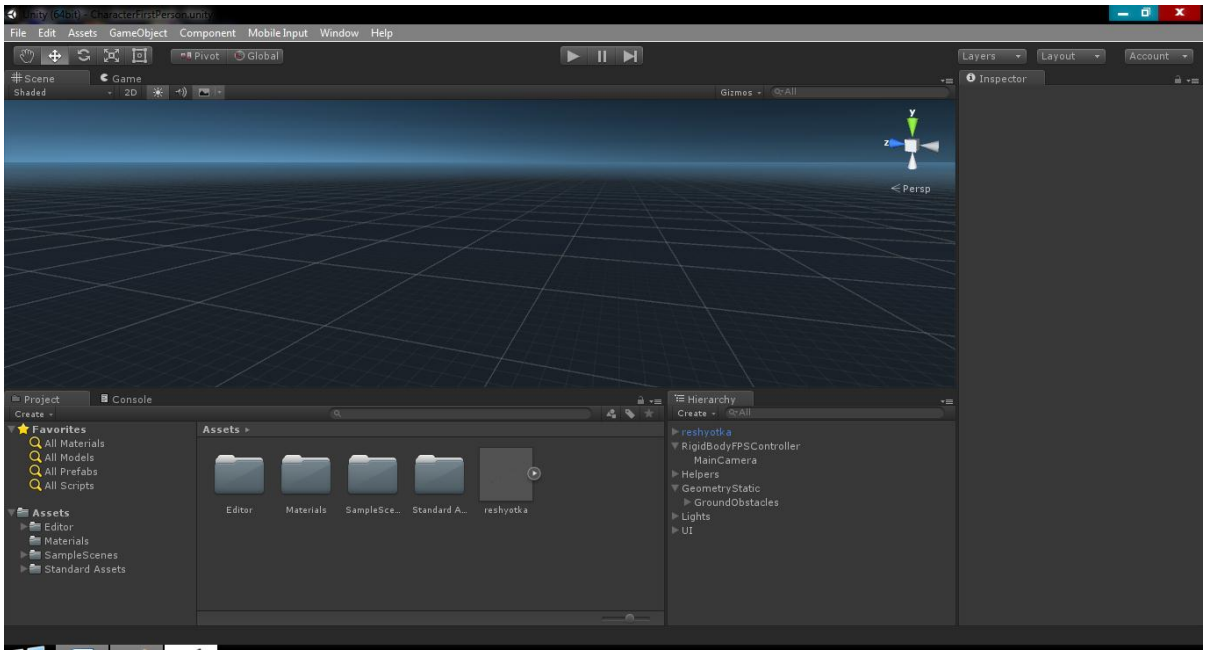
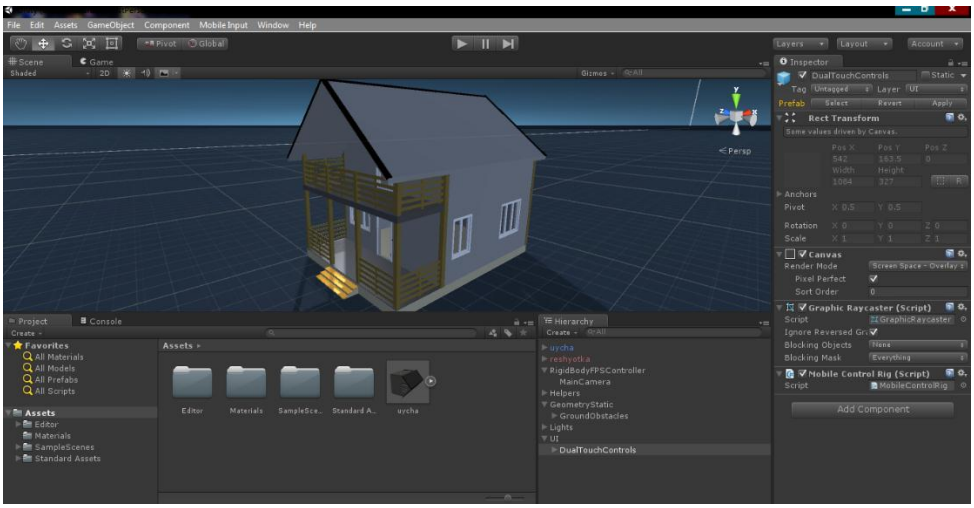


Figure 1. *Owerview of Unity window.*

To develop of our program we download elaborated 3D models into ”Unity” and then place it on the main field. (Figure 2). Let’s suppose, in our program there is a little house and chance to take a walk through it. Therefore we call our program ”3D trevelling”. We build moving object and write script code with programing language C# to expirience trevelling. (Figure 3).



(Figure 2). Location of 3D house in ”Unity”

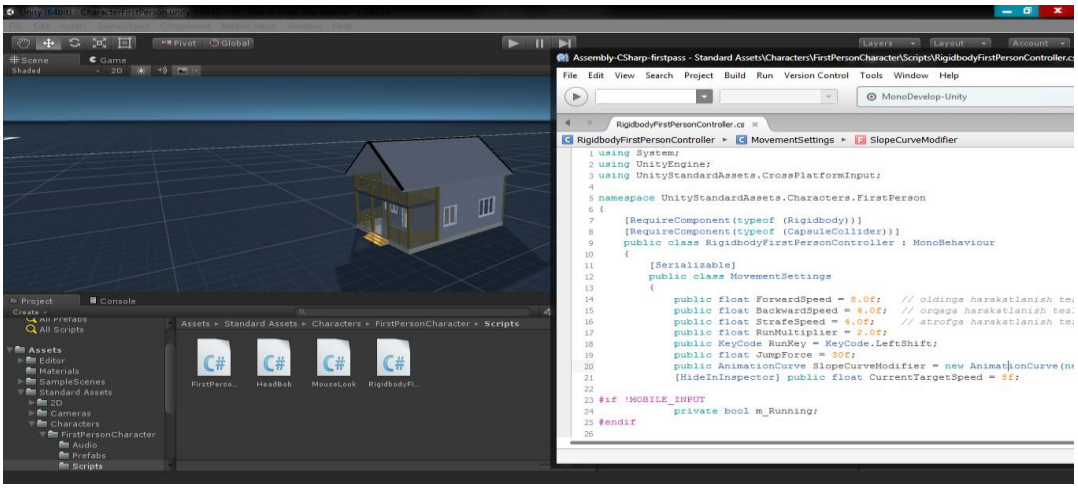


Figure 3.Writing codes in *C# for motion.*

After completion the work on the program we can compile it for the following platforms:

– Linux, Windows, Mac shaxsiy kompyuterlar uchun; for Linux, Windows, Mac PCs

– iOS, Android va BlackBerry telefonlari uchun; for iOS, Android and BlackBerry phones;

– Windows Store va Windows Phone uchun; For Windows Store and Windows Phone

– WebGL ko'rinishida; WebGL figure

– Tizen, Xbox uchun; for Tizen, Xbox

– PlayStation 3 va 4 lar uchun; for PlayStations 3 and 4

– Samsung TV televizorlari uchun. for Samsung TV sets

The possibility to compile for many platforms and devices at the same time is one of the most important features of "Unity".

Developed above program can be compiled for any desired platform. (Figure 4).

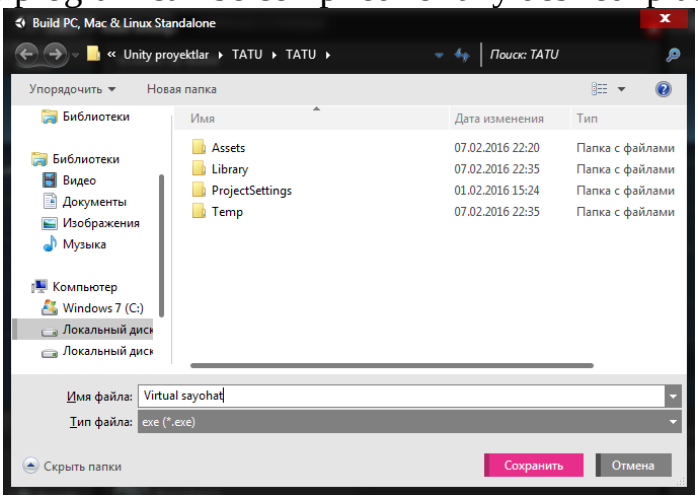


Figure 4. Compilation of 3D program in **.exe format.*

Unity 3D dasturi yordami Toshkent axborot texnologiyalari universitetining 3D modelini ishlab chiqaramiz hamda uni namoyish qilamiz. Bunda 3D modellar orqali biz TATU binolarida virtual sayohat qilishimiz mumkin.

Using Unity 3D program we will create 3D model of TUIT and demonstrate it. We can trevel through TUIT campuses vitually.

THE ROLE OF E-GOVERNMENT IN TECHNOLOGICAL REVOLUTION OF UZBEKISTAN

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Summary. *Thus, the domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.*

Key words: *e-document, e-government, ICT, Ziyonet, new innovations*

What is technological revolution? Technological revolution is, in general, a relatively short period in history when one technology (or better a set of technologies) is replaced by another technology (or by the set of technologies). As Nick Bostrom wrote: “We might define a technological revolution as a dramatic change brought about relatively quickly by the introduction of some new technology.” It is an era of an accelerated technological progress characterized not only by new innovations but also their application and diffusion.

A difference between technological revolution and technological change is not clearly defined. The technological change we could see as an introduction of an individual (single) new technology, while the technological revolution as a period in which more new technologies are adopted at the almost same time. These new technologies or technological changes are usually interconnected - as 3rd Kranzberg's law of technology says: "Technology comes in packages, big and small."

From the first days of independence Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society.

Over a short period the authorities created the legal framework conducive to further formation and progress of market of IT-technologies.

In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. President's Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21, 2012 and "On further development of computerization and introduction of information and communication technologies" dated May 30, 2002, became important documents in this direction.

At present the Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented. This program was approved by President's Resolution dated June 27, 2013.

Making a statement at enlarged meeting of the Cabinet of Ministers dedicated to the socio-economic development in 2015 and the most important priorities of economic program for 2016, President Islam Karimov noted that in today's conditions in the era of Internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation of system "Electronic government" are of priority significance. As the head of our state underlined, development of ICT has a direct impact on the level of competitiveness of the country, allows you to collect and summarize vast amounts of information, offers great opportunities for management at strategic level.

The task of regular improving of the governance, strengthening the capacity of IT-industry was entrusted to the Ministry for development of information technologies and communications, created by the Resolution of the Head of our state dated February 4, 2015. In addition, since 2002 a Centre for development and introduction of computer and information technologies UZINFOCOM operates, which assists in the development and implementation of national programs of computerization and introduction of ICT in all sectors of public administration, economic and social spheres.

Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy.

The basis for development of ICT in Uzbekistan is the telecommunications infrastructure. The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services.

Over the past 20 years in many regions of the country more than 2,000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high-speed Internet, watching HDTV-channels and others. Due to the measures taken in 2015, the overall rate of use of international information networks increased by 42.3% compared to 2014 and amounted to 15.5 Gb/s.

Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT.

In 2014-2015 Program of development of broadband access networks on Wi-Fi technology has been implemented successfully in the Republic of Uzbekistan. As a

result of comprehensive measures at airports, railway stations, places of frequent-stay travelers, parks, shopping malls and other public places of the capital and each administrative center of republic Wi-Fi points have been created.

The high development rates of national Internet segment should be separately noted. Uzbekistan has 10.2 million web users. According to UZINFOCOM center, in January 2016 the number of websites in the UZ zone exceeded 25 thousand, while growth totaled more than 30% compared to same period of last year.

The use of ICT and software products in the management and production processes plays a major role in the development of sectors of the economy and the domestic industry. For instance, in 2014-2015 in the framework of a special state program 86 projects have been realized in order to introduce information systems in large joint-stock companies, associations and organizations totaling more than 330 billion soms.

Particular attention is paid to development of national market of software products. In order to stimulate domestic programmers the National register of software developers has been created, which already included 69 companies. A directory of software manufacturers Software.uz has been developed that provides necessary information to citizens and businesses.

According to the Resolution of the President of the Republic of Uzbekistan "On measures to further strengthen the incentives of domestic software developers" dated September 20, 2013 new benefits and preferences for members of software industry were introduced. Thus, they are exempt from customs duties for imported equipment for their own use, components, parts, technical documentation and software until January 1, 2017.

It is known that interactive public services are of particular importance in protection of human rights and freedoms, saving time and expenditures for obtaining necessary information and services.

A consistent work on formation of "Electronic government" is carried out in the country. The activity of the Governmental portal of the Republic of Uzbekistan (gov.uz) and the The single portal of interactive state services (SPISS), located on the Internet at my.gov.uz, has been established.

Functional of SPISS expands dynamically, 235 kinds of interactive services are being rendered through it. Over the past five years this system received in total more than 200 thousand electronic applications of citizens and businessmen. Making an online appointment with the heads of government agencies, receipt of information on their activities, various inquiries and sending requests became popular. In January 2015, the portal has launched a new system for discussion of draft legal acts related to business activities, and evaluation of existing documents. To date, 80 draft laws have been discussed through this system, 9 of them have been improved taking into account the opinions of citizens. At this time, the discussion of more than 20 legal acts continues.

Information system E-Sud for electronic proceedings is functioning effectively since 2004. Through its implementation, procedures such as keeping registration books, document management within court, direction of judicial notifications and procedural

acts, familiarization of sides with case are completely automated now. All educational institutions of the republic are connected to ZiyoNET network, which is functioning since 2005.

In the library of portal, which was updated in 2014, has more than 75 thousand units of informative-educational resources, including textbooks, dissertations, research papers and others.

As part of implementation of resolution of Head of our state "On measures on further improvement of foreign language learning system" dated December 10, 2012, "Foreign Languages" section has been created on ZiyoNET, which includes over four thousand materials such as textbooks, interactive lessons, games, relevant video and audio.

The country regularly hosts major events dedicated to the development of hi-tech industry. In particular, Week of information and communication technologies ICTWeek Uzbekistan is being held since 2004. Traditionally it is opened with national exhibition of information technologies ICTExpo, which takes place once in two cities - Tashkent and Samarkand. The exhibition presents existing and future forms of ICT-based services, oriented to business community and authorities, and general population. Among the important events of the week - The Forum for Information and Communication Technologies ICTForum, wh ere representatives of leading companies, industry experts and foreign experts discuss state and prospects of progress in this sphere.

As part of the week conferences BestSoft Uzbekistan are also being held, during which they demonstrate the latest achievements of software developers, and e-Government Uzbekistan dedicated to the strategic objectives in the field of "e-government", results of implemented projects, exchange of experience and ideas in this direction.

Training of personnel in the development of ICT sector is topical. Currently, major domestic centers of integration of education, science and industry - Tashkent State Technical University (TSTU) and Tashkent University of Information Technologies named after Mukhammad al-Khwarizmi named after Mukhammad al-Khwarizmi (TUIT) - train specialists in technical direction and for IT sector. In 2013, TUIT opened two new master's direction - management of the system "Electronic Government", and library science. At the same time, these universities carry out scientific research on the basis of active cooperation with leading industrial enterprises of the country.

From October 1, 2014 the branch of the prestigious South Korean INHA University began its activity in Tashkent. Professionals in areas such as computer and software engineering, computer network engineering are trained here.

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INNOVATIONS FOR THE SAKE OF HUMAN'S INTERESTS

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Summary. *Effect of innovations, modern technologies and systems on our state's economy, education system and on other spheres is considered in this article. They ameliorated people's life significantly and led out our state to the global level.*

Key words: *Technology, accelerated, innovations, voice, data, images, video, Hi-tech, prophylaxis, diagnostic.*

The word Technology derives from the Greek word, *techno: art*, skill, cunning of hand and represents the collection of tools, including machinery, variations, alternations, arrangements, and procedures utilized by humans.

Technological revolution is, in general, a relatively short period in history when one technology (or better a set of technologies) is replaced by another technology. As Nick Bostrom wrote: "We might define a technological revolution as a dramatic change brought about relatively quickly by the introduction of some new technology. It is an era of an accelerated technological progress characterized not only by new innovations but also their application and diffusion."

Technology today affects every single aspect of nowadays society. In fact, there is not industry out there that has not been affected by the hi-tech revolution. Whether we are talking about transportation, communication, security, banking or healthcare, they are all rely in one way or another. New technologies radically change the way we live, work and think. The growth of high-speed networks, information technologies are making possible applications undreamed in the past. Now transferring of voice, data, images, video may be around the world in microseconds.

Without doubt, inculcation of new, modern technologies is indispensable requirement for state's development. In XXI century all civilized states contemplate about building informational society, creating various innovations and hi-tech as foundation for their socially economic, political and cultural development and make purposeful policy in this field. Uzbekistan that goes by the way of democratic reforms and development of market-based economy is not an exception too. For the last 5-7 years, there were significant changes in technological sphere in Uzbekistan. To begin with, technological revolution changed our medicine radically and highly improved quality of our life. Modern technology has changed the structure and organization of the entire medical field. Scientific - technical revolution opened new, unseen before opportunities in prophylaxis, diagnostic and treatment hard diseases. Now it is not fantastic to see devices, which can temporarily replace function of sick organ or regulate their work. Modern diagnostic instruments and apparatus increased cognitive possibilities of man's sense organs, allowed to penetrate in patient's body, to see pathological changes and cure them. One of the greatest innovations, which we can see almost in every policlinic, is a computerized fluorography. With its implementation, the

image quality got better sharply and what is very essential for us, the fluorography became harmless, as there is no more radiation. Technological revolution brought us new computer tomography which assists to diagnose diseases of brain, liver, pancreas, other organs of abdominal and chest cavity.

The explosion of technologies is changing enormously our banking system from paper and branch banks to digitized and networked banking services. New technologies eased bankers work significantly. Computers do almost half of their work like accounting, writing and keeping customer's records.

Technology is also becoming more and more prevalent in the landscape of education in our country. The web has driven this rapid adaption – as Google apps, mobility and software programming demonstrates technology is now at the front and centre of education. It is a very great ability for our students to use various web sites and to search necessary information. It is widely spread to bring own devices to universities just to help accelerate the adoption of these new learning technologies. Especially in the University of Information Technologies, computers and technologies are inalienable part of student's study, as they need not to only theory but practicing too. It seems that blackboards are being sent to history museums as more and more teachers use optical projectors with slides and presentations. It is a good idea to attract student's attention and to encourage them to study.

One of the greatest insertions of technological revolution were electronic books, which are very popular in Uzbekistan. It is very easy to purchase or download them and you do not have to go outside or to search them. They are very portable and take up less space. You do not need library or room for them; we can keep hundreds and thousands of e-books on our computer or phone. They also assist us to save our time and money as we can read them everywhere and carry them. No trees are required to manufacture paper for the pages of e-books, which is very beneficial for our state's economy. Uzbekistan has own library portal, which was updated in 2014, it has more than 75 thousand units of informative-educational resources, including textbooks, dissertations, research papers and others..

Our farms and agricultural operations work far differently than those a few decades ago, primarily because of advancements in technology, including sensors, devices, machines and information technologies. Today agriculture in Uzbekistan routinely uses sophisticated technologies such as machines; tractors with variety of functions, new engines, combines, cotton-picking machines with new shelters considerably simplify farmer's work.

Also in the building sphere, new technologies offer new opportunities. New materials, technologies and systems for construction engineering and for buildings technical equipment can make buildings in our country more comfortable, slimmer, more energy-efficient, more flexible, more convenient, more cost-efficient or more durable.

Over the past years, Uzbekistan carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy. The basis for development of ICT in Uzbekistan

is the telecommunications infrastructure. Over the past 10 years in many regions of the country, more than 2000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high speed Internet, watching HDTV-channels and others. Today, all mobile operators working in our country, consistently introduce the fourth generation network 4G LTE, which allows handling a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT. In 2014-2015 Program of development of broadband access networks on WI-FI technology has been implemented successfully in the Republic of Uzbekistan. Because of comprehensive measures at airports, railway stations, places of frequent- stay travelers, parks, shopping malls and other public places of the capital and each administrative centre of Republic WI-FI points have been created. All educational institutions of the republic are connected to ZiyoNET network, which is functioning since 2005. Furthermore Foreign Languages section has been created on ZiyoNET, which includes over four thousand materials such as textbooks, interactive lessons, games, relevant video and audio.

Thus, our IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, and Internet is gaining more space. We can say that Technological revolution led out our country to the new advanced global level.

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ROLE OF CRYPTOLOGY IN REAL LIFE

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Summary: *In this article we consider about role of cryptology science to keep our data in secure and practicing in real life.*

Keywords: *Information security, software, hardware, cryptography, symmetric, asymmetric, cryptosystems, public-key, private key, encrypted, EDS, eToken.*

In the era of information technology, the problem of ensuring information safety of telecommunication systems and information processing systems against external influences is of paramount importance. The successful solution of this problem depends on the security of citizens, the future of the country.

Today in the Republic of Uzbekistan pays special attention to the challenges and problems of information security at the state level. This is evidenced by the laws of the Republic of Uzbekistan, decrees and orders of the President of the Republic of Uzbekistan, decrees of the Government and guiding documents of ministries and agencies involved in the regulation of various aspects in the field of information technology.

Under the information security means the protection of information systems against accidental or deliberate interference, prejudicial to the owners or users of information.

The main goal of achieving a high level of information security is ensuring confidentiality, integrity, availability, authenticity and non-repudiation of information.

Means of ensuring of information security can be divided into four groups:

● organizational means (actions of a General nature taken by the leadership of the organization and specific security measures, dealing with people);

● legislative tools (standards, laws, regulations, etc.);

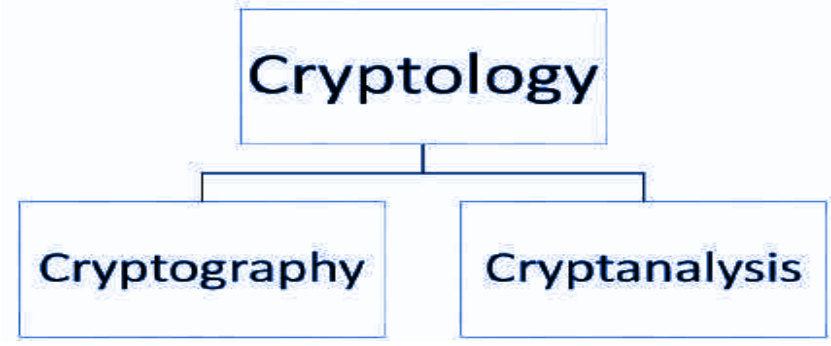
● software and hardware (system of identification and authentication; encryption of disk data; the authentication system of electronic data, etc.);

● cryptographic (digital signature, encryption, authentication, etc.).

Wide application of computer technology and the constant increase in information flows causes a continuous growth of interest in cryptography. Modern methods of cryptography guarantees almost absolute protection of data, but always remains the problem of the reliability of their implementation.

Another important problem of the use of cryptography is the contradiction between the desire of citizens to protect their information and the desire of government intelligence agencies to have access to some information to prevent illegal activities. It is extremely difficult to conclusively find the optimal solution to this problem.

Without the use of cryptography today is unthinkable task of information security related to confidentiality and integrity, authentication, and inability of repudiation. If before 1990 cryptography has protected exclusively by state lines, in our days the use of cryptographic methods became widespread with the development of computer networks and electronic data interchange in various fields: Finance, banking, trade, etc.

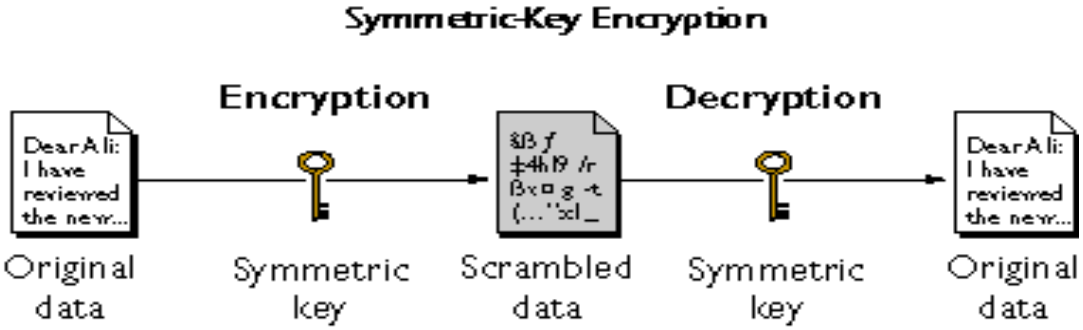


- **Cryptology** (*from other Greek - κρυπτός - hidden and λόγος - word*) is a science dealing with methods of encryption and decryption. Cryptology consists of two parts - cryptography and cryptanalysis.
- **Cryptography** (*from other Greek - κρυπτός - hidden and γράφω - I write*) - the science of methods of securing confidentiality (the impossibility of reading information to outsiders), the integrity of data (the impossibility of imperceptible change of information), authentication (authentication of authorship or other properties of the object), and Also the impossibility of refusal of authorship.
- **Cryptanalysis** (*from other Greek - κρυπτός - hidden and analysis*) - the science of methods for decrypting encrypted information without the key intended for such decryption.

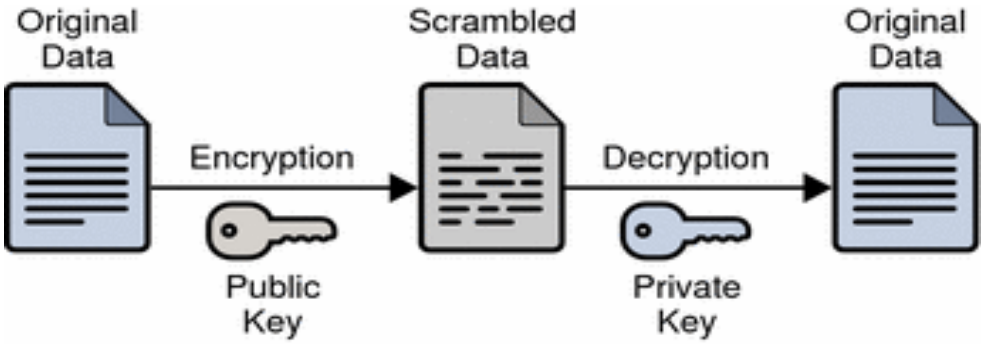
Currently, one of the most effective and reliable methods of ensuring information security are cryptographic methods. In this regard, in 2007 the decision of the President of the Republic of Uzbekistan №PP-614 "On measures on organization of cryptographic protection of information in the Republic of Uzbekistan". Recent years Uzbekistan has developed a number of national standards and normative documents in the field of cryptographic protection of information.

To distinguish between two types of cryptographic systems: symmetric and asymmetric. For symmetric cryptosystems, has a long history, characterized by the narrowness of the range of tasks and the need for reliable channel for key distribution, and thus they provide resistance to attacks.

In symmetric cryptosystems, the same key is used both to encrypt and to decrypt the message. This means that this key must first be transferred via a trusted channel, so that both parties knew it before to transmit the encrypted message over an unreliable channel.



Asymmetric cryptography that emerged in the mid-seventies of the last century, focused on solving a broader range of tasks such as encryption with public key distribution of secret keys on open communication channels and digital signature of documents in cases of lack of mutual trust between the parties, etc.



When using public-key cryptography, everyone has a pair of complementary keys: open and closed. Each of the keys within a couple, suitable for decrypting messages encrypted using a different key from the same pair. Knowing the public key, the private is impossible to calculate. The public key can be published and widely distributed via communication networks.

One of the essential attributes of the electronic document is an electronic digital signature (EDS) that allows user to control the authenticity and integrity of messages and to reliably determine their authorship, including third party.

Currently, many countries have the algorithms of electronic digital signature. For example, the U.S. uses DSA, Russia — GOST 34.10-94 and GOST R 34.10-2001, Japan — ESIGH in Europe — Schnorr, South Korea — KCDSA, Belarus — STB 1176.2-99, etc. In recent years, Uzbekistan has been conducting fundamental and applied scientific researches in the field of cryptology. A digital signature is an electronic analogue of the usual handwritten signature and allows establishing the authenticity of the source of a signed message. However, the capabilities of EDS technology, is somewhat broader. It is known, for example, that, upon the certification of a multiple-page document you have to sign on each page. The use of electronic signature guarantees the protection against forgery of documents of unlimited storage and allows you to control the integrity of messages. Now is the continued work on the introduction of electronic digital signature in electronic documents of public administration. The introduction of electronic digital signature in the public administration of the Republic of Uzbekistan will allow increasing the efficiency and effectiveness of problem solving, the performance of activities of public administration bodies and contributes to the accession of the Republic of Uzbekistan to the world information community.

However, a more reliable way of storing the authentication information recognized by the use of special hardware. If necessary, ensure that employees work on different computers (supporting security) using hardware-software system that enables you to store authentication data and cryptographic keys on the server. Users are free to work on any computer having access to your authentication data and cryptographic keys. Electronic USB-keys and smart cards eToken represent a compact device designed to provide information security for corporate customers and private users. In Uzbekistan based on public standards developed by hardware-software means of "E-kalit falls".

The problem of determining the effectiveness of remedies is often more time-consuming than their development requires special knowledge and, as a rule, higher

qualification than the development task. These circumstances lead to the fact that on the market there are a variety of means of cryptographic protection of information, about which nobody can say anything definite. Today, there are well-known and tested cryptographic algorithms, the security of which are either proven mathematically or based on the need of solving the mathematically complex problems (factorization, discrete logarithm, etc.). Therefore, knowledge of attacks and holes in cryptosystems, as well as an understanding of the reasons why they took place, are one of the necessary conditions for the development of secure systems and their use.

It should be noted that when you export the hardware information and communication technology in other countries in the protection of information using software with lower security relative to their national standards because national standards are not used in products intended for export. In this regard, currently, particularly relevant is the problem of development, testing, implementation and further development of algorithm and program data encryption and digital signature for the Republic of Uzbekistan.

WEB PROGRAM FOR LEARNING ENGLISH FOR BEGINNERS

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Summary. *Today, being competitive in the world requires to know several foreign languages. Therefore attracting young people to learn foreign languages becomes a vital aspect. In this scientific article, a couple of leading programs teaching English in Uzbekistan have been studied. Considering the shortcomings of these training programs, we created a new interactive web program for learning English for beginners. This program differs from the rest with its design, training method and additional functions.*

Keywords: *web program, learning English, aim, project, beginners, specialists, create, application, interactive.*

As the matter of fact, there is no sphere without implementation of information technologies in XXI century. With implementation of modern information technologies to education system, we can provide youth with information, increase their interest for studying, and make them spend their free time in effective way. When we talk about information, it is important its accuracy and safety. Intensive improvement of technologies let us get any information with not only the help of personal computers, but also our mobile phones, no matter of time and place. That is why we, programmers, in order to let youth, spend their free time effectively, should increase the number and quality of multimedia-intellectual educational programs.

Made by programist Farkhod Dadajanov mobile application “Bilimdon-Ingliz tili”, made by Uzinfocom- center of improvement and implementation of computer and

information technologies, Ziyonet project “lang.uz” –foreign language learning portal is working as a useful resource for learners. We can provide some other examples similar to these. If we talk about mobile application “Bilimdon-Ingliz tili”, its interface in white and black colors can make users especially pupils get bored. On the other hand, the portal “Lang.uz” is made ideally, for users on Elementary and Pre-Intermediate course. The project “Lang.uz” is made for users with primary knowledge, and this is its disadvantage.

We should make such web program, which lets users to learn English in spite of their age and knowledge. Such program can be made in such programming languages as Html, CSS, JavaScript, PHP, MySQL.

Analyzing such projects shows, if programming of English educating programs is carried out by the same group of programmers from first to last degrees, these programs usually more effective than others. In making such programs it’s important to pay attention to design, especially to choosing colors, collecting interesting information for kids, also it is useful installing short video materials. It is useful in learning English organizing such extra possibilities for high-level students as: online chats, discussion groups, meetings with foreign guests and excursions to embassies.

In programming such programs, we need help of qualified specialists. In forming the contest of the program, we used Dilnoza Niyazahunova’s English notebook, specialist of English language. Up to now 2 parts of the application has been published, and mentioned that on primary stage of the project 1st part formed as web application. On next stage, 2nd part of the application will be formed as web application. In creating of next stages of the application with Dilnoza Niyazahunova will also take part other qualified teachers of foreign languages department of Tashkent University of Information Technologies named after Mukhammad al-Khwarizmi named after Mukhammad al-Khwarizmi.

1st stage of the application based on alphabet teaching, and includes the following information: Writing alphabet letters – they are put in motion by JavaScript, capital and lowercase letters are written repeatedly, at the same time pronunciation of letters will be voiced. For each letter there will be some pictures, when you show them with mouse cursor, they are colored and the name of the picture is pronounced. If there are pictured animals, it will be possible to voice their natural voices. On the final part of 1st stage all 26 letters of the alphabet are repeated and presented an interactive game which requires choosing correctly bubbles with vowels.

2nd stage of the application is more complicated than the 1st one, and include following information:

- Presented some pictures, users should guess first letter of the words which name the pictures in English;
- Within an interesting picture of a bus there is written alphabet, and some letters missed. Users should write missed letters;
- On the next stage alphabet is presented in scattered form. Users should write missed letters;

- There will be 2 tables, 1st contains pictures, 2nd contains meanings of the pictures in English. Users should match them in right order;
- There will be some pictures, users should paint them with correct color, users just choose names of colors;
- There will be a table with mixed letters, and users should make words using these letters. Here they should use only letters in one order;
- Will be presented pictured and voice information about fruits, vegetables, pets, wild animals, family members, siblings, parts of body, clothes, home accessories, types of transport.

At the end of this course, some logical tasks will be given. For example, the task is to remove inappropriate words from words of different types, write missed letters and solve crossword puzzles.

In the process the decision task, the participants gain points and eventually is given the result of a participant's rating. For participants in the beginning of the course fill out a special form which collects information about the participants. And the program includes a feedback between specialists and participants. During each level, the participant is given a chance to work on their shortcomings.

Before the presentation of the project, it is planned to finish two initial levels. This project has given as a means of teaching English.

Today, to be competitive in the world it is required to know several foreign languages. From 2013/2014 academic year in secondary schools of Uzbekistan, in accordance with the resolution of first President of Uzbekistan Islam Karimov, foreign languages were introduced from the first class.

This year, children, who entered the first grade in 2013, finish primary school. According to the Ministry of Public Education, the proportion of primary school students who study English is 94%. Increased attention to English has led to a reduction in the study of other foreign languages. For this reason, the Ministry of Public Education proposes, from the new academic year, to introduce in general and specialized schools, as well as in boarding schools, in addition to the English, the second foreign language: German, French, Korean, Chinese, Japanese, Arabic, Persian, Hindi and others. Therefore, in the future, we are planning to create such programs in other languages too.

Our main aim is to improve students' level of learning foreign languages, teaching students with the help of interactive applications, and making students think independently, raising foreign language level of students graduating primary level up to at least intermediate level.

To sum up, it is important to mention that learning such applications can influence well on their effect. Providing a good competition among such applications, improves quality of learning foreign languages using these applications.

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TECHNOLOGICAL REVOLUTION OF UZBEKISTAN

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Summary: *this article reviews the status of the ICT sector and tendencies in the basic areas of the Uzbek knowledge-based economy, including policies and policy instruments, institutional mode, ICT infrastructure, information system, innovation opportunities and the perspective and challenges faced by Uzbekistan in the area of the ICT development.*

Key words: *ICT infrastructure, information system, ICT development, Government, knowledge based economy.*

The article was prepared by a national expert, nominated by the Government, and represents an overview of the present situation and an assessment of the emerging trends in all the major areas, constituting the foundation of the knowledge-based economy, such as policy and policy instruments, institutional regime, ICT infrastructure, information system, national innovation capacities and capabilities.

In the last decade of the 20th century, information and communication technologies (ICT) became one of the major factors influencing the development of society and the life of people. Many countries understand the enormous advantages brought about by the accelerated development and proliferation of information-communication technologies. The economic activities associated with the manufacturing and use of information technology have become a driving force of the steady economic growth of these countries. A new era of knowledge-based economy has begun.

Knowledge-based economy is not only the digital economy that comprises the manufacturing and use of computers and telecommunication equipment. It is not only the networked economy, whose elements are connected and operated through telecommunications.

There are various aspects of the knowledge-based economy:

• The knowledge-based economy is enabled and driven by powerful technology ICT.

A new ICT generation appears every three - four years. Today, ICT companies are in line with the largest corporations. The ICT sector is considered to be one of the most rapidly growing economic sectors;

• A telecommunication network, integrally connected with ICT growth, has spread its roots throughout all spheres of human activity, forcing them to change their methods of operation and the conditions under which they operate;

• Knowledge based on information and supported by cultural and spiritual values has become an independent force and decisive factor in a social, economic,

technological and cultural transformation;

• A global information society has becoming a reality. The knowledge-based economy has allowed a fast integration of the huge intellectual resources of the transition countries into a global pool, stimulating the development of everyone;

• The knowledge-based economy continues to influence other spheres of public life of countries, including the institutional and innovation systems, development of human resources, etc.

The ICT sector has become a major component of the economy of Uzbekistan and a force of its growth. The President of Republic of Uzbekistan highlights the basic aspects and strategic goals of the country with respect to ICT and the Internet in the Statement, May 2001.

As of May 2003, several National Programs targeted to ICT and Internet network development in Uzbekistan have been developed:

«A National Program of Reconstruction and Development of Telecommunication Network of the Republic of Uzbekistan for the Period up to 2010» (Resolution of the Cabinet of Ministers № 307, 1 August 1995). The purpose of the Program is to create a National Telecommunication Network on the basis of digital transmission systems and digital switching equipment, stipulating a deep integration into the global telecommunication system and providing comprehensive satisfaction of the needs of the economy and the population in communication services.

The main objectives of the Program are:

• Defining priority directions of the telecommunication development

• Formulating the State principles for support of the telecommunication development.

• Attracting investment resources from non-governmental sources, including foreign investment, for telecommunication network development.

• Creating a material and technological basis of communication that meets international requirements, organization of production of telecommunication equipment, optical fiber cable with the participation of foreign investors.

• Observance of sovereign rights of the country and the interests of regional structures in forming the technical basis of telecommunication and organization of their interaction during the creation and operational stages of development of the telecommunication system.

«Program of Modernization and Development of National Data Transmission

Network of the Republic of Uzbekistan for the Period 1999-2003» (Resolution of the Cabinet of Ministers № 193, 22 April 1999.)

The purpose of the Program is to define basic organizational and technical measures to stimulate modernization and development of the National Data Transmission Network for the period 1999-2003 and a network expansion in Tashkent, Nukus and province centers within the period 1999-2001 and in the Regional Centers during 2000-2003.

The primary objectives of the Program are:

• Basic technical requirements for the construction and organization of the National Data Transmission Network; Country Readiness Assessment Report – Uzbekistan.

• Technical means, ways of perfection of communication basis for the creation of a single information space and expansion of the opportunity for integration of the

Republic of Uzbekistan into a global information space.

• Measures on centralized connection of data transmission networks of the Country operators (providers) to global information networks, including the Internet, and long-distance networks of the Republic of Uzbekistan, as well as identifying directions and stages of network modernization and development.

• Identifying sources and mechanisms of financing network modernization and development, including utilization of the National Operator-UzPAK finances, attraction of foreign investments, and the utilization of budgetary resources.

«Program of Computerization and Information Technologies Development for 2002-2010» (Resolution of the Cabinet of Ministers № 200, 6 June 2002). The main purpose of the Program is satisfaction of information needs of society and raising the competitiveness of domestic producers on global markets.

The following are foreseen as goals:

• Accelerating the development of modern telecommunication infrastructure and digitalization of networks and the development of mobile networks.

• Development of an Internet National Segment.

• Creation of conditions stimulating the development of computerization, domestic industry and exports of software.

• Training of highly qualified personnel in ICT.

• Development of a competitive environment in the ICT sector.

• Further perfection of the normative and legislation base, standardization and certification.

The State Programmers have the assistance of donor countries: United Kingdom, Germany, United States of America, Switzerland and Japan. These countries bring an essential contribution to the development of the Uzbekistan ICT sector by supporting scientific research institutes, educational establishments, small and medium-sized businesses, and non-governmental organizations.

General long-distance channels of the telecommunication network of the country are based on fiber-optic and microwave (radio relay) communication lines (TAE FOCL, FOCL and radio relay lines), and they allow creation of high-speed data transmission lines (from 64 Kbps up to 2048 Kbps) between Tashkent, Nukus and the regional centres of Uzbekistan. Communication between the regional centers and areas essentially varies throughout the territory of Uzbekistan. A modern network is already established in the northern areas of the country: in Karakalpakistan Republic, Bukhara, Navoi, Khorezm and Syr-Darya provinces. Almost 40 per cent of these areas have digital channels. In other areas, the analogue channels connecting the regional centers with areas remain in place. Data transmission networks in Uzbekistan are constructed

on the currently existing telecommunication network. Leased circuits (mainly digital) are being used to organize data transmission long-distance and at central-office level. International connection (output) of networks with international information networks, including the Internet, is organized by direct communication, using satellite and terrestrial digital international channels.

Nowadays, in Uzbekistan many innovation technologies are being developed very rapidly. The reason why is the support of our Government to increase Education system.

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THE PRACTICE OF APPLYING FSO TECHNOLOGY

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Summary*. This article is devoted to the consideration of practical application of FSO technology. Highly efficient wireless systems are based on FSO technology. The article deals with the issues of FSO deployment, for example, in buildings. The advantages of FSO system to create a secure network connection have been revealed in this article.*

Key words: *FSO technology, broadband communication, physical obstacles, data transfer, wireless systems, bandwidth.*

Many organizations and companies that require rapid deployment of reliable, inexpensive and secure broadband communication links use FSO technology. Two recent cases demonstrate the unique advantage of using FSO systems in buildings that are of historical value and are architectural monuments. In one case, it was required in a recently restored historic building to urgently expand the Gigabit Ethernet network using FSO technology. In another case, it was not possible to install cameras because of the impossibility of laying the cable. An obstacle to cable - laying was a protected historical landmark. Only by deploying the FSO system the task has been solved.

Such physical obstacles as road and railroads, and even other buildings in the industrial zone are the main factor in the use of wireless communication systems. One of the system integrators used the FSO system when it was required to connect two buildings that were separated by a four-lane road.

As mentioned earlier in the article, the use of the FSO system for data transfer between buildings practically makes it impossible to read and unnoticeably intercept

the signal. This was the determining factor for one large financial institution that began using FSO links as a means of providing network reservation channels.

Risk management is critical for hospitals and health centers, which must comply with federal legislation, requiring them to maintain the confidentiality of patient records. That's why one major provider installed the FSO system to create a secure network connection between its medical center and the rented premises in a building approximately 300 meters from the medical center. In addition to the safety requirements, the communication line had to be installed quickly and it had to cross the road. The FSO line met all these requirements, and its high throughputs made it easy to transfer large files with radiographic shots.

It is important to admit that there is no technology that is equally suitable in all situations, and that each means of communication has its advantages. Highly efficient wireless systems based on FSO technology are a viable alternative if the network designer needs to take into account the effects of weather conditions typical in a given locality, the length of the wireless link, the bandwidth requirements and the potential use of the FSO system as auxiliary backup links. The ability to quickly deploy an unlicensed and secure wireless system that has a large bandwidth and is independent of the data transfer protocol ensures the use and application of FSO in building corporate networks.

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MODERN TECHNOLOGIES OF WORKING WITH DATA GENERATED FROM INTERNET OF THINGS

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Summary: *In this article considers problems with data that generated from the Internet of Things, solutions and technologies, which is used to processing.*

Keywords: *Internet of Things, devices, data, collect, store, processing, Big Data, batch processing, stream processing*

The growth of network technologies has led to use of the Internet in many spheres of human activity. At first the Internet was only for communication between people. After connecting hardware and software devices network functions expanded. The widespread use of the Internet as a transport led to a sharp increase in the number of connected hardware and software devices to the network in comparison with people.

In this regard, in the sphere of information technologies appeared a new term – the Internet of Things. The Internet of Things (IoT) is a global network of computers, sensors and actuators that communicate with each other using the Internet.

According to some information, by 2010 year on the Internet network was made 900 exabytes (10^{18} bytes) of data. By information from Cisco in the same year to the telecommunications networks were connected more than 12.8 billion software and hardware devices. From various experts' data with growth rate like this by 2020 we can expect a huge number of hardware and software devices connected to telecommunications networks from 26 to 50 billion of devices.

Significant parts of these devices will continuously produce some data. In this regard, the specialists face to problems such as collecting, storing, processing, and receipt certain knowledge from this data.

To solve these problems originated the concept of Big Data.

Under this concept began to develop tools and guidelines for the storage, processing and analyzing of data that have several key attributes:

• Size – tens of terabytes per day.
• Complexity – unstructured, a huge number of sources.
• Required to handle the new technology.

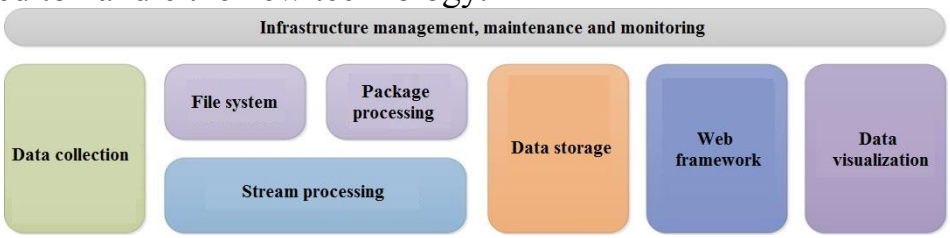

Fig. 1. A common infrastructure for Big Data

A key parameter of infrastructure is distribution, that is, many nodes performing each individual function.

Data collection from various sources online is one of the features of new technologies for data collection. Currently technologies which are widely used to data collection are Apache Kafka, Logstash, Amazon Kinesis.

Further, the collected data is processed using batch processing or using stream processing.

In batch processing data is accumulated in the file system, the handler runs on a schedule. As features of the new technologies of batch processing can be considered a huge amount of data and distributed batch processing. Hadoop MapReduce, Spark, Elastic MapReduce and Amazon are one of the best technologies for batch processing of data. For batch processing, in many cases, requires a distributed data store. And this uses the Hadoop Distributed File System (HDFS), Amazon S3 and Microsoft Azure.

One of the features of big data stream processing is data in large volumes constantly updated. They use Storm technology, which is used in Twitter, Spark Streaming and AWS Lambda.

After processing the data, the problem arises of storing data in large volumes. The requirements for reliability and type/speed of data access will depend on the specific

application which will use data. For instance, we can highlight the technology of Oracle, MySQL, PostgreSQL, Amazon RedShift, ElasticSearch.

Thus, above methods will increase the process of collecting, storing and processing to reduce the large amount of information in the Internet network.

However, application of these methods will not completely solve this problem. In this regard, at the present stage integrates new trends such as Deep data analysis and Machine learning.

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THE IMPORTANCE OF LISTENING AND ROLE OF TEXT READERS IN LANGUAGE LEARNING

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Summary. *This text is about the importance of listening and role of text readers in language learning. It is considered that, people`s ability to learn from listening in this text. As we know, human beings have the unique ability to learn from listening. with it comes to our ability to understand the world. This separates humans from other species on Earth. As babies, we acquire language, listening to speak our parents or family members. Then we begin to copy the words that we hear, and it will eventually grow in a speech in the proposals of our first language. This shows how important the role of listening in language learning. The document emphasizes the role of the listener in the study of language and the role of the TTS (Text-to-Speech) technology for listening.*

Keywords: *TTS (Text-to-speech), multi-tasking, segmenting, digital device, convert, optical character recognition (OCR).*

Life in a competitive society requires constant training. As young people, most of our years are spent at school, where there is a need to listen and understand what the teachers say. To prove that we listen to lectures, we ask questions to clarify the questions and ultimately expand our knowledge in various subjects.

Listening has an important role in learning foreign languages. In fact, this is one of the four macro skills of mastering the language. Other skills, namely reading, speaking and writing along with grammar, are important for the development of language proficiency. Listening as a receptive skill first develops in infancy. This awakens the awareness of the language, in fact, of any language.

The Importance of Listening

The role of listening in language teaching was considered the least understood of all the language skills. However, in a study conducted in 1950 year, it was found that, when we are dealing, this occurs 45% of listening, the speech of 30%, 15% and 10%

reading from writing. People develop sound judgment from my own experience, and it can be transferred to another form of communication. with the highest percentage of participation in the exchange of information the student should be considered a precursor of the English language. Since people communicate approximately 71% of their waking hours, it can be concluded that listening is used in most parts of the day.

Listening plays a vital role in educating, not just languages, but any branch of knowledge. when students attend classes, it is expected that they will understand and retain information from lectures. In language classes, most of these lectures will range from grammar, pronunciation, stress in words, vocabulary, syntax, and so on P. It should be emphasized that an understanding of the transmitted messages can be based on the tone of voice, pitch and accent. And this is possible only when we listen. Listening is not only used as a language skill for scientists, but is also considered an important life skill. Mastering this skill is crucial for understanding the messages that we encounter every day. In addition, it plays a role in building bridges for the context of values, because we use gestures, facial expressions and body language when speaking with others.

Without listening skills, language learning impossible. This is because there is no communication, in which there is no human interaction. Listening to the target language improves language skills. when students listen, students build meaning and make sense of the words they hear. Sound, rhythm, intonation and stress in the language can be fully adapted only for listening. we practice the use of our second language, reading, writing, speaking and listening. Since the first three skills must be learned by the time when we turn three years, our earlier scheme can only be by listening. In order to understand the nuances of the target language, you need to be able to listen. As soon as we understand the spoken language, it is easier to improve other skills and gain confidence. In addition to being the main form of communication, listening makes it possible to understand the elegance of the language, which is clearly not present in the grammar or reading.

Would it be surprising to learn that our short-term memory is even shorter in a foreign language? When we think about it, it makes sense. How often have we forgotten that someone just said, in our target language? For me, at least, it happens much more than in my own language. Listening is a vital step in overcoming this problem.

In order not to get into too many details, although this is exciting, this effect may be related to how our short-term memory works. when we listen to someone speaking, our brain begins to process information "segmenting" it into small pieces to store in our short-term memory. He breaks them based on our knowledge of the "rules" for how they speak this language. Instead of storing the actual words "green goldfish," our brain will be able to transform these words in the form of green goldfish for storage.

In a foreign language, we are not familiar with the "rules of segmentation" for how they speak this language. Our short-term memory should store all words separately.

One of the reasons why listening is so important in a foreign language is that it helps us become familiar with these segmentation rules. Not only will this enhance your understanding, it will improve our conversation in the language too.

Learning the rules of segmentation is usually an unconscious process, so the easiest way to learn them is to get a lot of listening practices.

Here are a few ways to become more familiar with the rules of language segmentation in:

- ❖ watch movies in our learning language.
- ❖ Reading a book with listening to audio version together.
- ❖ Listening to the radio in our learning language.
- ❖ watching clips online in our learning language.

The role of TTS technology for learning English

Text-to-speech (TTS) technology reads digital text - words on computers, smartphones and tablets.

TTS can help students who have problems with reading.

Text-to-speech (TTS) is an auxiliary technology that reads the digital text out loud. It is sometimes called the "read aloud" technology.

At the touch of a button or by touching a finger, TTS can take words to a computer or other digital device and convert them to audio. It can also help students in writing and editing, and even focus.

How Text-to-Speech works

TTS works with virtually every personal digital device, including computers, smartphones and tablets. All kinds of text files can be read aloud, including word and Pages documents. Even online pages can be read aloud.

The voice in the TTS is generated by the computer, and the read speed can usually be accelerated or slowed down. The quality of the voice varies, but some voices seem human. There are even computer-generated voices that sound like children speaking.

Many TTS tools highlight words when they are read aloud. This allows students to see the text and hear it at the same time.

Some TTS tools also have Optical character Recognition (OcR) technology. OcR allows TTS tools to read text aloud from images. For example, you can take a picture of a street sign, and convert words into a sign into audio.

How Text-to-Speech can Help You

Printed materials in the classroom, such as books and handouts, can create obstacles for students with reading problems. This is because some students struggle with decoding and understanding printed words on the page. Using digital text with TTS helps to eliminate these barriers.

And since TTS allows students to see and hear text while reading, it creates a multi-sensory reading process. The researchers found that the combination of visual and auditory text when reading:

- ❖ Improves word recognition
- ❖ Increases the ability to pay attention and remember information while reading
- ❖ Allows learners to focus on understanding, not on sounding words
- ❖ Increases student endurance to read assignments
- ❖ Helps students recognize and correct errors in their own letter
- ❖ Helping people with dyslexia.
- ❖ Allow students to listen to textbooks
- ❖ Enable multitasking
- ❖ Effective proofreading
- ❖ Learn English or other languages

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PEOPLE WHO MADE GREAT CONTRIBUTIONS FOR THE DEVELOPMENT OF UZBEKISTAN

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Summary: *The world is being gone around the time and there were happening different of the events which could be memorized even taken on the pages of history. That lifetime is being endured due to the human beings. The exact explanation can be written like that all personalities are getting survived because of their existence otherwise that living part would get boring completely. After the eras, each country got separated from their origination. This bordering led them to have a feel of concurrency which caused them to be promoted furthermore. For this they started to have full of the stack of creating convenience and overcome the obstacles by manifesting the solutions. These all possibilities which were mentioned got performed by people exactly by humans. Precisely faces who helped to be risen up with status among other countries. One of well-developed is Uzbekistan which has own people who contributed their best.*

Key words: *Folk, peak, ancestors, peace, usage, algorithm, observing, treasures, warrior, period time, merely, revolution, obligation, to force, dweller, repeatable*

As a vivid fact there are enough of countries in the world which are being developed over and over the period time. That means until they got this status there were different type of difficulties which had to be overcome and problems which had to be solved. Obviously, not in vain these items came up. The reason can be included merely with one expression and it is "Revolution of the development of the country". For this saying there might get enrolled one a folk expression "A place without movement won't get any trouble meanwhile a developing sphere all the time can get variety of the questions which must be answered". Precisely writing there is no a country which reached such great achievements or high peak of the summit without having at least one a bright person in the history. There are many of these similarities and unlike of them is Uzbekistan which is called as one part of paradise of the Earth.

Uzbekistan has achieved so many awards for 25 years which can not be counted one by one. Actually the Independence of Uzbekistan is already gone over the first quarter of the century. In a word explaining for this short time not imaginable of the achievements got reached by the citizens or children of that country. As the result majority of the countries are getting astonished by seeing the result by each sphere. Not only by one direction we are going but every type is being given with the highest attention by the government.

Before typing mentioned sentences people of Uzbekistan must be aware of their ancestors who led them till this position of living. Apparently, if they were not attempting to do their stuff sincerely, at the moment we would not be able to be in a gorgeous of the situation. It is our obligation to remember and show respect to their spirits otherwise it will be an action of snob person. By avoiding it their names will be taken in an account in an upcoming line. For the beginning will be our ancestor Amir Temur. Amir Temur was a great warrior and header of the empire.

The main notice side of him was "Justice". That means he was an open face to the science and wanted to leave after himself not repeatable treasures. These treasures are now called as the culture of the Uzbekistan or the fundament which are still wondering all the visitors. Let's take some of the examples, the first coming example is buildings which are staying in the city Samarkand and each of the building has specific history, the second one is development the relationship with foreign partners from that time then getting into a good touch with each other, the last example is giving the ways to the process of science after all the continuation went well or till our time. The predecessors of Amir Temur were Mirzo Ulugbek and Zakhiriddin Mukhammad Bobur. Mirzo Ulugbek was so clever it can be proven with one proof. When he was a king there did not take place any war. That means he was relying only on his mind not on the strength of the muscle. The main heed was being altered from the military to the science or with one production of the expression can be represented dedicated himself to the studying. The main activity was observing the stars in the sky. Even now his studies are being used by science dealers who get lost by their mind set how he that time did it. Additionally, it denotes how Uzbekistan was full of the bright people.

The second person is Zakhiriddin Mukhammad Bobur who was forced to leave motherland because of some reasons and founded the empire in India being the son of Uzbekistan. For the period time he left after himself great name there and at the moment there stays a sightseeing which is called “Taji Mahal”. At the present time we are all using the gadgets and programming skills which get required by the era’s time. Whenever we get into that usage anyone of them need to bethink the name of structure “Algorithm”. Algorithm is the father all of them.

When “Algorithm” gets reminded, any living personality must know our ancestor who is founder of that is Al Khorazmiy. He was the only person who gave this term to the mathematic. If he did not do it, there is not the exact fact when these further development stages would come up. One more person is going to be mentioned in this list. That “Human” could be seen by every dweller of country Uzbekistan. Each effort of him was having full of prosperity as the result we are all living by not being got down than others. He devoted himself to country by saying “Why we need to be afraid of new steps, we are not less than others if once a decision gets done, it must be taken despite of the difficulties and if you are planning the goal you should take it bigger than you think”.

People fell asleep in a peace when he was trying to defend us as children of himself. One more saying of him can be enrolled “Each child is my child, if you are my child, just never be scared of anything”. These all words were about our the first president Islom Abduganiyevich Karimov.

If once somebody gets slightly hesitated about the future of Uzbekistan they do not need to be given with hater. The words do not mean anything as answer instead of that must be an action which should make them ashamed. Everything is being depended on the person.

ADVANTAGES OF LEARNING ENGLISH BY MOBILE DEVICES

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Summary. *This thesis describes the benefits of implementing mobile-based tasks in learning English language. The study revealed innovative uses of mobile devices in such areas as vocabulary, listening, grammar, phonetics, and reading comprehension. The thesis notes changing relationship between learners and teachers.*

Key words: *mobile device, mobile application, MALL (Mobile-Assisted Language Learning), Information technologies.*

It is a fact that XXI century is the century of Information technologies. Life is getting faster day-by-day and somebody who moves, goes or does slowly would miss

opportunities. In fact, if you want to succeed, you have to work harder, do things faster and should not waste your time.

Information technologies facilitate the way to solve those problems and make opportunities to be first. Thus, everybody should take advantage of IT and it is the requirement of the time!

We live in a world that the mobile technology develops at so fast speed that we have difficulty following. In only a few years the mobile market has changed drastically with the advent of smartphones with android system and Apple products with iOS system such as iPad and iPhone, and the number of people that own these kinds of devices is growing at a fast rate especially among young people.

With the mobile devices, a new market of application software called Mobile App has appeared and is growing at an incredible speed. Apps are easily available online, and there are two App stores: iTunes App store and Android Market. ITunes App store offers over 700.000 apps available to consumers, while there are over 675.000 apps on Android Market. Among this incredible number of apps, there are a large number of apps relating to English learning for our students. Students according to their own interests can easily and free download these English learning apps. Besides, these apps are developed in terms of learners' different purposes. Also, using apps on mobile devices to learn English also breaks the restriction of time and place. It means that students can learn English at any time and in any place. Mobile devices are becoming a kind of important tools for students to learn English.

On the other hand, English, as the most prominent language in the world, is playing an important role in Uzbekistan. For the current college students, it is a necessity to have a good ability of English, because of academic and job factors. For example, there are many majors need English to support such as international trade, e-commerce and information technology, and a majority of multinational companies in Uzbekistan are interested in the graduates who have excellent ability of English.

Government of Uzbekistan has been enhancing English education. Before Uzbek College students go into universities, they must accept at twelve years English education and pass a series of test that English exams are included. English shares the equally most important role with Math and Uzbek for our students.

With the accelerated development of Apps about learning English and the popularization of mobile devices among college students, students have become increasingly interested in the learning benefits that apps on mobile devices bring. According to the relevant researches, the Mobile-Assisted Language Learning (MALL) can not only enhance students' English ability, but also increase students' learning motivation. Seemingly, it is helpful and efficient for college students using mobile devices to learn English by themselves.

The reality is that we don't know whether it is efficient and effective for college students to use mobile apps to learn English by themselves. MALL is a new way for Uzbek students to learn English. Thus, students' attitudes towards it are not clear. On the other hand, with the explosion of apps, college students are supplied with more choices. But every coin has two sides. Although there are a lot of apps referring to

learning English and college students are easier to get these materials and resources, the reality is that the App market is like a jungle. There is too much software for college students to choice and use. Obviously, there is a lack of recommendation about relevant apps and suggestions about how effectively to use them to learn English. Thus, empirical research about these problems is much needed.

Areas of mobile-based language learning are diverse, among which the most common ones are vocabulary, listening, grammar, phonetics, reading comprehension, etc.

Learning Vocabulary. The type of activities focusing on vocabulary learning via mobile phone differs from one research project to another, depending on the level of language proficiency of the learners. Sending e-mail or SMS to students is a common way of learning new vocabulary based on the lessons covered in the classroom.

Listening Comprehension. Listening dialogues and conversations maybe considered the first stage in learning a second language. With the advent of modern mobile phones, it is now possible to design a mobile multimedia system for learning listening skills through listening different tasks.

Learning Grammar. Grammar rules can be learnt through a specifically designed program installed on mobile phone, in which grammatical rules are taught, followed by multiple-choice activities where learners select the correct answer from the given alternatives. So, most popular grammatical exercises are in the form of 'true-false' or 'fill-in the blanks' tasks, which are to be responded by the learners. Grammatical explanations may also be presented to learners via vocal service or short message service.

Pronunciation. In so far as, modern mobile devices enable their users to access multimedia functions including listening and speaking, a good m-learning service should consist of speech facilities for transmitting voice. Having such facilities, learners may download dictionaries on the PDA with sound functions, so that they can learn the correct pronunciation of unfamiliar or new words to be able to fulfill their learning needs. Mobile devices with multimedia function give learners the opportunity to record their own voice. Further, teachers can analyze students' weaknesses in pronunciation. This way, by enhancing various functions of the system like providing a dictionary for looking up unfamiliar words and their correct phonetic form, the pronunciation as well as speaking skills of the learners can be well improved.

Reading Comprehension. Reading practices help learners to enhance their vocabulary and promote reading comprehension. Reading activities can be offered to learners either via a well-designed learning course installed on the mobile devices or through SMS sent.

In conclusion, we emphasize that as application of mobile technology is increasing and penetrating all aspects of the lives so that this technology plays a vital role in learning different dimensions of knowledge. Nowadays, it is clear shift – from teacher-led learning to student-led learning that cause the students to use the technology in more effective and interesting way. In fact, we can provide a richer learning environment through mobile phones for our language learners. Pressures of study and

assignment deadlines lead students to search for effective solutions on the move. Even if students are studying in different departments, they are in a good position to share the experience across disciplines boundaries, and teachers may find more challenging to do.

Although going through language activities on mobile phones may take longer time compared to computers, the learners feel a greater sense of freedom of time and place, so that they can take the advantage of spare time to learn a second language when and where they are. Mobile technology gets learning away from the classroom environment with little or no access to the teacher, though the learning process can hardly be accomplished without a teacher's direction or guidance. As the demand for acquiring a foreign language increases and the people time for more formal, classroom-based, traditional language learning courses decreases, the need felt by busy users for learning a foreign language through MALL will inevitably increases. In other words, MALL can be considered an ideal solution to language learning barriers in terms of time and place.

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IPTV AND ITS USAGE IN OUR LIFE

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Summary: *In this article IPTV is introduced, its functions, impact and other aspects is explained deeply. Some features of IPTV is discussed and given some ideas about more efficiently usage of IPTV*

Key words: *IPTV,MPEG-4,DVR,fiber optic cable, channels, IP Group Membership*

Over the last decade, the growth of satellite service, the rise of digital cable, and the birth of HDTV have all left their mark on the television landscape. Now, a new delivery method threatens to shake things up even more powerfully. Internet Protocol Television (IPTV) has arrived, and backed by the deep pockets of the telecommunications industry, it's poised to offer more interactivity and bring a hefty dose of competition to the business of selling TV.

IPTV describes a system capable of receiving and displaying a video stream encoded as a series of Internet Protocol packets. If you've ever watched a video clip on your computer, you've used an IPTV system in its broadest sense. When most people discuss IPTV, though, they're talking about watching traditional channels on your television, where people demand a smooth, high-resolution, lag-free picture, and it's the telcos that are jumping headfirst into this market. Once known only as phone companies, the telcos now want to turn a "triple play" of voice, data, and video that will retire the side and put them securely in the batter's box.

How it works: First things first: the venerable set-top box, on its way out in the cable world, will make a resurgence in IPTV systems. The box will connect to the home DSL line and is responsible for reassembling the packets into a coherent video stream and then decoding the contents. Your computer could do the same job, but most people still don't have an always-on PC sitting beside the TV, so the box will make a comeback. Where will the box pull its picture from? To answer that question, let's start at the source.

Most video enters the system at the telco's national headend, where network feeds are pulled from satellites and encoded if necessary (often in MPEG-2, though H.264 and Windows Media are also possibilities). The video stream is broken up into IP packets and dumped into the telco's core network, which is a massive IP network that handles all sorts of other traffic (data, voice, etc.) in addition to the video. Here the advantages of owning the entire network from stem to stern (as the telcos do) really come into play, since quality of service (QoS) tools can prioritize the video traffic to prevent delay or fragmentation of the signal. Without control of the network, this would be dicey, since QoS requests are not often recognized between operators. With end-to-end control, the telcos can guarantee enough bandwidth for their signal at all times, which is key to providing the "just works" reliability consumers have come to expect from their television sets.

The video streams are received by a local office, which has the job of getting them out to the folks on the couch. This office is the place that local content (such as TV stations, advertising, and video on demand) is added to the mix, but it's also the spot where the IPTV middleware is housed. This software stack handles user authentication, channel change requests, billing, VoD requests, etc.—basically, all of the boring but necessary infrastructure.

No matter how well-designed a network may be or how rigorous its QoS controls are, there is always the possibility of errors creeping into the video stream. For unicast streams, this is less of an issue; the set-top box can simply request that the server resend lost or corrupted packets. With multicast streams, it is much more important to ensure

that the network is well-engineered from beginning to end, as the user's set-top box only subscribes to the stream—it can make no requests for additional information. To overcome this problem, multicast streams incorporate a variety of error correction measures such as forward error correction (FEC), in which redundant packets are transmitted as part of the stream. Again, this is a case where owning the entire network is important since it allows a company to do everything in its power to guarantee the safe delivery of streams from one end of the network to the other without relying on third parties or the public Internet.

The obvious challenge to this business model comes from being a "broadcaster" without a network, which means that users need to bring their own access and that content is delivered over networks owned by the telcos or cable providers (in most cases). Both groups have begun making noise about "tiered pricing" schemes, and you can expect them to push the idea even harder as increased amounts of video stream through "their pipes." Any company serious about providing their own IPTV service would no doubt ante up, since consumers are unlikely to subscribe to a TV service that suffers from bandwidth bottlenecks or other inconsistencies.

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THE FUTURE OF OPTICAL ACCESS NETWORKS

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Summary. *In this article we consider the issues of effective access technologies. Nowadays, to meet the increasing demands of consumers to increase the bandwidth, optical access networks (ODDs) are preferred. The latest developments in this field give us the prospect of obtaining high bandwidth, unlimited access and a wide range of applications for millions of end users. The article is dedicated to the consideration of TDM, WDM networks, and development of next-generation PON-networks.*

Keywords: *broadband, bottleneck, bandwidth, point-to-point connection, optical access*

In the field of telecommunications and networking there have been done many breakthroughs lately. The service offered in this sphere might be perfected and there is still much to be done. In this article we are going to consider one of the effective access technologies.

In a constantly expanding network infrastructure, broadband subscriber access is seen as a bottleneck due to limited bandwidth. Existing copper technologies, such as DSL and coaxial cable access, are already at their peak: they can provide a maximum speed of no more than a few tens of Mbit / s of the end user, with a relatively small transmission distance. To meet the increasing demands of consumers to increase the bandwidth (and today the demand for higher transmission speeds is often explosive and difficult to predict), optical access networks (ODDs) are preferred. The latest developments in this field give us the prospect of obtaining high bandwidth, unlimited access and a wide range of applications for millions of end users. FTTx is an effective access technology, where as the "x" can act a house, office, campus, and any industrial facility. Instead of using a point-to-point (P2P) connection, passive optical networks (PON-Passive Optical Networks) use a point-to-multipoint (P2MP) architecture. PON architecture is used in the following schemes and technologies of communication organization: Time Division Multiplexing PONs (TDM), Wave length Division Multiplexing (WDM), Optical Code Division Multiplexing (OCDM) and Sub-Carrier Multiplexing (SCM).

TDM -PON and WDM- PON. Among these schemes, the leading role in terms of implementation belongs to TDM-PON and WDM-PON. Today TDM-PON is the most popular technology due to its economical and rather simple structure (Fig. 1). Nevertheless, this attractive configuration has a number of disadvantages: limited bandwidth, lack of flexibility of the coverage area, weak protective mechanisms. On the other hand, WDM-PON networks (Fig. 2) can provide more bandwidth than TDM-PON networks. They can also improve security by using separate wavelengths assigned to each ONU subscriber unit (Optical Network Unit). Therefore, WDM-PON networks are considered as a promising solution for optical access networks. However, today the cost of deploying the WDM-PON network is unacceptably high. As a result, solutions for TDM-PON networks: Ethernet PON (EPON), Gigabit PON (GPON) and 10 Gb / s 10G-EPON are expected to prevail in the next few years.

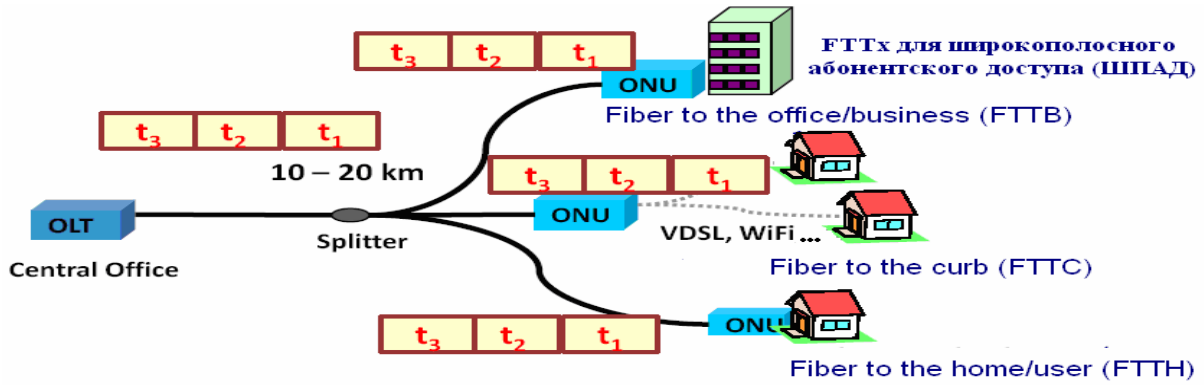

Fig.1 Technology TDM-PON

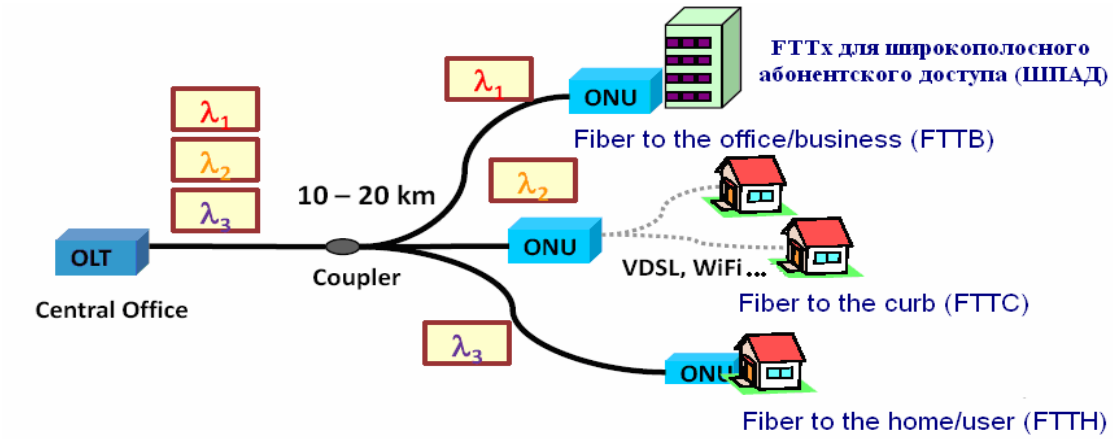

Fig.2. Technology WDM-PON

Aspects of the development of next-generation PON networks. The evolutionary path of existing TDM-PON systems in accordance with the concept proposed by the ITU can be represented by three main directions:

- Speed increase up to 10 Gbit / s;
- Achieving a transmission distance of up to 80 km;
- Increase of the branching factor.

To achieve a speed increase, high-speed transceivers are required which operate in the mode of high-frequency pulsations (burstmode) and able to quickly restore the level and phase for each individual high-frequency pulse.

To fulfill requirements 2 and 3, semiconductor optical amplifiers (SOA - Semiconductor Optical Amplifier) can be used. This will not cause interruption of current services, because SOA is transparent to the format and speed of the data being transmitted.

The improvement of solutions in TDM-PON should be oriented not only towards increasing the bandwidth and distance, but also bringing to the system as many intelligent capabilities as possible to create intelligent IN nodes (Intellectual Nodes). For example, installing a passive splitter in TDM-PON is done to distribute optical power between users equivalently. This approach does not require additional power supplies, thus, assuming energy savings. However, the lack of intelligent functions makes the network inflexible and vulnerable to network attacks. Moreover, this architecture does not provide a transition from TDM to WDM networks. The scenario of evolution is conditioned by actual tasks, addressed primarily to existing PON-solutions.

"Call" for the OSD. PON networks, deployed at present, need to solve the following tasks and problems due to the use of strictly passive components:

- Lack of flexibility in power distribution
- Static reconfiguration of wavelengths
- The complexity of network evolution
- Vulnerability to network attacks
- Energy efficiency

Despite the significant success in the current use of TDM-PON due to its reasonable cost and relative ease of operation, this technology is energetically inefficient and is unable to smoothly switch to wave multiplexing. Devices and technologies that, on the one hand, can keep passive nature and, on the other hand, flexibly distribute optical power and wavelength, while providing a sufficiently cost-effective migration from TDM-PON to WDM-PON, are the key to a successful future of optical access networks.

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THE PROCESS OF DEVELOPING MOBILE SOFTWARE FOR ANDROID SYSTEM

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Summary.*In the article we examined the principles of news applications, as well as the main components of C++, Java Android Developer Tools. Various events of the Android operating system have been considered and created a handler for them. The article studies the main characteristics of the input circuits, and describes the process of developing mobile software for Android system: provides the possibility of calculating the input circuits of VHF, UHF transmitters.*

Keywords: *modeling approaches, application, Android operating system, interface, input circuits*

With the advent of mobile phones, tablets, visiting sites and watching newsbecame not relevant. Therefore, to view the news one started to use news apps. They have their own advantages over the site: increased speed; load only the necessary information i.e., saves internet traffic; no advertising; a more convenient interface for viewing; more user-friendly functionality. Setting obtained in the work - to develop

software for the Android system: provides the possibility of calculating the input circuits of VHF, UHF transmitters.

Mandatory attribute in the study of any new area is a selection of relevant literature, manuals and other information sources. Reading this literature helps to solve problems.

The Android operating system is one of the most popular platforms for mobile devices. In addition, it is not a cheap product analogue from Apple as an alternative to its main competitor, with a high dynamics of development. The platform was developed using C ++ language. The flexibility of the Android system settings very successfully combined with a convenient tool that is ideal for the creation of new applications. The main source of software for android devices is Android Market.

This article is devoted to the study of the mobile application of visual object-oriented Java programming. For the development of the issue of this article we used components SDK Android version 4.0.3. The article considers working components with the mobile application, also their description, and the main features and functions. This application will provide an opportunity for the calculation of the input circuits quickly; it is one of the means to implement their ideas.

The purpose of its creation can carry very different characters. Therefore, the creation of the Internet portal requires a clear definition of goals. My goal is the study and description of the basic principles of news applications, the study of the component to work with the news application.

Statement of a problem

The input circuit is the part of the receiver circuit, connecting the antenna-feeder system with the input of the first stage of the receiver. The first stage can be a radio frequency amplifier or mixer.

The main purpose is to transfer input circuits useful signal from the antenna to the input of the first active element and the preliminary selection of the useful signal received from the totality of the signals induced in the antenna circuit.

The input circuit is typically a passive quadruple comprising resonance system and couplers. Depending on the system, resonant frequency band is performed on the concentrated or distributed elements and consists of one or more resonant circuits or resonators (coaxial, strip line, volume). Connected elements provide a connection to the antenna circuit loop (resonator), and at several resonant elements, the relationship between them and the first receiver stage.

In the range of receivers, the most widely used single-circuit is the input circuit. combi and Multi-input circuits can be used in professional receivers. Figure 1-3 shows the common scheme of single-loop input circuits.

Figure 1 shows a diagram of a transformer coupling between the contour of the input circuit and antenna. The circuit in Figure 2 is used capacitive coupling of the input circuit to the antenna. If the active element is a bipolar transistor, it can be used double-circuit switch incomplete, Figure 3. (Not often, but it is used to combine the connection of the input circuit to the antenna, usually inductive-capacitive coupling).

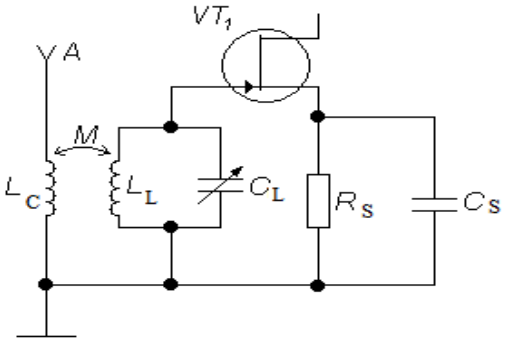

Fig. 1 Inputcircuit

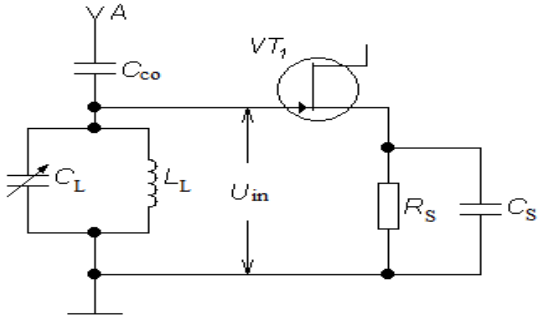

Fig. 2 Input circuit transformer capacitive coupled to the antenna connection

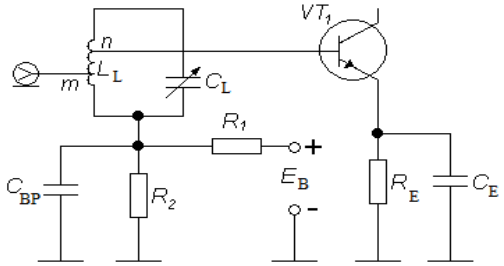

Fig. 1.3 Input circuit with a connection to an antenna filter

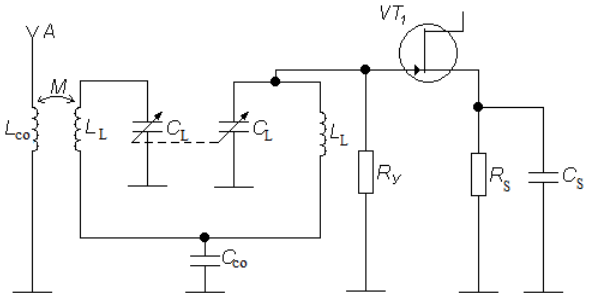

Fig.1.4 Input circuit with auto-transformer double-circuit band pass filter

Fig.1.4 shows one of the circuitscommonly used dual-input circuit. Here, the connection of the first circuit to the antenna - transformer. Communication between circuits - inside the vessel through the condenser. Active device - FET fully connected to the second circuit [1,2].

The concept of the problem decision

Before creating your first application, you can create a virtual Android-powered device to quickly test it on your software. Firstly, I would like to say a few words on the Android Virtual Device (AVD). This is a virtual smartphone with Android operating

system, which you can easily run the program you created. As you can see, Android Virtual Device advantage is that you can clearly see how your program will run on different smartphones with Android, instead of buying the whole range and test your application on each of them.

First of all, download your application icon, or rather three icons under the different options. The folder drawable-hdpi ship png-image with a transparent background in size 72x72, in the drawable-mdpi respectively 48x48 and drawable-ldpi the smallest size of 36x36. This can be done by simply dragging files directly on the wood. The next step will be the controls. In my program only three interface element is needed: **ImageView** (just picture the application logo), **Button** (to update the temperature value) and **TextView** (the output temperature values). These controls need to be described in a special xml-file. In the tree, it is located at res → layout → main.xml.

Direct application code is located on the path src → «name of your package» → «name of the application» .java.

I would like to explain that the logic is explained in three simple steps:

• Load HTML-page with the temperature values

• Use the regex "pull" temperature

• View TextView temperature

Note that when an application requires some system permissions, you must specify them in the manifest AndroidManifest.xml. In this particular case, we use the Internet connection, respectively, add the line <uses-permission android: name = «android.permission.INTERNET» /> in a xml-file above.

The above were uncovered during the design and development of applications for Android, study ways and possibilities of the promising market of Android Market, as well as discussion of the principle of a mobile application, which determines the accuracy of the information found on the Internet. Development of applications for mobile devices using the Android operating system, with the development of information technology, is getting more and more interesting in the future development of IT. The merits for this belong to Google, so it should be noted that Android developers have gone a very competent way, allowing anyone who wishes to develop applications for the platform. This is facilitated by:

Open source code, which plays into the hands of developers, because they can use the work of other programmers from around the world. Ease of development, qualitative feedback, a huge number of developers around the world, open source, access to market - is the way of success in today's world of computer mobile technology [3].

Conclusion

Processing begins at a time when a user enters a search request, and then the application goes into its database (index) for the selection of the most relevant keywords and returns pages with the results that are most relevant for users.

The above were uncovered during the design and development of applications for Android, study the ways and possibilities of the promising market of Android Market, as well as the discussion of the principle of a mobile application, which determines the

accuracy of the information found on the Internet. Development of applications for mobile devices using the Android operating system, with the development of information technology, is getting more and more interesting in the future development of IT. The merits for this belong to Google, so it should be noted that Android developers have gone a very competent way, allowing anyone who wishes to develop applications for the platform. This is facilitated by open source code, which plays into the hands of developers, because they can use the work of other programmers from around the world. Ease of development, qualitative feedback, a huge number of developers around the world, open source, access to market - is the way of success in today's world of computer mobile technology.

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ADVANTAGES OF USING MODERN INFORMATION TECHNOLOGIES IN EDUCATIONAL AREAS

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Summary. *Technology plays a role in all aspects of people's lives, especially in the field of education. Nowadays, an increasing number of students rely on computers for research and to produce a perfect paper for school purposes. Many people have decided that information technologies in education will help some students to progress in their studies much more better than original way of learning.*

Key words: *technologies revolution, virtual education, communication, "lecture style"*

Introduction

Technologies have changed many methods of teaching, at the same time making them more understandable, improving their effectiveness. Technology has been used widely in the field of education, be it in the form of PowerPoint presentations or online books and study resources.

Nowadays technology has become an integral part of our society. It's a part of almost everything we do including how we learn and teach. To better prepare students for their future careers, using technology in the classroom is essential. Information technology has the power to create and enhance new proficiencies in the education arena, at the same time modern technologies revolution most of the approaches we view, receive and perceive information every day. There has been a paradigm shift from textbook based education system to a more interactive and virtual education system across the world.

Efficiency of using technologies in the Classroom

There are many benefits of using technology in the classroom, especially as students become increasingly literate. The shift in worldwide computer usage and the need for computer skills in today's workforce necessitate to create guidelines for educators to ensure that students are prepared to meet the demands of the 21st century.

For example, modern-day education is not focused on simply learning concepts or facts as they are laid out in a curriculum. Instead, it is about the process of building connections. As a result, students gain an awareness of the importance and the value of communication. Today, with a single laptop, a webcam, a projector, and an Internet connection, a teacher can broadcast and begin collaboration with any other classroom. As groups of learners coalesce around shared passions online, they experience something that is difficult to replicate.

As classroom computer technology is being used for different types of communication (for presentation, for class interaction, and for collaboration), students are required to be readers, writers, editors, and publishers and must be willing to collaborate and co-create closely with others -- all skills that are critical for students to learn as they grow and enter the workplace.

Another advantage of using technology in the classroom is its flexibility and adaptability to differentiated learning. Technologies such as podcasts, for instance, provide students with the opportunity to learn at their own pace and the freedom to go back and relearn content whenever they want.

For example, this could be especially important for ESL students and students with learning disabilities, many ESL students need additional support with pronunciation and defining common vocabulary that may be new to them. Other students might have difficulty reading and reviewing complex texts. The ability to access podcasts on classroom computers can help address these students' needs. Using technology in the classroom, therefore, can help combat the "lecture style" system of education, which does cater to a variety of learning processes.

How information technologies changes the face of education all over the world?

Multimedia content: Multimedia content is one of the major changes, that brought about by use of information technology in education. Multimedia learning meets the needs of all types of learning styles. Studying and learning through the use of videos, pictures, text and games offer a better understanding of concepts than learning

in the traditional manner. Tutors can also use online learning resources and apps to present information in an easy-to-apprehend manner.

Free access to quality content: Digital devices have resulted in a paradigm shift from limited information to a vast resource of quality content available online. They offer personalization, by providing direct access to all kinds of content, are interactive and mobile. The access to quality content is also at a lightning speed rather than spending hours browsing through books to pull out required content.

Mobile learning: It is known that classroom learning gradually becomes a thing of the past. The use of information technology in education has led us to a new method, denominated as "mobile learning." Students can move from their desks, walk around, and learn new concepts. Students can now access learning modules from the comfort of their home, skype with other classes and involve in various collaborations for project learning.

Self-Monitoring techniques: Self-Monitoring techniques are considered as one of the most appreciated changes that has been fueled by use of information technology in education. Excess of tools are available for self-development and evaluation. There are unlimited mock tests and applications available online that can offer real-time evaluation of the students. There is no need for classroom evaluation tests as it was earlier. Real-time and factual test results offer an easy insight into the performance of students.

Focus on practical skill training: The utilization of information technology in education has shifted the focus of education from monotonous soft-skill training techniques to practical skill training. Most universities now concentrate their activities and promote projects, so that students can easily develop new ideas and implement them, thus allowing showing a portfolio of work activities later to their future employers.

Students with disabilities: Recent studies have shown how the use of information technology in education has helped students with various disabilities to learn with other students. Tablets have helped many students with autism to communicate effectively. E-Books with text-to-speech features have assisted blind students or children with dyslexia to gain access to all kinds of learning material.

Cost-effective education: Many people argue that the use of information technology in education involves huge costs. However, if you look at it closely, resources such as eBooks, free online resources and virtual outdoor trips are in fact promoting better learning at affordable prices across students of all strata and ages.

eBooks are often cheaper, at same time available with interactive learning sessions, worksheets, and linked dictionary tools. Think of the days when every change in information involved purchase of new books and resources. Due to digital learning techniques, most schools that subscribe to eBooks have access to constantly updated content at almost nil cost.

Information technology in education has improved communication. Nowadays by virtue of Information Technologies, people have the opportunity for distance learning. In regions that were once thought hard to reach are now accessible through eLearning.

Tutors can teach students over long distances and students can get their academic papers through eLearning. It is also an opportunity for those students that feel like studying from home.

Conclusion

In conclusion, I would like to say that information technology in education has facilitated the studying process and provided unlimited access to all information sources. Many online libraries assist teachers and students with comprehensive reading materials. Students and teachers can also easily download eBooks from the internet through their phones where they want. By virtue of Information Technologies, teachers can improve teaching skills and learning abilities of students.

ONLINE EDUCATION IN THE FIELD OF TEACHING AND ITS IMPORTANCE

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Annotation. *This article is devoted to online education and its importance to our country. Author presents the advantages of online teaching and online learning as well as the Moodle system, which was integrated in to the education system.*

Key words: *education, online education, distance teaching, distance learning, module, virtual word, multifunction.*

Humanity stepped ahead towards 21st century. As our president has already mentioned 21st century has managed to turn into the information century. Fast developing information technology has entered all spheres of the daily life. Occurring advancements in our society is creating incredible opportunities for us. The result of these enhancements can be seen in exchanging information by using distance transmitting not bothering ourselves to pay a special visit to a place where we should deliver the documents or other information. Information technology is adding its own portion to all subjects of the life simultaneously as it is effecting on education area positively.

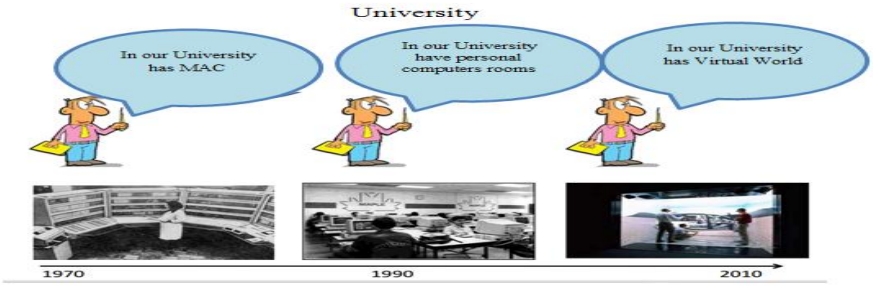

Figure 1. *Education evolution*

In the meantime, people can easily reach any information that they are in need of on internet as well as having a chance to access online education (learning). If we are to compete with the world educational institutions such as universities, colleges and high schools, we must have to endeavor with full potential considering world-standard measures. To be more precise, distance learning (online learning) helps us to implement aforementioned attempts effectively and efficiently.

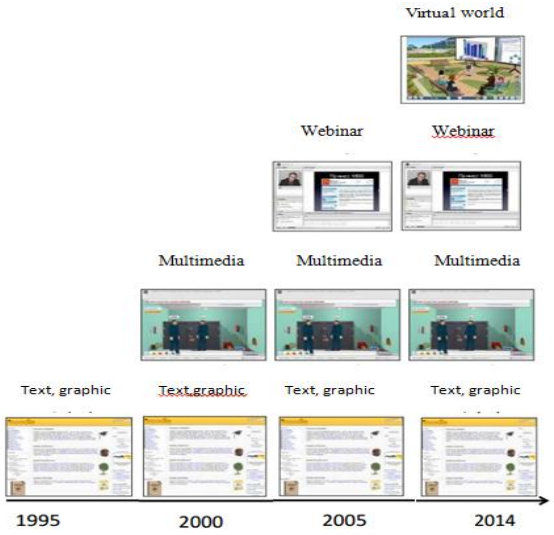

Figure2. *The effect of the development of information technology on education fields.*

Contemporary world is encountering diversity of modern conceptions at the same time with the old traditional ones. In the following there will be given main concepts with explanations:

- Teaching – it is a process of systematic knowledge, which is directed to particular aim by being equipped with essentials.
- Education – is a result of teaching and conducting and developing the personality involving the process of learning the knowledge that you get from this.
- Distance teaching (online teaching) – education form of availability of innovative and traditional methods based on information and telecommunication technologies.
- Distance learning (online learning) - is a method of delivering educational information via the internet instead of in a physical classroom. There are many different applications for online learning, ranging in scope from simple downloadable content through to structured programs that include assessment and award.
- Online education - is also known as distance learning and consists of taking classes via the internet. More and more students take online classes because of the flexibility and convenience it provides. You can attend class sessions from the comfort of your home and complete assignments at almost any time of the day.
- Adaptability – students are able to choose right time for them in order to be flexible enough to acquire knowledge.

➢ Module – creates an opportunity to provide knowledge individually or cooperatively according to the choice of the learners.

➢ Multifunction – capability of having education at the same time with working.

➢ Resource availability – supplying large amounts of students with all sources without any insufficiency.

➢ Economizing - Economizes on the time of teaching staff, and the cost of instruction. Allows the students to use all materials freely and efficiently.

➢ Equality – Irrespective of the learners' financial condition or health condition, he/she can gain knowledge equally as others.

➢ Internationalization – importing and exporting the world-standard education.

Figure 3. *View of traditional and online education*

➢ Role of teachers – online teaching amends teacher's importance in teaching and refreshes it. Being online lecturer or tutor demands continuous work on individual skills to be competent enough and to possess always up-to-date knowledge.

➢ Quality – online teaching can be competitive enough in teaching quality with other methods of providing education, namely traditional teaching. Reversely, online teaching endorses and boosts student by assisting them to get wide range of last version of new and innovated education.

Teaching processes based on Information technology

Figure 4*. Study process in virtual world.*

As can be witnessed, online teaching has marvelous features for both learners and tutors. However, question of why people need online courses is not still completely answered. As a full response here is provided final importance and characteristics why online courses are vital:

- Student-centered learning - the variety of online tools draw on individual learning styles and help students become more versatile learners.
- Collaborative learning - online group work allows students to become more active participants in the learning process. Contributing input requires that students comprehend what is being discussed, organize their thinking coherently.
- Easy access to global resources - Students can easily access online databases and subject experts in the online classroom.
- Experiential learning through multimedia presentations - new technologies can be used to engage and motivate students. Technology can also be used to support students in their learning activities. Accessible for non-traditional students - online delivery of programs and courses makes participation possible for students who experience geographic and time barriers in gaining access to higher education.
- Draws on student interest in online learning - many students are interested in online learning.
- Limited enrollments into high education in places require online education.
- Improvement of international integration among nationalities.
- Offer the opportunity to think about teaching in new ways
- Provide ideas and techniques to implement in traditional courses
- Expand the reach of the curriculum
- Professional satisfaction
- Instructor convenience

In a nutshell, by gathering all abovementioned details, it can be concluded that introducing the system of distance education brings benefits in all ways. In supreme education, all opportunities are adequate to implement the system in reality. In the territory of the Republic of Uzbekistan every single educational institution is provided with all technologies, counting from computers to electronic equipment has to be utilized by students in their academic life sufficiently and it is understood that internet network system also well established. Provided facilities help to prevent several problems that can be faced in supreme educational fields.

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DEVELOPMENT OF ELECTRONIC HEALTH CARE SYSTEM IN UZBEKISTAN

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Summary: *The article shows ICT development in Uzbekistan's health care system and includes some beneficial information about present situation of this industry in the country.*

Key words*:e-Health, communications infrastructure, emerge systems, telemedicine industry,The Ministry of Health of the Republic of Uzbekistan, Uzmedinfo.*

As per the United Nations Foundation, e-Health means, "using information and communication technologies (ICT) – such as computers, mobile phones, satellite communications and other communication devices – for health services and information".

e-Health alludes to technologies used across the quality chain in the health care industry from clinical tests to education, research and administrative aims. It has the potential to increase effectiveness of health care admistration, extend health care to rural areas, provide cheaper and better quality of health care, enhance the use of evidence-based medicine, emphasize prophylactic health care, inspire patients and consumers, and keep up relationships between patients and physicians.

For Uzbekistan to build a world class telemedicine industry needs a conducive communications infrastructure. Use Hospitals and other health care institutions can benefit from the broadband telecommunications infrastructure that can for e-Health solutions. Furthermore, the experience gained from telecommunications for e-Health applications in developing countries can also benefit equipment suppliers and service providers in developed countries, giving them a better understanding of what is cost-effective in emerging markets.

There are three main participants enclosed in e-Health: patient, physician and provider. To ensure that these players work together to promote, deliver and develop health care service, e-Health applications must insure delivery of health information services, facilitate the interaction between providers and patients, and integrate health care industry-related business solutions. Furthermore, e-Health applications must ensure both local and remote entree to health care record and maintain all parties, including employers and employees, recipients and providers.

Today there are a lot of software applications in the market which make possible health care service supply, impart education, and allow prophylactic health care. Nevetheless, there are very few integral end-to-end systems that maintain the total continuum of care for a patient, and give information from lots of sources with the patients and/or providers when and where they require it. A lot of e-Health resolutions marketed to date are designed to address single tasks.

Some of necessary condition of the e-Health information infrastructure involves:

- an environment for information exchange that is proxy, mobile, high-speed, low-power consuming and easily avaible;
- a clear framework for cloud computing for that can meet the demands which will come with the splay comprehension of e-Health;
- single regular medical record for each patient, avaible on a national base;
- an integrated national e-Health web site;
- a communication network of national health;
- a representative industry to make resolve and direct progress;
- a straight certification system for e-Health specialists;
- a multilingual platform for translation;
- industry standards for communications among different systems and applications, normed control of access, registries of participators, and private control system;
- a clear division between IT and content and governance. IT architecture can and should be normed across the country.

In order to implement the Decree of the President of the Republic of Uzbekistan "On further development of computerization and introduction of information and communication technologies", dated May 30, 2002 № UP-3080 and the Decree of the President of the Republic of Uzbekistan "On additional measures for further development of information and communication technologies" of July 8, 2005, the number PP-117, improving health management system, improving the quality of medical services and the development of continuing professional education administration personnel and health institutions through the introduction of modern information and communication technologies (ICT), the Ministry of Health established a specialized unit "Uzmedinfo" – the National Centre for development of electronic health.

The objectives of the center are defined:

- development and implementation of common policies, as well as coordination of the implementation of information and communication technologies into the practice of governments and public health institutions;
- contribute to the improvement of the health information system of the Ministry through the development, expertise and involvement in the development of e-health projects, creation and implementation of modern medical information systems and resources, the National Integrated Health Information System, a corporate health management system, systems of health care, health information systems, telemedicine and distance vocational training of health workers;
- examination of information systems and health resources for information security and privacy of personal information;
- Ministry of Health to assist in the maintenance and effective use of information and communication systems and computer equipment;
- facilitate management and health agencies authorities in the implementation process and effective use of health information resources and information and communication technologies.

Republican Centre for e-Health development “Uzmedinfo” was created as an independent structural unit of the Ministry of Health is the lead agency and the Ministry of Health on the implementation and development of information and communication technologies, telemedicine and distance learning.

The purpose of the center - to coordinate the activities of governments and public health agencies, projects implemented within the framework of national and international investments and grants, in terms of information systems and information resources, purchasing computer and telecommunication equipment, development and implementation of software, training personnel in the use of ICT.

Uzbekistan has "Electronic healthcare development Project" with Asian Development Bank which will support the Ministry of Health (MOH) to strengthen health information and governance by establishing a national health management information system (NHMIS) which will be embedded into the government's broader E-Government platform.

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ON THE QUALITY OF POSTAL SERVICE IN UZBEKISTAN

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Summary. *In the given article are presented the results of the spent researches in operating the system of quality indicators of services. A mail service in Uzbekistan and problems on formation of new system of the indicators characterizing quality of granting of services of a mail service, for the purpose of performance of obligations of Republic Uzbekistan before the World postal union on improvement of quality of services and efficiency of a post network are resulted in this text.*

Key words: *postal service consumption, a liberalized mail market, segment, bank account, postal transfer, shortcoming, countries, postal operator.*

About quality in recent years, a lot is said in the environment of postal operators. In modern conditions, high quality of services is a necessary condition for the stable

and efficient functioning of the manufacturer in a competitive market and is one of the main and decisive indicators of its activities.

The quality of the products (services) of operators and postal service providers is understood as a set of properties that determine its suitability to meet the requirements of users to the mail products (services) in accordance with its purpose.

In the conditions of growing competition in the market of postal services, the quality of the services provided is one of the competitive advantages of the postal service operator. Ensuring the competitiveness of the activity of postal operators in the provision of services can be achieved only when managing the quality of service delivery at all stages of the service life cycle.

Given some conditions in the future, such as high-quality user requirements, a liberalized mail market that implies competition between public postal operators and private operators, and a possible reduction in the volume of international mail, it is extremely important for the Universal Postal Union to distribute even more information about the objectives in Quality of service and activities to improve it. The Universal Postal Union continues to develop documents and procedures to verify the quality of the international service and to continue its program of certification of postal operators in the field of quality management.

Expected overall performance of the Universal Postal Union on the quality of the international postal service:

- a higher percentage of countries that have defined and applied quality standards for the service;
- a higher percentage of countries that meet the global quality standard;
- an increase in the number of countries that have reduced their mail forwarding time;
- Increase the level of security of items that are trusted by the postal service.

It is generally recognized that the postal service must continue to fulfill its statutory mail delivery mission in a timely, regular and reasonable manner accessible to everyone throughout the country. The uneven development of the economy, transport and market infrastructure, as well as differences in the level of well-being and solvency of the population in the regions of Uzbekistan, lead to imbalances in the attractiveness of the postal services market. In urban areas and densely populated areas, the percentage of postal service consumption is the highest, and in rural areas, as well as remote and hard-to-reach areas, postal services are the least in demand.

Currently, postal services on the territory of Uzbekistan, along with the national postal operator (JSC "Uzbekiston Pochtasi"), more than 10 commercial structures (non-state operators of the market). On the market of postal services are all their types - services for sending written correspondence, parcels, express mail, postal money transfers, services for the delivery and payment of pensions and benefits, the distribution of periodicals. At the same time, the activity of non-state operators rendering postal services is virtually unrelated to rendering universal postal services and is limited mainly by profitable segments of the postal services market in cities.

This is what the conducted research of the structure of the market of postal services and its state by types of services in Uzbekistan showed.

The main activities of the national operator and non-governmental operators of the postal services market are different. The activity of non-state market operators is dominated by the provision of expensive and high-quality services - forwarding of express mail. The activity of the national postal service operator includes traditional postal services - the transfer and delivery (delivery) of postal items (written correspondence, parcels and printed publications in the relevant packaging) and postal money transfers, as well as contractual services - payment of pensions and benefits, acceptance of payments , Distribution of periodicals, etc., most of which are low-profit or unprofitable.

The volume of outgoing written correspondence for JSC "Uzbekiston pochtasi" for 2009 amounted to more than 14,000.0 thousand units. Objects of postal service of OJSC "Uzbekiston Pochtasi", according to official statistics, 95-98% of written correspondence are delivered on target dates, which are up to 7 days, and in Tashkent the control period for sending simple letters is 2 days.

The volume of outgoing parcels for JSC "O'zbekiston pochtasi" for 2009 amounted to more than 80.0 thousand parcels and per capita - about 0.003 parcels per year, while in the countries of the European Union this figure is 6.8.

Services for the transfer of funds between individuals and legal entities, similar to postal transfers, in Uzbekistan are provided by commercial banks using international money transfer systems. Send a money transfer without opening an account can any citizen in any bank of Uzbekistan that has the right to work with individuals. At the same time, for citizens of rural regions of the country, where the banking network is underdeveloped, postal money transfers are the only available money transfer service.

Objects of postal service of OJSC "Uzbekiston Pochtasi" send internal postal orders within the same deadlines as registered written correspondence (up to 10 days). The volume of services for the transfer of funds for 2009 amounted to more than 800.0 thousand units.

Delivery (handing) of pensions and benefits is a socially significant service, especially for users in rural areas. Uzbekistan is one of the few countries in the world where pensioners are provided with a service to deliver pensions to their homes. At the same time, alternative ways of obtaining pensions and benefits are being expanded, for example, transfer of funds to the user's bank account.

In accordance with Article 23 of the Law "On Postal Communication" [2], the national postal operator of the Republic of Uzbekistan has the exclusive right to provide services for the delivery (delivery) of state pensions and benefits. The volume of pensions and benefits paid by the objects of postal service of JSC "Uzbekiston Pochtasi" in 2009 amounted to more than 30000,0 thousand units.

Between 1990 and 1999, the periodical market in the country fell by an average of 20% per year. This trend stopped in 2000, and by now the cumulative circulation of periodicals has stabilized. Distribution of periodicals is carried out through two main channels - by retailing periodicals and delivering them to subscribers. In 1990, the

subscription periodicals accounted for about 75% of the cumulative circulation of periodicals and was mainly delivered by the postal communication facilities of JSC "Uzbekiston Pochtasi". In the period from 2005 to 2010, the growth in the volume of periodical printed publications delivered to subscribers was 39%.

The system of indicators of the quality of postal services in the Republic of Uzbekistan was developed and put into effect in 2001. The order of the Uzbek Post and Telecommunications Agency dated January 22, 2001 No. 29 [3] established the following indicators and standards for the quality of mail products:

- fulfillment of the deadlines for the completion of written correspondence;
- the number of losses and theft of postal items due to the fault of communication enterprises;
- the number of checks on transfer operations arising from the fault of enterprises;
- shortages and theft of transfer and pension amounts due to the fault of communication enterprises;
- it is not necessary due to the fault of the communication enterprises along the main, intra-regional and intra-regional routes;
- shortages and embezzlement of subscription and retail amounts due to the fault of enterprises;
- shortages and theft of subscription and retail publications through the fault of enterprises;
- violation of delivery terms for consumers of republican newspapers through the fault of print distribution workers;
- the number of justified complaints about the work of postal and electronic communications.

By the same order of the Uzbek agency of mail and telecommunications the control terms of passage of postal items and the target dates of delivery of the republican newspapers were approved.

Over the past decade, significant changes have taken place in the provision of postal services in connection with the introduction of new technologies. Operators and postal service providers have modern technical capabilities to expand the range of services provided, move to a qualitatively new level of customer service and meet their needs, which is closely tied to the requirements of a market economy and creates a platform for further integration into the international postal space. This, to a large extent, calls for a review of the current system of postal service quality indicators.

The system of quality indicators should reflect the consumer properties of each particular service in relation to the stages of its provision. Indicators should be measurable and be determined by available means when collecting and processing data. The system of indicators can be formulated from indicators regulated by normative documents, as well as from unregulated indicators, but necessary in accordance with the purposes of the assessment.

Regulated indicators can be selected from the normative documentation in force at the time of assessment in the field of services provided (laws, technical regulations, standards, guidelines, rules, etc.). In the absence of regulatory documents, internal

standards for quality indicators that develop and incorporate enterprises into their standards can be used as reference values in assessing the quality of services.

Reference values of indicators, not regulated by regulatory documents and not accepted in international practice, can be determined by the enterprise itself on statistical data.

All indicators of the quality of postal service can be divided into indicators of service quality and quality of postal services (services).

The quality of service indicator is designed to determine the ability of an operator or provider to provide a specific service and facilitate its use. Indicators of the quality of postal service are characterized by the density of the network of offices and postal points and their time of action. The density of the network of branches and postal points in turn is characterized by a service radius of one branch or postal service and the number of people per department or post office.

The quality of postal services is characterized by:

- speed of sending, processing and delivery of mail;
- stability and regularity of action;
- safety of postal items;
- no complaints about the operation of postal facilities.

Conducted during 2009-2010. Studies allow us to draw the following conclusion about the quality of the main postal services provided by the postal facilities of the OJSC "Uzbekiston Pochtasi" - in general, the quality of the basic services is satisfactory, but at the same time there are a number of shortcomings in the current system of indicators and quality standards in postal communications:

- the deadlines for sending mail items on separate routes have not been established, for example: the deadline for sending simple written correspondence and parcels between the regional center (the Republic of Karakalpakstan) and the district center within the region, the district center and any settlement within the area between the populated The point of one region and the settlement of another region, in the regional centers, as well as the deadlines for the transfer of registered written correspondence;

- in terms of the reflection of consumer services, there is a duplication of individual indicators, for example: the indicator "Undelivered mail through the fault of communication enterprises along trunk, intraregional and intraregional routes" essentially duplicates the indicator "Checklists for the passage of postal items";

- at the level of the Universal Postal Union, today the setting of deadlines for sending mail items is reflected in days as D + X (D - filing day, X - delivery day after filing), the current system of reflecting these dates in hours is not monitored.

Elimination of these shortcomings, as well as the formation of a new structure of indicators of postal services, are the primary task of the postal industry of Uzbekistan to bring the indicators and standards of postal communication quality in line with the requirements of the postal strategy pursued by the Universal Postal Union.

Based on the results of the research, the following classification of postal service quality indicators is proposed.

A. Quality of service standards

Access to services:

The maximum distance between the user and the nearest post office, as well as mailboxes;

The seizure of written correspondence from mailboxes (the number of excavations per day, per week); Delivery of written correspondence (number of deliveries per day, per week);

Mode of operation of post offices (minimum number of hours of work per day, per week); Standards for access to postal services (population per post office, taking into account a group of settlements).

Customer Satisfaction:

Normative (days) of consideration of claims / appeals;

The norm of the degree of satisfaction of users (the number of polls and frequency).

B. The quality of postal services

Speed and reliability:

The standards for sending simple written correspondence within the country

(D + X), Standards for the transfer of registered written correspondence within the country (D + X), The norms for sending parcels inside the republic (D + X),

The norms of sending simple money transfers within the republic, Standards for the transfer of international simple written correspondence (D + X) between the city of Tashkent and the capitals of states.

Responsibility and processing of requests for information:

Loss and theft of postal items,

Damage or replacement of part of the enclosure of postal items,

Shortage and theft of remittances,

Return of international mail without explaining the reasons for their non-delivery.

From the above indicators in Uzbekistan today, only the target dates for sending simple written correspondence and parcels from the city of Tashkent to the regional centers and the city of Nukus in the direct and reverse direction, from the regional center to any locality within the region, and also around the city of Tashkent [3] , The standards for placement and development of the postal communication network are defined RH 45-052: 2008 [4]. The responsibility for loss, damage (damage), shortage of internal postal items is determined by Article 27 of the Law "On Postal Communication" [2], responsibility for loss, theft, damage or replacement of an attachment, as well as for the return of parcels of international postal items without explaining the reasons for them Non-delivery - the Universal Postal Union Convention. The basis for the standard for sending priority international simple written correspondence is the international quality standard D + 5 with the goal of 80% between the capitals of states.

At the XXIII Congress of the Universal Postal Union (Geneva, 2008), the Nairobi postal strategy was adopted. The eighteen strategic programs of this strategy describe how four objectives will be achieved based on measures taken by governments, regulators, regional unions, designated operators, permanent bodies of the Universal

Postal Union and all other stakeholders in the postal sector. The Universal Postal Union will focus on high-quality, affordable, reliable, functionally compatible and effective universal postal service that meets the needs of the market and customers. Even greater importance will be attached to improving the quality of services and the effectiveness of the postal network. To fulfill the obligations of the Republic of Uzbekistan to improve the quality of services and the effectiveness of the postal network in order to implement the Nairobi postal strategy, it is necessary:

Ensure a percentage of compliance with the international quality standard D + 5 by at least 80% for written correspondence;

Expand the use of the tracking system for all types of registered mail;

To participate in the continuous monitoring of the quality of the written correspondence service conducted under the direction of the Universal Postal Union. The implementation of this standard can be achieved only on condition that the established time limits for the passage of the international priority letter correspondence on the main and intraregional postal routes are revised;

Ensure uninterrupted and safe operation of the postal communication network of the republic, for which purpose to optimize the main and intraregional postal routes, ensure the fulfillment of the deadlines for sending mail within the country;

Implement a global monitoring system.

Improving the quality of postal services is the first priority area for the implementation of the Regional Postal Development Plan for Europe and the CIS under the leadership of the Universal Postal Union, which will be the main means of implementing the Nairobi postal strategy on the ground.

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THE DEVELOPMENT OF INFORMATION TECHNOLOGIES IN UZBEKISTAN

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Summary: *Information and communication technologies as an important factor in the development of Uzbekistan's economy. In this article, the market development of information technology evaluation is considered in Uzbekistan, its structure, basic tendencies and directions of development. And in this article the estimation of market of information technologies development is considered in Uzbekistan, his structure, tendencies and basic directions of development.*

Keywords: *Information technologies, IT, nanotechnological revolution, communication technologies, market volume, rates of height, investment.*

Information and communication technologies (ICTs) are one of the most effective factors in shaping the twenty-first century. Their innovative impact affects the way people live, work and education, as well as the interaction between government and civil society.

At the present time, when information and communication technologies are developing rapidly, computers, the Internet and other modern means of communication are an integral part of our daily lives and in the remote villages of our country.

President Islam Karimov's Decree "On measures for further implementation and development of modern information and communication technologies" on March 21, 2012 is an important guide for action in expanding the scope of work in this direction year increases the efficiency of the use of ICT, improving computer technology and developing electronic document management system. Modern communication technologies are implemented in all areas, it is convenient and rapid means of exchanging information and customer service. This can be seen in the example of the interactive services provided in the strategic sectors of the Republic of Uzbekistan.

Investments in ICT today - the most important stimulus for the development of the economy in both developed and developing countries. The research aimed at studying the effect of the growth of the Internet - activity showed a natural connection between GDP growth rates and the development of the country's ICT sector. One of the criteria of ICT - availability of any country is an indicator of «Connectivity Scorecard». The assessment criteria which are the level of development of ICT infrastructure, the level of ICT implementation in the public and businesses, the level of the impact of ICT on the development of social and economic growth.

According to the method of calculation of UNDP Education Index of Uzbekistan has a value of 0.91, the network readiness index of the world about 3.0, Digital Opportunity Index 0.34, and the index of readiness for e-government 0.4. These index numbers show that the government of Uzbekistan, year after year pays special attention to ICT. An example of this is the decision taken on April 3, 2014 PP-2158 "On measures for further implementation of information and communication technologies in the real economy." Resolution approves the list of priority projects for the introduction of information and communication systems and products in the domain of the real economy in 2014-2015.

Currently, the government adopted a program for the integrated development of information and communication systems of Uzbekistan for 2013-2020. For the successful implementation of this program should be dealt with the following tasks:

- Effective maintenance of the population of the republic the possibility to carry out the relationship public authorities in electronic form;
- Introduction and use of the principle of "single window" in the system of state regulation;
- Implementation of measures to create databases and complex information systems "Electronic Government".

As of 2014, all the public authorities of the Republic have their own websites, users have more than 200 kinds of interactive services. For a single electronic document management system connected to almost all the district city and regional government. At this time, 98% of the organizations of the republic pass the reports in electronic form the tax office.

Training of personnel in the development of ICT sector is topical.

Currently, major domestic centers of integration of education, science and industry - Tashkent State Technical University (TSTU) and Tashkent University of Information Technologies named after Mukhammad al-Khwarizmi named after Mukhammad al-Khwarizmi (TUIT) - train specialists in technical direction and for IT sector. In 2013, TUIT opened two new master's direction - management of the system "Electronic Government", and library science. At the same time, these universities carry out scientific research on the basis of active cooperation with leading industrial enterprises of the country.

From October 1, 2014 the branch of the prestigious South Korean INHA University began its activity in Tashkent. Professionals in areas such as computer and software engineering, computer network engineering are trained here.

Thus, the domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.

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LINUX

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Summary: *Now there are a lot of operation systems. We all are familiar with other operating systems like Microsoft windows, Apple Mac OS, iOS, Google android, etc, just like them Linux is also an operating system. Linux is an open-source operating system. The time has come make a bid for Linux and freedom. Escape Windows*

Keywords: *Distribution, software, command-line, application, desktop, laptop, servers, device, hacking, PC, OS*

If you want to buy a new PC because of pre-installing windows, you have come to the conclusion that Microsoft has finally lost the plot, now is the perfect time to switch to a better OS. Macs are shiny and expensive, so why buy one when you can keep your existing PC and move to Linux? Gone these days when Linux meant immersing yourself in command-line chicanery. Your existing Windows installation without losing any data.

Linux Distributions. A Linux distribution is a collection of (usually open source) software. A distribution can bundle server software, system management tools, documentation and many desktop applications in a central secure software repository. A distribution aims to provide a common look and feel, secure and easy software management and often a specific operational purpose.

There are a lot of Linux distribution like **Red Hat, Ubuntu, Debian** and others. **Red Hat** is a billion dollar commercial Linux company that puts a lot of effort in developing Linux. They have hundreds of Linux specialists and are known for their excellent support. Canonical started sending out free compact discs with **Ubuntu** Linux in 2004 and quickly became popular for home users (many switching from Microsoft Windows). Canonical wants Ubuntu to be an easy to use graphical Linux desktop without need to ever see a command line. Of course they also want to make a profit by selling support for Ubuntu. There is no company behind **Debian**. Instead there are thousands of well organized developers that elect a Debian Project Leader every two years. Debian is seen as one of the most stable Linux distributions. It is also the basis of every release of Ubuntu. Distributions like CentOS, Oracle Enterprise Linux and Scientific Linux are based on Red Hat Enterprise Linux and share many of the same principles, directories and system administration techniques. Linux Mint, Edubuntu and many other *buntu named distributions are based on Ubuntu and thus share a lot with Debian. There are hundreds of other Linux distributions.

Choose your Linux distribution for your reasons

distribution name	reason(s) for using
Red Hat Enterprise (RHEL)	You are a manager and you want a good support contract
CentOS	You want Red Hat without the support contract from Red Hat.

Fedora	You want Red Hat on your laptop/desktop.
Linux Mint	You want a personal graphical desktop to play movies, music and games.
Debian	Favorite for servers, laptops, and any other device.
Ubuntu	Very popular, based on Debian.
Kali	You want a pointy-clicky hacking interface.
Others	Advanced users may prefer Arch, Gentoo, OpenSUSE, Scientific, …

When you are new in Linux, go for the latest Mint or Fedora. If you only want to practice the Linux command line then install one Debian server or one CentOS server without graphical interface. If you want to know more information about linux or get Linux distribution visit these sites: redhat.com, centos.org, debian.org, www.linuxmint.com, ubuntu.com

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UNIX OPERATION SYSTEM

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Summary. *First of all, it is necessary to underline that Linux is a system that is isolated from viruses for 100 percent. One of the advantages of Linux is , it is an open system. The codes of operation system are spread freely. This is the most comfortable method for studying how this operation system is done. In order to be professional in one field, you have to know this field in depth. As an example of my opinion can be Uzbek operation systems such as Doppix, UzMot, EastLinux that are created on the basis of Linux*

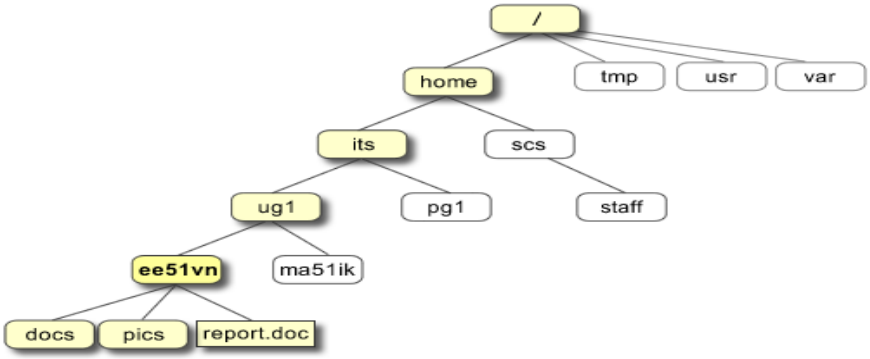
Key words: UNIX, *Autonomic, Desktop, Operation System, Linux, Multi-user,* Server, *GUI, Laptop, Root, Terminal, Directory, BSD, Software.*

UNIX is an operating system which was first developed in the 1960s, and has been under constant development ever since. By operating system, we mean the suite of programs which make the computer work. It is a stable, multi-user, multi-tasking system for servers, desktops and laptops.

UNIX systems also have a graphical user interface (GUI) similar to Microsoft Windows which provides an easy to use environment. However, knowledge of UNIX is required for operations which aren't covered by a graphical program, or for when there is no windows interface available, for example, in a telnet session.

There are many different versions of UNIX, although they share common similarities. The most popular varieties of UNIX are Sun Solaris, GNU/Linux, and MacOS X.

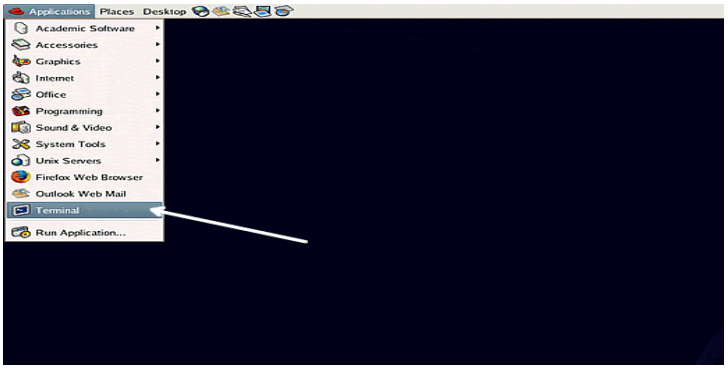
All the files are grouped together in the directory structure. The file-system is arranged in a hierarchical structure, like an inverted tree. The top of the hierarchy is traditionally called **root** (written as a slash /)



In the diagram above, we see that the home directory of the undergraduate student **"ee51vn"** contains two sub-directories (**docs** and **pics**) and a file called **report.doc**.

The full path to the file **report.doc** is **"/home/its/ug1/ee51vn/report.doc"**

To open an UNIX terminal window, click on the "Terminal" icon from Applications/Accessories menus.



Advantages of Unix

Unix is more flexible and can be installed on many different types of machines, including main-frame computers, supercomputers and micro-computers.

Unix is more stable and does not go down as often as Windows does, therefore requires less administration and maintenance.

Unix has greater built-in security and permissions features than Windows.

Unix possesses much greater processing power than Windows.

Unix is the leader in serving the Web. About 90% of the Internet relies on Unix operating systems running on Apache, the world's most widely used Web server, which is free.

Software upgrades from Microsoft often require the user to purchase new or more hardware or prerequisite software. That is not the case with Unix.

The mostly free or inexpensive open-source operating systems, such as Linux and BSD, with their flexibility and control, prove to be very attractive to (aspiring) computer wizards. Many of the smartest programmers are developing state-of-the-art software free of charge for the fast growing "open-source movement".

Unix also inspires novel approaches to software design, such as solving problems by interconnecting simpler tools instead of creating large monolithic application programs.

Remember, no one single type of operating system can offer universal answers to all your computing needs. It is about having choices and making educated decisions.

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INFORMATION SYSTEM OF THE UNIVERSITY TIMETABLE USING C++ BUILDER

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Summary: *In this paper has been described creation process of automation the university timetable. The results of this research will help students to see their timetable and search some necessary information. Additionally, administrators will also have an opportunity to add or delete information in the timetable.*

Key words: *C++ Builder, Microsoft Access, Button, Form, BitBtn, MainMenu, ADOConnection, ADOQuery, SQL, DBGrid, DBNavigator.*

Today most industrial as well as educational spheres have their own information systems. They use those systems to make their work easier. Analyses of literature and

internet resources show that there are no any automatic systems for timetable. Most teachers and students at universities need this system, which will help to search some necessary information. This automatic system will save their valuable time, which can be devoted to their studies.

Many information systems are primarily delivery vehicles for data stored in databases. A database is a collection of interrelated data organized so that individual records or groups of records can be retrieved to satisfy various criteria. Typical examples of databases include employee records and product catalogs. Databases support the operations and management functions of an enterprise. Data warehouses contain the archival data, collected over time, that can be mined for information in order to develop and market new products, serve the existing customers better, or reach out to potential new customers. Anyone who has ever purchased something with a credit card—in person, by mail order, or over the Web—is included within such data collections. [1, p. 120].

Languages C and C++ programming are the basis of many application development tools for operating systems Microsoft Windows. The overwhelming majority of the examples contained in this paper on programming in the Windows environment, drawn up in the languages C and C ++ programming. If you choose to program in these languages, you will need a set of programs (compiler, linker, debugger, etc.), allowing to obtain workable program that is executable files. As a development tool can be used freely distributed by Borland Software Corporation. a set of programs under the general title Borland Builder C ++ 6.0 command line tools.

A feature of this software product, except for the free license is the lack of an integrated visual development environment and component libraries included in the full commercial product Borland Builder C++. However, in a free package includes almost all of the header and library files needed to develop 32-bit applications under Windows. Missing import library can be obtained using the utility implib.exe, included in this package. In addition, the package contains detailed documentation, but materials in the Win32 API programming quite a lot on the Internet, as well as documentation for the compiler Borland C++ guidelines.

C++Builder is a rapid application development (RAD) environment, originally developed by Borland and as of 2009 owned by Embarcadero Technologies, for writing programs in the C++ programming language targeting Windows NT (IA-32 and x64), OS X and Android. C++Builder combines the Visual Component Library and IDE written in Delphi with a C++ compiler. Most components developed in Delphi can be used in C++Builder with no or little modification, although the reverse is not true. C++Builder includes tools that allow drag-and-drop visual development, making programming easier by incorporating a WYSIWYG graphical user interface builder. [3]

Timetable Builder will give you a week-by-week visual perspective that will help you eliminate time conflicts, select labs, lectures and tutorials that will fit well in your weekly schedule and allow you to view course information such as class enrolment, waitlists, pre-requisites or course restrictions. [2, p. 2]

In this research work automatic base of timetable has been created. Initially, Microsoft Access 2010 has been opened and saved to the new base as timetable .mbd. format. It's important to save .mbd format in order to make a connection to Microsoft Access 2010 base with C++Builder 6.0. After that, tables have been created and filled using constructor division. Then, all tables have been filled. So, working process began by opening C++ Builder 6.0. Six Forms have been created for this project. First Form has been illustrated project theme and how to access it. For this one label, one BitBtn, MainMenu have been attached from Standard. Design is important for any project, so it has been completed. In Form2 two radio buttons and one LabeledEdit, one label, two Speedbuttons have been added. In Form3 seven buttons and one label, one ComboBox (in order to choose the groups' timetable), DBGrid, DBNavigator, ADOConnection, ADOQuery have been appended. Then Microsoft Access was connected with C++ Builder. For this purpose DBgrib1, DBNavigator1, DataSource1, ADOConnection1, ADOQuery1, two Edits, four buttons have been added.

The process of Microsoft Access database and connection to C++ Builder begun. Here we click to button ADOConnection and this open window. After choosing Build button Microsoft Jet 4.0 OLE DB Provider has been selected.

After choosing ADO Query Connection has been indicated ADOConnection1 and Active has been changed into True. It asks password and login. If Login Prompt changes into False, this message will not be shown. Second work in AdoQuery1 some necessary codes have been written into SQL. In order to see database we need DBGrid. Choosing DBGrid in Data source has been shown Data Source 1. So you can see what database connected to Dbgrid. Subsequently, Form4 has been created where only admin can access add, delete, search new teachers. Form5 has been created in order to make new timetable. Here has been added 4 ComboBox, 3 BitBtns, DBGrid, ADOConnection, ADOQuery, DataSource, Label and Edit. Connection process is the same as Form3, but there is a little bit difference that in ADOQuery another table should be shown.

In conclusion, it should be noted that database of Timetable in Microsoft Access, which has been completed using C++ builder, will enable both teachers and students to access Timetable database easily and provides with the information which they need. Timetable is a mirror that reflects the entire educational program which should follow University program. Using this base you can see and add new subject, pairs and so on easily. Besides that Borland Builder 6.0 program gives an opportunity to utilize program simply and comfortably.

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IMS – THE IDEAL ARCHITECTURE FOR ENABLING QUADRUPLE PLAY FOR OPERATORS IN UZBEKISTAN

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Summary. *This article is devoted to the consideration of the ideal architecture IMS, which enables quadruple play for operators in our country. This article focuses mainly on the basic requirements of a cooperative service delivery platform for providing quadruple play services.*

Key words: *IMS technology, quadruple play services, subscribers, mobile operator, line operator.*

IP-telephony is coming, and not only telephony. Triple Play services - telephony, Internet and television in one package appeared, which are transferred to packet switching networks via IP protocol. Now mobile communication is added to them, and a new term, quadruple play, is introduced. On the way of integration with the management of "smart home", it will be one more addition - the bus for the management of home appliances. There are all new services of using the mobile device as a means of mobile commerce. In a word, the happy period for telecom operators ended, when the means of access and ministerial restrictions supported clear distinctions between service providers. Today, life dictates new tough rules of the game because of the onset of cheap IP communications. The incomes of not only fixed-line operators, but also mobile communications, are falling. Money transfers to new players in the market of services and applications, to players from the IP-world, such as Google, Skype or Yahoo and hundreds of others. The convergence of communication networks (FMC - Fixed-Mobile Convergence) is inevitable, there have already been first successful attempts to enter telephone operators in new market conditions - mainly through mergers and acquisitions.

Currently, there are several trials of the IP multimedia subsystem deployed worldwide that promise to provide telecommunication and advanced multimedia services. This article focuses mainly on the basic requirements of a cooperative service delivery platform for providing quadruple play services. As a result of this research, an IMS-based cooperative service delivery platform is presented. This supports various access technologies to acquire the streaming services.

Nevertheless, it is necessary to pay attention to the primary task facing telecoms operators: convergence of networks requires the availability of advanced charging and billing tools, as well as a reliable system of user identification, which will be discussed in this article.

In the development of international standards for charging services (charging) and for settlements with subscribers (billing), mobile operators are most active. Therefore, we will consider about the Association of Third Generation Mobile Operators 3GPP, the Pay Circle Consortium, which develops mobile payment, m-commerce standards, and the international organization Liberty Alliance Project,

which deals with user identification issues. How are these organizations involved in charging and billing issues in the networks of the new generation NGN?

Tariffication in the NGN network

The architecture of next-generation NGN networks is aimed at generating new revenues from the provision of multimedia services. Whether forecasts are justified, it is difficult to say. But there is still hope that the phenomenal success that the SMS service had in the second generation mobile networks will be accompanied by MMS (Multimedia Messaging Service) in 3G networks. And further. Operators of communication realized that they could not come up with their own forces and develop many new services and rely on third-party developers.

The NGN core is made up of the IMS (IP Multimedia Subsystem) system - this is provided by the 3GPP standards. It is also fixed that the IMS operates in packet switching mode, and the main signaling protocol is SIP. The means of accessing the network can be different (xDSL, GPRS, EDGE, WLAN, ..), and all of them transmit packets.

The site of the IMS node in the NGN architecture

In NGN networks, the charging system becomes a key one: without a single tariffication system and mutual settlements, there can be no convergence of networks (at least, so do the telephony operators). By analogy with the SMS service in GSM networks, 3G networks focus primarily on various payment options for MMS, taking into account the following parameters:

- Types of messages, their length, time of storage in memory, etc.;
- Delivery time;
- Sending direction (upload / download), who sends / receives MM;
- The number of messages sent / received;
- Roaming conditions;
- Location conditions;
- Prepayment terms;
- The type of transport of the message.

In the 3GPP specifications, only in the 32 series "Charging management" there is more than 20 standards.

As the most complicated variant, we will consider the charging in real time (online charging) mode.

According to document 3GPP TS 32.815, in all sections of the 3G network are placed charging triggers (Charging Trigger Function - Figure 2), which transmit signals to the real-time charging module OCF (Online Charging Function). Trigger signals come from the mentioned levels of the system: CS-domain, services (service element) and the system itself IMS (sub-system). One of the important tasks of OCF is to reconcile these three streams of messages launching the charging system. The signals are transmitted via the Ro interface, more precisely, via the ATS protocol. There are two units in the OCF subsystem: the RF Function (Rating Function) function available via the Re interface, and the ABMF (Balance Management Function) balance management function available via the Rc interface.

In telecommunications, **quadruple play** or **quad play** is a marketing term combining the triple play service of broadband Internet access, television and telephone with wireless service provisions. This service set is also sometimes humorously referred to as "The Fantastic Four".

"Mobile service provisions" refers in part to the ability of subscribers to purchase mobile phone like services, as is often seen in co-marketing efforts between providers of landline services. It also reflects the ambition to gain wireless access on the go to voice, internet, and content/video without tethering to a network via cables.

Given advances in WiMAX and other technologies, the ability to transfer information over a wireless link at various combinations of speeds, distances, and non-line-of-sight conditions is rapidly improving. It is possible that one could never need to be wired to get any communication service, even at home.

In addition to being a testament to technological convergence, quadruple play also involves a diverse group of stakeholders, from large Internet backbone providers to smaller startups.

Nowadays IMS technology is in use in Uzbekistan, but not all of its services are used in full. The subscriber stations are not yet fully supported by the Internet, or in some places copper cables are still connected to the Internet through telephone lines. This leads to a decrease in speed. If the speed is low, we can use some of the services, but some of them we cannot. Therefore, in the implementation of IMS technology-based service Quadreplay, first of all, subscriber lines of all users must be full of fiber optic cables. Second of all, if we use this service, mobile operators will face big changes.

On the other hand, by applying this technology, we will be able to use four services at homes at the same time. These include IPTV, Internet, mobile and fixed telephony. Today, only three services are used. They are IPTV, Internet and IP telephony.

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FIBER OPTICS

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Summary. *Fiber optics have become the industry standard for the terrestrial transmission of telecommunication information's. Fiber optics will continue to be a major player in delivery of broadband services. This article is about developing of fiber optic in industry, its usage, demand for it and its pros and cons.*

Keywords: *fiber, optic, communication, type, cable, single mode, multimode.*

Nowadays information technologies are developing rapidly in globalization process. Exchanging information process is rapidly increasing. Nowadays exchanging information process not only chatting also one of the power of acting became society progress. The size of information's transmission, its speed and rising its quality giving the possibilities of enlarging the types of communication sources. At present optical instruments and devices are developing in many spheres and communication.

Fiber-optic communication is a method of transmitting information from one place to another by sending pulses of light through an optical fiber. The light forms an electromagnetic carrier wave that is modulated to carry information. Fiber is preferred over electrical cabling when high bandwidth, long distance, or immunity to electromagnetic interference are required.

Optical fiber is used by many telecommunications companies to transmit telephone signals, Internet communication, and cable television signals. Due to much lower attenuation and interference, optical fiber has large advantages over existing copper wire in long-distance and high-demand applications. However, infrastructure development within cities was relatively difficult and time-consuming, and fiber-optic systems were complex and expensive to install and operate. Due to these difficulties, fiber-optic communication systems have primarily been installed in long-distance applications, where they can be used to their full transmission capacity, offsetting the increased cost.

The phone system is mostly fiber optics beyond the short subscriber link. Fiber links offer over 1,000 times as much bandwidth over distances over 100 times further. Specifically, you can have:

	Distance	Bandwidth	Voice Channels
Copper	2.5 km	1.5 Mb/s	24
Fiber	200 KM	2.5+ Gb/s	32,000 +

Fiber does not have infinite bandwidth either! At least not the multimode fiber used in most premises networks. It's a lot higher than copper, but as you approach gigabit speeds, you are limiting the distances available for links to 500 meters or so.

Singlemode fiber, as used in telco and CATV networks, practically has infinite bandwidth. But it uses higher cost components and can be pricey for shorter links. It's not necessary for today's networks but may be for the next generation

Optical fibers come in two main types:

A **single-mode** fiber has a small core that forces the light waves to stay in the same path, or mode. This keeps the light signals going further before they need to be beefed up, or amplified. Most longdistance, or long-haul, fiber optic telephone lines use single-mode fiber.

A **multimode fiber** has a much larger core than single-mode fiber. This gives light waves more room to bounce around inside as they travel down the path. The extra movement eventually causes the pulses to smear, and lose information. That means multimode fiber signals can't travel as far before they need to be cleaned up and reamplified. Multimode fibers can carry only a third or less the information-carrying capacity—or bandwidth—than single-mode fiber. The technology for multimode fiber is less expensive and can only be used for short distances (such as in LANs)

These types of fibers have sharp boundaries between the core and cladding, with clearly defined indices of refraction. The entire core uses single index of refraction. Single mode fiber has a core diameter of 8 to 9 microns, which only allows one light path or *mode.*

There are advantages and disadvantages of Fiber optic.

ADVANTAGES

- **Bandwidth** - Fibre optic cables have a much greater bandwidth than metal cables. The amount of information that can be transmitted per unit time of fibre over other transmission media is its most significant advantage. With the high performance single mode cable used by telephone industries for long distance telecommunication, the bandwidth surpasses the needs of today's applications and gives room for growth tomorrow.
- **Low Power Loss** - An optical fibre offers low power loss. This allows for longer transmission distances. In comparison to copper; in a network, the longest recommended copper distance is 100m while with fibre, it is 2000m.
- **Interference** - Fibre optic cables are immune to electromagnetic interference. It can also be run in electrically noisy environments without concern as electrical noise will not affect fibre.
- **Size** - In comparison to copper, a fibre optic cable has nearly 4.5 times as much capacity as the wire cable has and a cross sectional area that is 30 times less.
- **Weight** - Fibre optic cables are much thinner and lighter than metal wires. They also occupy less space with cables of the same information capacity. Lighter weight makes fibre easier to install.
- **Safety** - Since the fibre is a dielectric, it does not present a spark hazard.
- **Security** - Optical fibres are difficult to tap. As they do not radiate electromagnetic energy, emissions cannot be intercepted. As physically tapping the fibre takes great skill to do undetected, fibre is the most secure medium available for carrying sensitive data.
- **Flexibility** - An optical fibre has greater tensile strength than copper or steel fibres of the same diameter. It is flexible, bends easily and resists most corrosive elements that attack copper cable.
- **Cost** - The raw materials for glass are plentiful, unlike copper. This means glass can be made more cheaply than copper.

DISADVANTAGES

- **Cost** - Cables are expensive to install but last longer than copper cables.
- **Transmission** - transmission on optical fibre requires repeating at distance intervals.
- **Fragile** - Fibres can be broken or have transmission loses when wrapped around curves of only a few centimetres radius. However by encasing fibres in a plastic sheath, it is difficult to bend the cable into a small enough radius to break the fibre.
- **Protection** - Optical fibres require more protection around the cable compared to copper.

The rapid expansion of wireless telecommunications networks, including cellular phone and data services, measured either by data volume or bandwidth, means fiber optic transmission technology will be a significant part of the future systems. Engineers are becoming more familiar and comfortable with fiber solutions. Starting with XXI century Ethernet technologies has been changing to fiber in Uzbekistan. Because fiber is more optimal than Ethernet. More than 10 telecommunication operators in Uzbekistan have been actively introducing broadband access technologies via fiber – optic connections based on FTTx architecture for multi-storey residential houses and buildings. According to experts, fiber optic network is most widespread in Tashkent region -32600 subscribers, Samarkand -23800 subscribers. In my opinion after 10 years fiber optic network will take whole Uzbekistan.

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THINGS DONE AND PERSPECTIVES FOR THE DEVELOPMENT OF E-GOVERNMENT IN UZBEKISTAN

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Summary: *In this article considered projects which were done, achieved results and plans for the development of e-government in Uzbekistan.*

Keywords: ICT, e-government, *data, collect, store, processing, information technology, communication, information and telecommunication technologies*

The impact of information technology on the interconnection of people, on improving the effectiveness of public administration and on empowering citizens removes any doubts about the importance of ensuring the universal availability of these technologies. This transformation requires changes not only in the "external" part of the service provision sector for the population, but also in the integration and re-

engineering of intra-departmental and interdepartmental business processes in the public sector.

Over the past 10 years, the government of Uzbekistan has carried out numerous reforms on the phased introduction of ICT in all areas and has made significant progress in advancing information technologies for the development and implementation of the concept of e-government. A legal framework has been created and is constantly improving, opening up opportunities for the development of ICT. National programs have been developed and are being implemented. The total bandwidth of access channels from Uzbekistan to external Internet backbones has increased more than 500 times in the last decade, and the number of licensed Internet providers has increased from 135 in 2002 to 626 in 2016.

The development of the sphere of communication, information and telecommunication technologies as an important factor in improving the well-being of the people and economic growth of the country is one of the main priorities of the state policy of Uzbekistan. This is confirmed by the presidential decree of June 27, 2013, which approved the Comprehensive Development Program of the National Information and Communication System of the Republic of Uzbekistan for 2013-2020.

The main objectives of the program adoption are further development and wide introduction of modern ICT in all sectors of the economy and spheres of life, ensuring the accelerated development of information resources, systems and networks, as well as expanding the range and improving the interactive public services provided to business entities and the population.

This program is also known as a master plan for the development of e-Government. This decree also formed the republican commission for the coordination and implementation of this program; The commission includes the heads of several key ministries and departments, as well as the prime minister (chairman of the commission). The Electronic Government Development Center and the Information Security Support Center have been created.

The Republican Commission was established to coordinate the activities of state and economic management bodies, monitor and make decisions on further improving the provision of interactive public services, optimize the functional and operational processes and procedures of state bodies. The goal of the program is further development and wide introduction of modern ICT in all sectors of the economy and spheres of life of the country, ensuring the accelerated development of information resources, systems and networks, as well as stimulating the expansion of the range and improvement of interactive public services to business entities and the population.

The commissioning of these systems will create favorable conditions for small businesses and private entrepreneurship in the system of state and corporate procurement, develop competition, effectively use financial means by optimizing prices for goods (work, services), and ensure transparency in the implementation of state and corporate orders.

The Government of Uzbekistan plans to further strengthen the institutional mechanisms and establish an institution that would have the competence to establish a

full-fledged e-government structure and to implement leadership during its implementation and further development. Plans for the development of a virtual receiving government include the connection to the service of regional and subordinate units of state bodies, as well as district prosecutor's offices.

Attention should be paid to build the capacity of those government employees who are involved and responsible for implementing the e-government master plan for 2013-2020, namely, improving their knowledge, changing their way of thinking, and developing an exchange of information and experience in their environment. It can also make a positive contribution to strengthening interdepartmental cooperation in the implementation of e-government system solutions.

The development of e-government is not a one-time event or a short-term project, but a long-term evolutionary process of transforming the government to provide services to citizens.

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OPEN BOOKS - OPEN MINDS

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Summary. *This article is about books, their history of creation, developing steps and the attention of our government towards the reading books.*

Key words: *Book, eBook, digital, library, software, publisher, hardcover, texture, substantial, textbook.*

BOOKS wash away from the SOUL the DUST of EVERYDAY life

Books play a significant role in our life. When we open a book, we open a new world. For the majority of people, books are part of their everyday life. A book is like a best friend who will never walk away from you. Books are packed with knowledge, insights into a happy life, life lessons, love, fear, prayer and helpful advice. On the 23-of April the world celebrates the World Book Day. Reading is the perfect hobby.

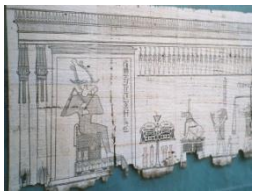
The history of books starts with the development of writing, and various other inventions such as paper and printing, and continues through to the modern day business of book printing. The earliest history of books actually predates what would conventionally be called “books” today and begins with tablets, scrolls and sheets of Papyrus. Then hand-bound, expensive and elaborate books, called codices, appeared. These gave way to press-printed volumes and eventually lead to the mass printed tomes

prevalent today. Contemporary books may even have no physical presence with the advent of the e-book.

There were times when people had neither letters nor paper. The history of books is considered to begin with a written language when literary works appeared on leaves, clay tablets, bark. Only in the 14th century, Johan Gutenberg from Germany invented printing with a movable type. Now millions of books are published every year.

But we know that in the VI century the Muslims sacred book Quran was written by companions of Muhammad (s.a.v), after his death. Quran was compiled by his companions who wrote down and memorized parts of it. This codices had differences that motivated the caliph Uthman to establish a standart version now known as Uthman 's codex, which is generally considered the archetype of the Quran known today.

Sumerian language cuneiform script



Egyptian papyrus showing the god Osiris and the weighing of the heart

A Chines bamboo book meets clay tablet, 2400-2200 BC the modern definition of Codex

An eBook is an electronic version of a traditional print book that can be read by using a personal computer or by using an eBook reader. An electronic book (or e-book) is a book publication made available in digital form, consisting of text, images, or both, readable on the flat-panel display of computers or other electronic devices. E-Books are also referred to as "e-books", "e-Books", "e-journals", "e-editions" or as "digital books".

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A digital library is a special library with a focused collection of digital objects that can include text, visual material, audio material, video material, stored as electronic media formats (as opposed to print, microform, or other media), along with means for organizing, storing and retrieving the files and media contained in the library collection. Digital libraries can very immensely in size and scope and can be

maintained by individuals, organizations or affiliated with established physical library buildings or institutions, or with academic institutions. The digital content may be stored locally, or accessed remotely via computer networks. An electronic library is a type of information retrieval system. Digital libraries may be more willing to adopt innovations in technology providing users with improvements in electronic and audio book technology as well as presenting new forms of communication such as wikis and blogs, conventional libraries may consider that providing online access to their OP AC catalog is sufficient. An important advantage to digital conversion is increased accessibility to users.

Alisher Navoi State Public Library is the largest library of our country , which serves as the national library and holds over 10 million items. The Central State Archive of Uzbekistan considers as the Republican Library for Science and Technology (two million volumes), the Foundation Library of the Uzbek Academy of Sciences (1.5 million), the Pedagogical Institute (808,000), Tashkent State University (2.46 million), Samarqand (Samarkand) State University's library holds 1.6 million volumes, and the Pedagogical Institute named after Ulugbek in Fergana holds 295,000 volumes.

Nowadays the great attention is given to reading books by our government. Uzbekistan could become one of the most bibliophile countries: the program, which has been launched mainly orientated for the development of comprehensive measures on the elaboration of the system for publication and distribution of books and improving and promoting the reading culture.

A commission established by the Decree of the President develops a set of measures that systematically sets up the work on the publication and distribution of artistic, spiritual, non-fiction, educational literature aimed at increasing the intellectual potential of young people. The program touches a delivery system of published books at affordable prices in the regions, online ordering of publications and electronic versions of books. Particular attention is paid to improving the reading culture of the population.

The working group is engaged in-depth study of the situation in this sphere. By now, it is clear that there is a need to establish the study of demand on the books, raising the intellectual level among the population in the country, especially the youth. Social polls are conducted in the formation of a common list of applications for published literature.

The results showed the need to improve the management system for the publication and delivery of books to the population. It is necessary to organize the work of translating the best works of world literature into Uzbek language and selected works of Uzbek literature into foreign languages on a regular basis. Particular significance is attached to children's literature. It is essential to improve the system of encouragement for publishers and writers, creation of the conditions of granting financial privileges and material support to publishers, improving the orders for the purchase of quality paper and printing materials from abroad to publish books by printing enterprises and publishing houses.

Experts say about the need to review issues of allocation or lease of places for specialized bookstores in regional and district centers and cities. It is proposed to introduce preferences to businesses, in which the share of the book trade in commodity turnover is more than 70%.

One of the priority tasks of the program will be a review of the formation of the funds of information and library institutions, especially information and resource centers in the field of education, along with educational literature and a list of artistic, educational, scientific and popular literature, as well as estimates for the costs of its purchase.

The propaganda of published books among the public gains momentum through the media, in particular, the TV channel Madaniyat va Marifat. Moreover the systemic organization of creative meetings with authors of books in educational institutions, libraries and mahalla, the formation of culture and skills of reading in them also gains traction. Due to improving the organizing system of festivals and fairs of the book in the regions with the participation of writers, poets are enhanced the propaganda of highly artistic works of national and world classical literature among the population, conducted the competitions in the such nominations, as "The best book of the year", "The best bibliophile family", "The best children's book", "The best audiobook", "Best e-book" among readers, producers of printed and electronic books, booksellers and librarians and educators.

To sum up, it may be said that Books give a soul to the universe, wings to the mind, flight to the imagination, and life to everything.

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LET US MAKE OUR CAPITAL SMART CITY

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Abstract: *Popularization of the Internet made it to be most demanded means of communication, data saving and transporting. In this article we try to consider the issues of making our city smart. This will have the term "smart city". In other words we may call it smart urban. For implementation of the "smart city" project in our capital which is the topic of our article, we tried to distinguish the main components of a "smart" city where we can apply it. We also analyzed emerging problems and their further elimination in the smart city technology.*

Keywords: *popularization of the Internet, smart city, broadband access, switching centers, data transfer, voice traffic, trunk lines, infrastructure multimedia services*

After gaining independence the introduction of information and communication technologies (ICT) has become one of the priority tasks of the state policy in Uzbekistan, which contributes to the achievement of significant results in the formation of the national information space and the enhancement of the management systems efficiency. From the first days of independence Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society. Over a short period the authorities created the legal framework conducive to further formation and progress of market of IT-technologies.

The basis for development of ICT in Uzbekistan is the telecommunications infrastructure. The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services.

We live in the age of technologies. Technology is developing day by day. Everywhere we go, we hear about the Internet. It's on television, in magazines, newspapers, in schools, institutes, in all spheres of our life. Popularization of the Internet made it to be most demanded means of communication, data saving and transporting. In this article we try to consider the issues of making our city smart. Further, this will have the term “smart city”. In other words we may call it smart urban.

The creation of the "smart" city system will become possible due to the ubiquitous spread of the Internet, in particular, the popularization of the Internet of things (IoT). An important role here also plays the technology of large data. Such projects are based on a system of sensors connected to the network, which collect a huge amount of data and process them in real time. Here the services of the entire city will unite. For this purpose we will need one single operating system which will lead all operations.

The basis of any smart city is a common use platform that will unite and streamline the work of all city services. The optimal option for the introduction of "smart" urban technology will be a single system, operating under the leadership of one organization. As a successful example of creating a "smart" city, one can mention the infrastructure of Dubai managed by the centralized IT organization Dubai Smart Government (DSG), acting as a single provider of IT services.

To implement the “smart city” project in our capital we distinguish the following main components of a "smart" city where we can apply it:

- **Energetics**- an intelligent grid of power supply, equipped with a flexible distribution system, automatic registration and regulation of demand. In some projects, energy-efficient buildings and structures are being created.
- **Water supply**- automated management of the water supply system, demand monitoring, intellectual system. Also, the "smart" water supply system assumes automatic water disposal and leak detection, regulation of rainwater runoff and flood waters in the city.

- **Transport**-automatic regulation of traffic flows, "smart" infrastructure for traffic management and public transport, automatic system for paying for the use of roads.
- **Security**-infrastructure that provides physical security, - video surveillance systems, video fixing, calling emergency services, alerting.
- **Services**-e-government, education, health and tourism. A unified system that integrates the information of all objects of urban infrastructure.
- **Government**- provision of state and municipal services in electronic format, publication and use of open data, implementation of decision support system, analysis and forecasting, incident management.
- **Residents**-feedback from users of the services of the city's intelligent system government. There are some examples of a smart city in the world.

One of the examples of an "intelligent" city is in Songdo, South Korea, where a huge number of sensors allow you to manage the infrastructure, as well as the Plan IT Valley in Portugal, which has its own "city operating system". There are less successful examples of implementing IoT on a city scale. Thus, London, interested in the development of IT infrastructure, failed to create a single centralized system due to political disagreements with some of its districts.

Most often initiators of smart city projects in other countries are IT companies themselves. The suppliers of innovative solutions know everything about the arrangement of IT systems, but in this case there are other questions. "Smart" city is not just a complex of innovative technologies; first of all, this system is called upon to solve the real problems of the existing city. This project is developed for monitoring and analyzing emerging problems and their further elimination. In this area, we may achieve greater success if we use IT tools together with social innovations. Data can be collected using special mobile applications. For example, residents using such programs can report problems directly to the authorities. These are relatively cheap and effective ways of obtaining information, but for this it is necessary to establish affordable Internet in a territorial and financial sense, and also take into account the prevalence of gadgets among the population. Another important factor is the willingness to invest their own forces in the development of the city both from the residents and the administration.

The "smart" city system will provide for the transfer of huge amounts of information, so one of the most pressing issues in this case is information security. In implementing smart city project in our city there may be some problems too. Some specialists revealed a number of the most urgent problems:

- Insufficiently reliable authentication. Most systems did not require a secure password during installation, and if they failed to enter the account, the account was not blocked.
- Violation of data confidentiality. Any intelligent system collects personal information: name, address, passport data, and phone number. This information can be used by attackers for personal purposes.

•The use of surveillance cameras and the ability to watch video also compromises the privacy of user data.

•Lack of data encryption. Although all systems implement transport-level encryption mechanisms such as SSL / TLS, many cloud connections remain vulnerable to attack.

To protect the network of used gadgets, a system for managing corporate mobility (EMM) has been developed. With this solution, you can control access to corporate information for all devices, set appropriate permissions or restrictions. Also, EMM-technology can continuously monitor gadget performance and automatically act in case of exceeding the user's authority.

So, for a more complete provision of security for a "smart" city and for its further development, in general, it will be useful to exchange experiences with other cities. And, of course, the big players here are the big players in the market of innovative technologies that create all the necessary IT infrastructure and development not only for a specific user, but also for the scale of a particular region. So, the implementation of smart city project will make our city more prosperous and safe.

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EFFECTIVENESS OF PARALLEL PROGRAMMING IN PERFORMING AN ACTION ON THE MATRIX THAN OTHER PROGRAMMING METHODS

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Summary: *In this article discussed the methods and means of parallel processing with a needful researcher of various specialties for the best deal of data processing tasks using modern computing facilities. It is explored method of consistently and parallel programming based on the algebra of multidimensional matrices.*

Key words: *Parallel programming, matrix, multiply matrices.*

Nowadays, in many areas of science and public life use pictures unceasingly. For example, you play computer games, take pictures, or, scientists and researchers take photo of the earth, the moon or other planets, or galaxies. For all of mentioned above use pictures which based on a matrix on a computer. Therefore, perform an action on matrices is important in programming.

Widespread personal computers, in the 80s and 90s, fundamentally changed not only quantitative but also qualitative composition of the user computing. Previously, consumers of computer services were mainly representatives of "exact" sciences. But now, desktop computers become a tool of biologists, medical humanities and other fields. Physics, astronomers, meteorologists and many others along with personal computers widely use modern supercomputers. This is facilitated by the tradition of careful construction and study of mathematical models of the processes. These models will automatically lead to the realization of the need for parallel processing.

Parallel programming is a programming technique that takes advantage of multi-core or multi-processor computers. Parallel computing is computing method, in which programs are designed as a set of cooperating computational processes operating asynchronously and at the same time.

Using of parallel programming becomes more necessary, since it allows the most efficient using of multi-core processors and multiprocessor systems. For a several reasons, including an increase in energy consumption and limited memory capacity, enhance the clock speed of modern processors became impossible. CPU manufacturers have begun to increase their productivity by placing a single chip multiple processor cores, without changing or even reducing the clock frequency. Therefore, to increase the speed of application should now be a new approach to the organization of the code. The idea of parallel processing was born a long time ago. One of the first implementations of it belongs to the famous American physicist R. Feynman.

Now consider the parallel processing of multiply of matrices. Mathematicians to represent data in solving various problems for a long time have used matrix. Matrix algebra is well-designed and easy to use in applied mathematics. As an example of parallel computing, we consider multiply matrices. Formally, the problem is stated as follows:

It is given two matrices A and B of dimension NxN. We need to calculate their multiplication: C matrix. C [i] [j] = sum over k from 1 to N A [i] [k] * B [k] [j].

The solution is without using of parallel computing. The simplest algorithm for solving this problem in C++ programming language with the asymptotic $O(N^3)$ as follows:

```
      for(int i = 0; i < n; ++i)
  for(int j = 0; j < n; ++j){
    c[i][j] = 0;
    for(int k = 0; k < n; ++k)
      c[i][j] = a[i][k]*b[k][j];
  }
```

There is a well-known method which allows to accelerate the work of the above code in 4-5 times. This is the replacement of the array b to an array bt, which contains the transposed matrix B:

```
        for(int i = 0; i < n; ++i)
  for(int j = 0; j < n; ++j)
    bt[i][j] = b[j][i];
for(int i = 0; i < n; ++i)
  for(int j = 0; j < n; ++j){
    c[i][j] = 0;
    for(int k = 0; k < n; ++k)
      c[i][j] = a[i][k]*bt[j][k];
  }
```

Accelerating operation in this case, the processor related with the cache of processor. In the first case, the elements of the array b, which we turn on in the cycle k, are in different rows but in the same column, and means in memory are located at a distance equal to the size of one row of the array. In the second case we consistently refer to one row elements of bt array, which located in a row of memory.

Solution using parallel computing. Since each element of the matrix C is computed independently of the others, the matrices A and B are not changed. To calculate the product in parallel, simply designate which elements of C to calculate what the flow computing. For this, function has been created, which is transferred 2 numbers: lf and rg. The function calculates the rows of the matrix C with lf by rg inclusive with using the original matrix B:

```
        #define forn(i, n) for(int i = 0; i < int(n); ++i)
struct matrixMulParam{
  int lf, rg;
  matrixMulParam(int cLf = 0, int cRg = 0) : lf(cLf), rg(cRg){}
};
DWORD matrixMulNoHack(LPVOID p){
  for(int i = ((matrixMulParam*)p)->lf; i <= ((matrixMulParam*)p)->rg; ++i)
    forn(j, n){
      c[i][j] = 0;
      forn(k, n)
        c[i][j] += a[i][k] * b[k][j];
    }

  delete ((matrixMulParam*)p);
  return 0;
}
```

In a nutshell, including following advantages such as user-friendly programming perspective to memory in global address to space, both fast and uniform due to the proximity of memory to CPUs in data sharing between tasks, scalable

memory with the number of processors also increasing the number of processors and the size of memory increases proportionately. Parallel programming can be the best method for all spheres.

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DEVELOPMENT OF THE FUTURE EDUCATION IN UZBEKISTAN WITH THE MANS OF ICT

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Summary. *The following article is devoted to the education system in the nearest future of Uzbekistan in the sphere of ICT. In the work the author presents*

Key words: *ICT, population, crossroad, sovereign democratic republic, major decentralize*

Situated between its two main rivers, the Amu Darya and the Syr Darya, Uzbekistan, with a population of 25.5 million, is the most populous republic in Central Asia. Slightly larger than California, it borders on Turkmenistan, Afghanistan and Tajikistan to the south, Kazakhstan to the north, and Kyrgyzstan to the east. Although Uzbekistan is completely landlocked, it is strategically located at the crossroads of the ancient silk roads between China, the Middle East and Europe. The country has several cities in addition to the capital Tashkent, but most of the multi-ethnic population remains rural. Agriculture has always been the foundation of the Uzbek economy, and continues to account for 40 percent of employment and 60 percent of exports. The world's second largest cotton producer, Uzbekistan also produces gold and oil. Annexed by Russia in the 19th century, today Uzbekistan is a sovereign democratic republic with a unicameral legislature called the Oliy Majlis. Since gaining independence in 1991,Uzbekistan has been working to establish a market oriented economy. Despite its low level of integration in the world economy, it has been able to achieve macroeconomic stability, with a moderate but sustained annual GDP growth rate of 3.5–4 percent, making it the only country of the former Soviet Union to have surpassed its pre-independence GDP level in 2001. UNDP has been promoting access to the Internet in Uzbekistan for over five years and remains the major and most consistent partner of the government in developing a policy and regulatory framework for the promotion of ICT as a driver for social development. A country in transition, Uzbekistan faces the continuing challenge of transforming from a centrally-planned

economy to one in which informed decision-making is shared, decentralized and ultimately made more transparent. The use of information technologies as a comprehensive tool to resolve a broad range of socio-economic issues during the transition period has been declared a major goal for the country. In Uzbekistan, as in other transition countries, UNDP is playing a key role among development stakeholders in helping the country to reach such goals by initiating and supporting a wide range of ICT for development (ICTD) initiatives and projects. Such projects firstly build the capacity required to take advantage of suitable information management practices and information technologies that can then facilitate this transition process. They also assist in developing telecommunication infrastructure and increasing public access to a wide range of information resources. Altogether, there have been four major ICT-related projects: Improvement of Information Services and Communication Facilities in Uzbekistan through the Establishment of an Intraministerial Network (UzNet); Capacity Building to Develop and Promote Internet Technologies in Uzbekistan (UzSciNet); Digital Development Initiative (DDI); and Promotion of ICT Units in Rural Areas to Foster Small and Micro-Enterprises Development in Uzbekistan. This paper describes the experience of UNDP Uzbekistan, focusing on certain best practices developed in the Capacity Building to Develop and Promote Internet Technologies in Uzbekistan project, the development of the Uzbekistan Scientific Network and its spin-off projects.

Gaining Access in the Right Way

When UNDP and the Government of Uzbekistan initiated the first ICTD project – UzNet – in 1996, the stablishment of a high-tech intraministerial network and other services within the government did not ngender all the results expected. Instead, it revealed a number of underlying weaknesses in the Internet environment that spurred subsequent projects. Unsatisfactory telecoms infrastructure, low Internet usage outside the capital area, low purchasing power, government monopolies, lack of local Internet content, and lack of awareness about the benefits of ICT were just some of these. As a result, UNDP identified a need to deliver Internet access to a wide audience, teach people how to maximise ICT, establish a suitable legislative base, and develop local Internet content. Through its ICT-related initiatives, UNDP has helped change the situation in Uzbekistan dramatically. First, in two years overall Internet international channel capacity has increased exponentially, the number of Internet Service Providers hasdoubled, hundreds of Internet cafes have been opened all around the capital and in regional centres as well. The number of active Internet users has skyrocketed, to a couple of hundred thousand today. Fibre-optical and frame relay communication lines now connect the country's capital with all regional centres and major cities.Basic telecommunications have also improved. The total number of telephone lines is about two million, one third of them digital. Connecting to higher learning *t*o-date, the most successful ICT effort in Uzbekistan is the UzSciNet project, providing the high-speed Internet backbone network for thousands of computers in scientific, medical and educational organisations across the country. The product of a partnership among UNDP, the Open Society Institute, the NATO Scientific Committee and the Academy

of Sciences which is the main local partner, the project is working to further facilitate Uzbekistan's integration into the global information community by providing free access to world information resources to a wide range of people. In 1999 UNDP launched the project "Capacity Building for Developing and Promoting Internet Technologies in Uzbekistan," using the Uzbekistan Scientific Network, on a cost-sharing basis with the Open Society Institute – Assistance Foundation which contributed 50 percent of funds to the project budget. The idea of such a network was instigated in 1997 with an initiative among scientists at the Tashkent Technical Physics Institute, which was planning to create a network of institutions under the Uzbekistan Academy of Sciences and support it with Internet connectivity. Through its Silk Highway initiative, the NATO Scientific Committee provided UzSciNet with a high-speed satellite channel via Germany's DEZY Scientific Network Laboratory.

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THE INTERNET AS A LEARNING TOOL FOR ENGLISH ACQUISITION

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Summary. *Methods of using the internet in English learning are described in this article. The article says that technology can be an enormous help for learners of English who are striving to use multiple models and to differentiate their instruction. Some explanations how students can integrate Internet technologies into their learning are given.*

Key words: *IT, online, language learning, software programs, technological skills, research, Web, network, resources, develop.*

The aim of the education informatization is a global intensification of intellectual activity by use of information technologies. The advantageous of using new technologies in education are: job oriented study, benchmarking, networking, novelty, digital competence, and real events in/from the world of Business, telecommunication, information technologies, highly reputable ESP educators from Uzbekistan and the

First Class European Universities, new approaches and new ICT enabled services. Practicing during the lesson and fulfilling teacher's tasks, students can learn vocabulary according to their specialty without any difficulties as it is still the problem for beginners, since many of technical terms are new to them. Our students' task is to use new technologies for creating more impressive PowerPoint presentations in English according to their direction of study which is the part of their self study. It is very important for students to improve their English in order to study in groups for gifted students of the University.

The Internet represents one of the most successful examples of the benefits of sustained investment and commitment to research and development of information infrastructure. Internet technology has changed the way we learn. The Internet is reshaping nearly all aspects of society. It provides users with the possibility of communication with other users and a wealth of information.

The majority of our university students use the Internet to share ideas, conduct research, and collaborate in the production of knowledge. Online learning technology helps students build a stronger foundation and understanding in education at their own pace. On line programs gauge a student's conceptually week areas in a particular subject, providing immediate feedback, which is important in learning process. There are a lot of English language learning publications and didactic materials for IT students on the Internet. Information collected on the Web is more current, more visually stimulating, and available in greater amounts than information collected from traditional sources of information, such as dictionaries and encyclopedias and so on.

There are five main ways to use the Internet for information-collection in the classroom:

1) During the lesson teachers give students a task and allow them to get the information they need without supervision (uncontrolled lesson). But the lesson could be semi-controlled as well, i.e. students make teacher-directed exercises.

2) Teacher-controlled exercises could be adopted to be semi-controlled. The teacher could allow the students to direct the Internet search in order to relinquish some of control to the students.

3) This way of using the Internet would be to have one computer connected to the Internet available in the classroom.

4) The fourth method would be to have students do tasks or assignments for homework by using the Internet to collect their information. They would be asked to use the information for input into their task and hand in the work.

5) Students can use the technological advances of the Internet as many of them have the Internet at home. These students can practice Internet vocabulary that is useful when doing a search, because most of the search engines and web pages are in English. Vocabulary practice exercises, which use these students as a resource, will allow all of students to learn the items. Students control the instructions, learn at their own pace, and can use the programs at home as software programs can be powerful and flexible tools for students to acquire basic information.

There are some advantageous of using the Internet for English learning:

▪Language learning is most successful when it takes place in authentic, meaningful contexts. The Internet gives students access to vast amounts of authentic material on any topic they are interested in and allows opportunities for authentic communication and publishing.

▪The Internet represents new forms of literacy needed in the 21st century. By combining English and technology in the classroom, teachers help their students master the skills they will need for academic and occupational success.

▪The Internet provides opportunities for students to interact with native and nonnative speakers from around the world. Interaction is the major means of acquiring a language and gaining fluency.

▪The Internet can inject an element of vitality into teaching and motivate students as they communicate in a medium that is flexible, multimodal, constantly changing, and connected to their real-life needs.

▪Mastery of the Internet. By mastering it, teachers and students can construct new knowledge, create multimedia future.

The use of internet learning techniques is an important strategy for challenging gifted students in the differentiated classroom. E-mail and chat rooms allow motivated students to share ideas with peers across Uzbekistan and around the world. Today, computer software packages exits in some quantity to assist students in this effort.

The Internet gives possibilities to learn about online education, including up-to-date information, on-line projects, multimedia authoring, distance education, and networking for professional development. Students can also use it to communicate with group mates and find professional resources for experimenting with new methods, approaches, and techniques. Access to the Internet increases the materials and resources available to learners as well as the opportunities for exchange of ideas. Information technologies hold great potential for positive effects on student learning. It is particularly important for them to have the essential technological skills so they can harness the power of computers and related technologies for effective learning. New technologies can be powerful learning tool in day-to-day interaction with each other. Most students who use computers and related technologies at home and in the classroom report the strong motivational aspects of computers and Internet resources. An essential element for improving students' basic skills such as spelling is keeping them interested. The use of computer stations in classrooms increased student computer use and overall motivation. As well as students can use the Internet for their homework in addition to traditional information sources such as Wikipedia, Google translator .e-dictionaries, e- journals, e-books and etc. It is convenient to use knowledge tests, which can be taken from the Internet on-line sites. Many software programs are developed to use reinforcement theory. When the user identifies a correct answer or exhibits desirable behavior, a reward is provided to reinforce and get the individual to repeat the behavior. Other software programs are developed to satisfy an individual's achievement motivation and aim at being both entertaining and educational. Some software programs with game like and competitive features are motivational to most students. Motivation to achieve meaningful learning

and higher-level goals is also important. Achieving higher-level goals requires students to do hard mental work and bear most of the responsibility for their own learning.

In conclusion, it can be emphasized that the Internet can motivate students to stay engaged in learning tasks and feedback. Different techniques encourage students and make their English learning perfect and creative nowadays. As well as the Internet gives opportunities of using authentic materials to expand students' knowledge.

The practice of holding previous students' conferences made it clear that Internet technologies open great prospects in creating English learning programs. Some of these programs were created by TUIT's students , that make English learning more interesting and fruitful by using texts on specialty, including video materials that simplify memorizing new words and expressions, as well as sound which helps students to attain better pronunciation. Furthermore, some web sites are available that take students on virtual field trips to illustrate concepts that might be difficult to reproduce by other means, as these Web sites, which are often free, provide visual and auditory representations and many of them are interactive. And it is very important for students to be prepared as high-qualified IT specialists with English proficiency as the English language is the integral component in their training.

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DEVELOPMENT OF INFORMATION SYSTEM "ELECTRONIC EDITORIAL"

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Summary. *In this paper an information system for automation the process of publication materials in editorial is developed. The results of this research will help to workers of editorial to work more effectively.*

Key words: *information system, electronic editorial, process models, IDEF0, IDEF3, IDEF1X, DFD diagram.*

Today, modern English is so dynamic that in circumstances where having an English lesson only became scarce for a wide range of learners and updating goals of a foreign language teaching is very necessary. Learning a language is certainly a creative process and cognitive, but for some reason, students often do not reach their goals in training, and they soon get bored with the language, culture, and education in general. Almost everyone remembers from their childhood school grammar rules and

exceptions, but very few people speak English fluently. What is the reason for the lack of motivation and interest in the learning process?

In order to partially solve this problem, information system must be designed to automate processes of giving task and sharing data among students of editorial.

How does this information system work?

Description: Students are taught English with the book "scale up" in every educational institution; therefore demand for this book is increasing day by day. This book includes four sections; reading, writing, listening and speaking. While doing exercises with the origin of the book in many cases learners confuse or hesitate whether they are right or not. For this reason this project has been created in order to help students to find a solution to this inconvenience. The main idea of this project is to give students more opportunity to use this book everywhere. They do not spend time to carry the book or wait for the teacher to correct their mistakes.

There are four units which include four lessons and there are also four stages like: listening, reading, writing and speaking. These stages are given step by step.

The first requirement which is needed is to download this mobile application via share it program, before that it is installed.

Listening

In this section, start button is used in order to carry out all tasks, but there is no pause while listening, because students have to listen listening exercises once only. After that stop button is used to do the next task. There students will be able to check their answers on the right side of the screen by pressing **check mark.** After this process finishes, if students make mistakes they are able to listen to the record again and write down their answers, then check up all of them repeatedly until they get true answers.

Reading

In this section, students have to read and give the right answers. They will have to use check mark button so as to find out if their answers are correct or not. If there is a wrong answer, they will find an incorrect symbol in the right side of the screen. Student will have a chance to read and write the right answer again.

Writing

In this section topic themes are taken to write. It is evident that the most difficult part of all section is considered writing task. Taking this fact into consideration, this task will be done by students under the teacher's control. Firstly, the teacher explains how to do this writing task, after that students will be able to write their exercises. In fact, this task requires students to study all writing tasks only in classrooms with teachers. In this case, students are able to correct their mistakes and misunderstandings.

Speaking

Here, students look at the various pictures and can start debate conversation according to those images. Students will be able to use electronic version of the text paper book and make up their sentences.

One of the advantages of this project is: while using a book version of "Scale up" students have to check their reading, listening tasks only with the teacher's presence.

However, having this new app version gives an opportunity to check their mistakes themselves.

Second plus site of this project is: there is an additional dictionary that is based on only all words of "natural text paper book" in this app version book. While students do different kinds of exercises in it, they don't have to close this electron book and find just another dictionary when they come up with some uncommon words to translate. They should click the button dictionary page in app version book and write down those words to translate into Uzbek language. It gives great opportunity students to save their time using this dictionary simultaneously.

Another one is: currently all students are able to download this app version of "SCALE UP1" book in a <<playmarket>> page.

Last but not least, students who have already downloaded and are using this book in their electronic devises currently can send their feedbacks and some comments or misunderstandings about this electronic book to my post address to komilkomil959595@gmail.com by completing required application form. All things will be kept in a secret!

To sum up, all exercises, such as listening, reading, writing and speaking exercises are taken from natural Scale up text paper book.

TUTOR OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT TUTOR)

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Summary. *This thesis describes the benefits of computer applications in learning English language and it reveals windows application that helps information technologies users. This application helps to users with key words of ICT and descriptions, tasks and crosswords in English.*

Key words: *information technologies, programmers, windows application, World Wide Web.*

It is a fact that XXI century is the century of Information technologies. Life is getting faster day-by-day and somebody who moves, goes or does slowly would miss opportunities. In fact, if you want to succeed, you have to work harder, do things faster and should not waste your time.

Information technologies facilitate the way to solve those problems and make opportunities to be first. Thus, everybody should take advantage of IT and it is the requirement of the time!

According to statistics, more than 75% of orders for software development come to domestic specialists from foreigners, and almost all customers prefer to communicate in English. That's why every IT-specialist should have it at a good level.

In this article we will describe how English will help you in your work and what resources you need to use when learning English for programmers
If you have already started work in the IT field, then you perfectly understand that without English programmers cannot do. However, some people believe that technical English cannot be taught: almost all the terminology has come from English, so everything will be clear and so. Those who are not sure whether to spend time learning a foreign language, we give a few weighty arguments.

Understanding terminology most programming languages are based on keywords in English. Selection of development tools in some of them there is no translated interface. Reading technical documentation, almost all reference materials and technical tasks are written in English (if you are interested in orders from abroad). Communicating with clients many foreign companies actively use the services of "IT people", and to understand the needs of clients, you need to know English well.

The study of professional literature the latest books and articles in the IT field are published in English. Programmers need to constantly be aware of all news and updates, so you should learn English. Visiting online courses and webinars On the Internet, you can find hundreds of free training courses from the programming guru. And on paid courses you can get an international diploma - a big plus to the resume. Searching for solutions on the World Wide Web in your work, you periodically encounter difficult tasks and some problems, the solution of which can be found in the English-speaking part of the Internet. The chance to get a job abroad is not a secret, that almost all IT-giants are in the USA. Such firms constantly require competent specialists, but to communicate with colleagues and management, you need to know English. Owning the IT vocabulary will increase your computer "literacy". Those who use a computer for an impressive period of time, mistakenly consider themselves "advanced" users. In fact, meeting with any English term often becomes an insurmountable obstacle.

That is why, we decide to create windows application for help information technologies users. This application helps to users with key words of ICT and descriptions, tasks and crosswords in English.

The application consists of three parts

- Key words and description – this part teaches the users to ICT key words with descriptions in English.
- Tasks – this part consists tests, multiple choices.
- Crosswords – there are some crosswords of ICT key words in this part.

Figure 1. Menu form of application

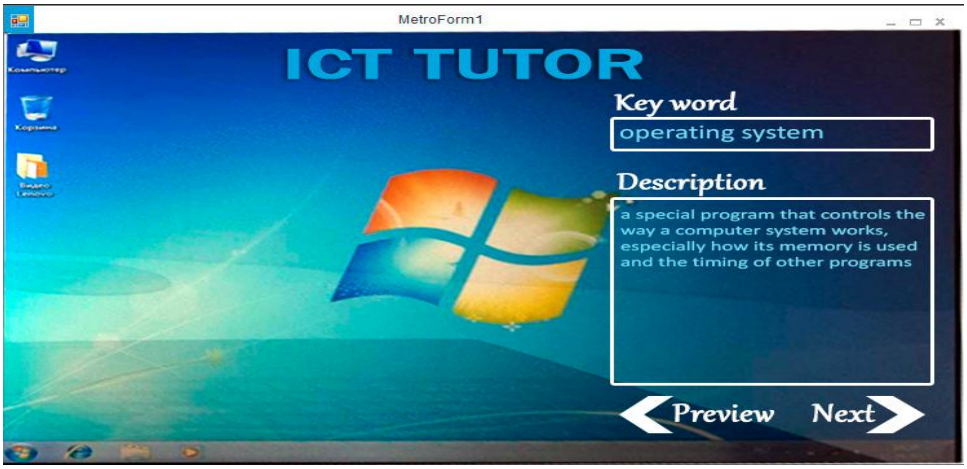

Figure 2. First part of application. "Key words"

In this part, you can learn ICT key word with its descriptions. When you have learned current key word then you can see next key word by clicking "Next" button. On the other hand, if you want to preview last key word you must to click "Preview" button.

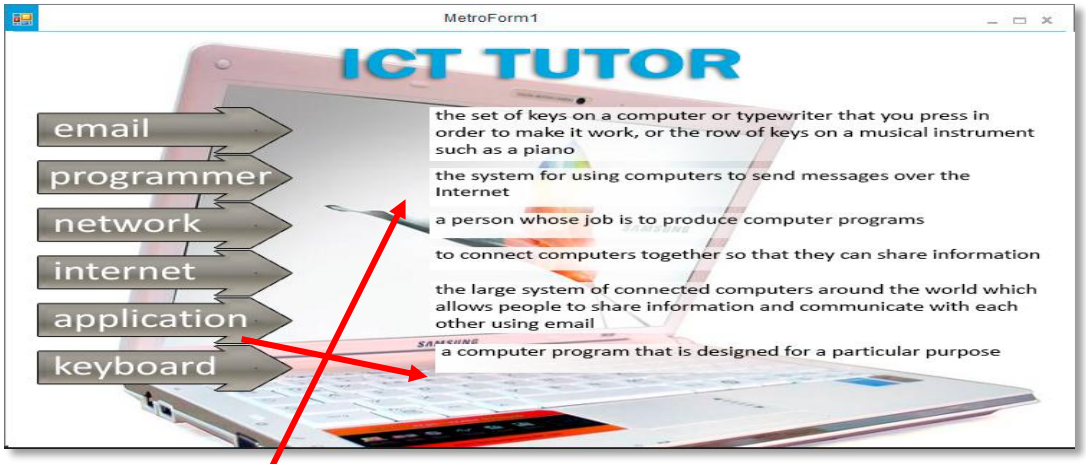

Figure 3. Second part of application. "Tasks"

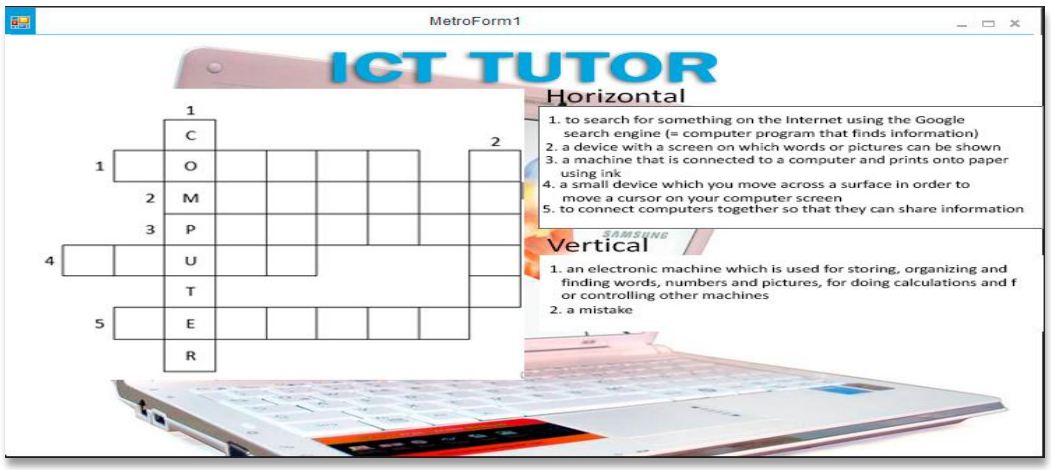

Figure 4. Third part of application. "Crossword"

Last two parts check your knowledge of ICT using tasks and crosswords. When you finished current task or crossword then the application shows new task or crossword.

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NEW GENERATION: SMART GLASSES

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Summary. *The planet we live is currently upgrading new age, the age of robots and the acceleration pace of information exchange because of human creativity. Especially, Uzbekistan is undergoing this process faster, coupled with technological developments. Thanks to our government and its support, the youth of the modern era has no limitations in any field. So, this article expresses "Smart glasses" as an example of youngsters` deeds in our motherland.*

Key words: *transparent screens, security, comfort, vision, technology, health, comfort, security, laptop, smart phones.*

Man, through the ages, has undergone many changes from the time when he depicted a herd of mammoths on the walls of his cave to these days when he can create beautiful pictures and even make a cup of coffee by use of computer technologies without leaving his favorite chair. The 20th century made huge steps and immense advances in developing computer technologies and reached many goals that made our life much easier. The foremost discovery of humanity, the internet has totally conquered our daily routine becoming as necessary as air and water. Indeed, other devices, gadgets are now in a favor of streamlining complexities, and this article targets to expand them with one more.

The situation during which the idea came to mind. When I begin something, I never stop until reaching my purpose. So following it, I started reading a book of my favorite, but could not take a break as it was so interesting and wonderful, full of new episodes… Consequently, I felt strain in my eyes, a pain in my neck which was constantly interrupting me. Then I thought, could I create something that`s comfortable enough to read for relaxing. In the meantime, "Smart Glasses" were born and they are waiting to be admitted by YOU!!!

About its structure and image. At a glance, it looks like simple glasses and are worn like them. However, they are accessed to either phone or a computer, via Bluetooth or USB. So, their glasses act as screens performing simultaneously. Yet, these "screens" are complexly formed. Firstly, they are transparent, when a user wants to pay attention to surroundings, there is no need to take them off, and it is enough to order by eyes! Secondly, screens perform only one side (inside of glasses), whereas the outside cover is black. This does 2 function: 1) not to draw other`s attention; 2) black background helps the vision of eyes. Thirdly, inside screen is covered by protective part, saving eyes from the lights of the display. Finally and the exclusiveness of the device is that, there are no buttons over the glasses as they are managed by eyes! So a user can utilize them lying on the sofa…

About its specialties. According to the statistics, a large segment of worldwide traffic consumption relates to video services, online-cinemas and texts, and this figure is expected to account for 62% by 2019. Thus, this innovation is aimed at making comforts for users to read texts or books, watch films and pictures. Furthermore, human rights and privacy are also taken into account. Prior to the screen performs only one side, it is invisible what the user is watching or reading, meaning that Smart Glasses do not draw other`s attention. Thus in the coincidence, it does not bother others. It is important to note that, these glasses are specialized for using in the loneliness, because it is just the tool for recreational purposes, aiming at making comfort and security for users as much as possible. So, to proof these let us see some more authentic episodes of life.

1st episode. For instance, you are watching your own pictures and photos via your phone, in the bus. But normally you don`t want them to be observed by passers-by, or their attention. In the meantime, smart glasses will come to fulfill their duty!

2st episode. Just imagine that, you are watching a film or a video that you made yourself as a surprising gift for your family members (or your group mates), all of a sudden, someone enters your room, without knocking the door, (e.g. your mother). Then you try to hide it, making the person entered suspect you! It is just the critic time where the fortune of your present is tackled! Do you have a craving for avoiding such situations mentioned above? Then we offer you "Smart glasses" or "SG" for your comfort and security!

Throughout history, it is inevitable that, innovations, discoveries and inventions will live longer, if they serve for good deeds, for providing pleasant, protected, safe and blissful life; if they really worth for utilizing in reality. In the first place, they should take care of human health! Indeed what about "Smart glasses" and its benefits?

As everyone is aware that constantly using computers, laptops or just smart phones has a great effect and negative influence on human health. However, there is a saying that " We humans cause and we humans can lessen it". But there is an arising question: "what is the correlation between "Smart glasses" and it? To address this question, simple symptoms of sedentary lifestyle, which is becoming "global problem" in this days, are analyzed. If a user utilizes his or her laptop`s or phone`s screen, without any break, the state of eyes begins deteriorating, suffering from strain and in worst cases losing their acuteness. Developers strived to tackle this problem while dealing with their innovation. The answer would be like that: "Smart glasses" has a function to switch themselves off automatically every another 30 minutes. After a five-minutes-time break, they are functioned automatically turn on! This is time for eyes to relax and regenerate themselves; for user to do some eyes` exercises. Consequently, there is no fear about the space between the user`s eyes and the screen of "Smart glasses".

To draw a conclusion, "Smart glasses" serve as an accessory for other devices like laptops and smart phones. Their main function is to create comfort and security, while not causing any health problems. "Smart glasses" are expected to place in your bag, serve YOU! And developers will be on cloud nine if they do it in the near future!

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CLOUD COMPUTING

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Summary. *This paper explores some of the basics of cloud computing with the aim of introducing aspects such as:*

- *Realities and risks of the model*
- *Components in the model*
- *Characteristics and Usage of the model*

The paper aims to provide means of understanding the model and exploring options available for complementing the technology and infrastructure needs.

Key words: *cloud, computing, model, software, platform, service, private, public, hybrid, Internet.*

What is the cloud? Where is the cloud? Are we in the cloud now? These are all questions you've probably heard or even asked yourself. The term "cloud computing" is everywhere.

In the simplest terms, cloud computing means storing and accessing data and programs over the Internet instead of your computer's hard drive. The cloud is just a metaphor for the Internet. It goes back to the days of flowcharts and presentations that would represent the gigantic server-farm infrastructure of the Internet as nothing but a puffy, white cumulus cloud, accepting connections and doling out information as it floats.

What cloud computing is not about is your hard drive. When you store data on or run programs from the hard drive, that's called local storage and computing. Everything you need is physically close to you, which means accessing your data is fast and easy, for that one computer, or others on the local network. Working off your hard drive is how the computer industry functioned for decades; some would argue it's still superior to cloud computing, for reasons I'll explain shortly.

The cloud is also not about having a dedicated network attached storage (NAS) hardware or server in residence. Storing data on a home or office network does not count as utilizing the cloud. (However, some NAS will let you remotely access things over the Internet, and there's at least one brand from Western Digital named "My Cloud," just to keep things confusing.)

For it to be considered "cloud computing," you need to access your data or your programs over the Internet, or at the very least, have that data synced with other information over the Web. In a big business, you may know all there is to know about what's on the other side of the connection; as an individual user, you may never have any idea what kind of massive data processing is happening on the other end. The end result is the same: with an online connection, cloud computing can be done anywhere, anytime.

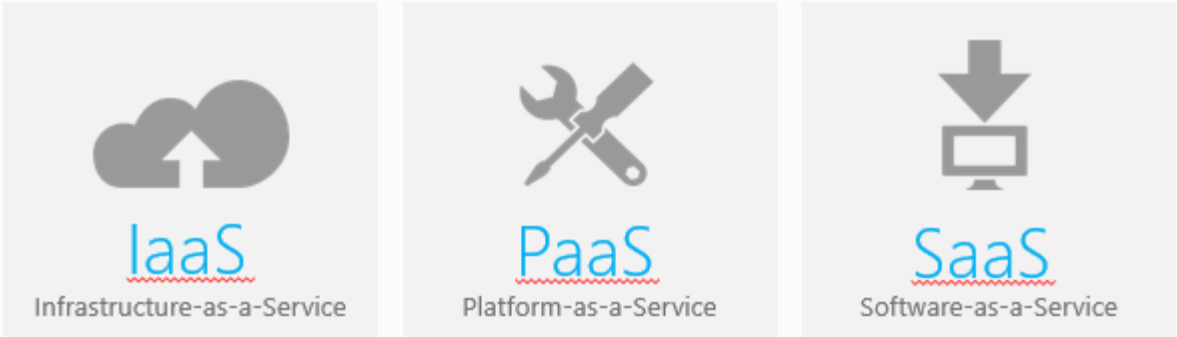
Cloud computing is a computing paradigm, where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. With the advent of this technology, the cost of computation, application hosting, content storage and delivery is reduced significantly.

Cloud computing is a practical approach to experience direct cost benefits and it has the potential to transform a data center from a capital-intensive set up to a variable priced environment.

The idea of cloud computing is based on a very fundamental principal of „reusability of IT capabilities'. The difference that cloud computing brings compared to traditional concepts of "grid computing", "distributed computing", "utility computing", or "autonomic computing" is to broaden horizons across organizational boundaries.

Cloud Computing Models

Cloud Providers offer services that can be grouped into three categories.



1. **Software as a Service (SaaS):** In this model, a complete application is offered to the customer, as a service on demand. A single instance of the service runs on the cloud & multiple end users are serviced. On the customer's side, there is no need for upfront investment in servers or software licenses, while for the provider, the costs are lowered, since only a single application needs to be hosted & maintained. Today companies such as Google, Salesforce, Microsoft, Zoho, etc offer SaaS.

2. **Platform as a Service (Paas):** Here, a layer of software, or development environment is encapsulated & offered as a service, upon which other higher levels of service can be built. The customer has the freedom to build his own applications, which run on the provider's infrastructure. To meet manageability and scalability requirements of the applications, PaaS providers offer a predefined combination of OS and application servers, such as LAMP platform (Linux, Apache, MySql and PHP), restricted J2EE, Ruby etc. Google's App Engine, Force.com, etc are some of the popular PaaS examples.

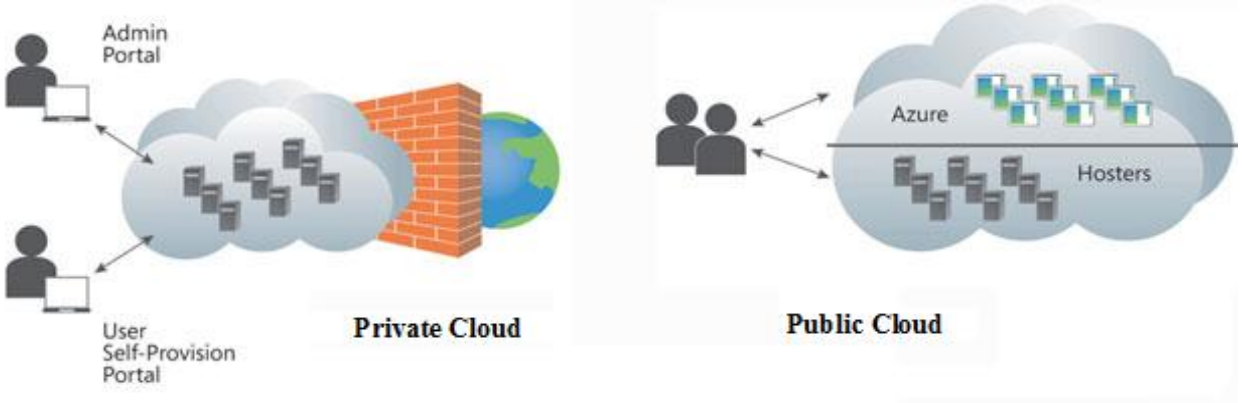
3. **Infrastructure as a Service (Iaas):** IaaS provides basic storage and computing capabilities as standardized services over the network. Servers, storage systems, networking equipment, data centre space etc. are pooled and made available to handle workloads. The customer would typically deploy his own software on the infrastructure. Some common examples are Amazon, GoGrid, 3 Tera, etc.

Understanding Public and Private Clouds

Enterprises can choose to deploy applications on Public, Private or Hybrid clouds. Cloud Integrators can play a vital part in determining the right cloud path for each organization.

Public Cloud

Public clouds are owned and operated by third parties; they deliver superior economies of scale to customers, as the infrastructure costs are spread among a mix of users, giving each individual client an attractive low-cost, "Pay-as-you-go" model. All customers share the same infrastructure pool with limited configuration, security protections, and availability variances. These are managed and supported by the cloud provider. One of the advantages of a Public cloud is that they may be larger than an enterprises cloud, thus providing the ability to scale seamlessly, on demand.



Private Cloud

Private clouds are built exclusively for a single enterprise. They aim to address concerns on data security and offer greater control, which is typically lacking in a public cloud. There are two variations to a private cloud:

- **On-premise Private Cloud:** On-premise private clouds, also known as internal clouds are hosted within one's own data center. This model provides a more standardized process and protection, but is limited in aspects of size and scalability. IT departments would also need to incur the capital and operational costs for the physical resources. This is best suited for applications, which require complete control and configurability of the infrastructure and security.

- **Externally hosted Private Cloud:** This type of private cloud is hosted externally with a cloud provider, where the provider facilitates an exclusive cloud environment with full guarantee of privacy. This is best suited for enterprises that don't prefer a public cloud due to sharing of physical resources.

Hybrid Cloud

Hybrid Clouds combine both public and private cloud models. With a Hybrid Cloud, service providers can utilize 3rd party Cloud Providers in a full or partial manner thus increasing the flexibility of computing. The Hybrid cloud environment is capable of providing on-demand, externally provisioned scale. The ability to augment a private cloud with the resources of a public cloud can be used to manage any unexpected surges in workload.

Conclusion

Nowadays, Cloud Computing is developing in Uzbekistan too. National Telecommunication Operator "Uztelecom" has presented a new project "UzCloud", which operates data processing and is considered the National Data Processing Centre.

To be more accurate, it gives more possibilities to Government organizations and big corporative clients, enlarging their business sphere to present us modern ICT services. We should develop such kind of technology because it would be very helpful in various spheres. By the help of Cloud Computing all users of mobile phones and internet could save their time and recourses, do their interests effectively. This technology takes into consideration everyone's wishes and demands.

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NETWORK SECURITY AND TYPES OF ATTACKS IN NETWORK

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Summary: *This report represented an analysis and evaluation of the network security and types of attacks in network. It also consists of researching modern decides to prevent network attacks and different methods of security them.*

Key words: *network security, anti-virus software, Intrusion Detection System (IDS), Open Systems Interface (OSI), node, passive and active attacks.*

The computer network technology is developing rapidly, and the development of internet technology is more quickly, people more aware of the importance of the network security. Protecting computer and network security are critical issues. The malicious nodes create a problem in the network. This malicious nodes acts as selfishness, it can use the resources of other nodes and preserve the resources of its own.

Network security starts with authorization, commonly with a username and a password. Network security consists of the provisions and policies adopted by a network administrator to prevent and monitor unauthorized access, modification in system, misuse, or denial of a computer network and network-accessible resources. Basically network security invoves the authorization of access to data in a network, which is controlled by the network admin. It has become more important to personal computer users, and organizations. If this authorized, a firewall forces to access policies such as what services are allowed to be accessed for network users. So that to prevent unauthorized access to system, this component may fail to check potentially harmful content such as computer worms or Trojans being transmitted over the network. Anti-virus software or an intrusion detection system (IDS) help detect the malware. Today

anomaly may also monitor the network like wire shark traffic and may be logged for audit purposes and for later on high-level analysis in system. Communication between two hosts using a network may be uses encryption to maintain privacy policy.

The world is becoming more interconnected of the Internet and new networking technology. There is a so large amount of personal, military, commercial, and government information on networking infrastructures worldwide available. Network security is becoming of great importance because of intellectual property that can be easily acquired through the internet. The network security is analyzed by researching the following:

- History of network security
- Internet architecture and security aspects of the Internet
- Types of network attacks and security methods
- Security for internet access in networks
- Current development in the network security hardware and software

System and Network Technology is a key technology for a wide variety of applications. It is a critical requirement in current situation networks, there is a significant lack of security methods that can be easily implemented. There exists a "communication gap" between the developers of security technology and developers of networks. Network design is a developed process that is depends on the Open Systems Interface (OSI) model. The OSI model has several advantages when designing network security. It offers modularity, ease-of-use, flexibility, and standardization of protocols. The protocols of different layers can be easily combined to create stacks which allow modular development. In contrast to secure network design is not a well- developed process. There isn't a methodology to manage the complexity of security requirements. When considering about network security, it should be emphasized that the complete network is secure. It does not only concern with the security in the computers at each end of the communication chain. When transferring from one node to another node data the communication channel should not be vulnerable to attack. A hacker will target the communication channel, get the data, and decrypt it and re-insert a duplicate message. Though securing the network is just as important as securing the computers and encrypting the message. While developing a secure network, the following needs to be considered.

Confidentiality - it means that the non-authenticated party does not examine the data

Integrity - it is a guarantee that the data which is received by the receiver has not been change or modified after the send by the sender.

Here we are presenting some basic class of attacks which can be a cause for slow network performance, uncontrolled traffic, viruses etc. Attacks to network from malicious nodes. Attacks can be categories in two: "Passive" when a network intruder intercepts data traveling through the network, and "Active" in which an intruder initiates commands to disrupt the network's normal operation.

Some active attacks are Spoofing attack, Wormhole attack, Modification, Denial of services, Sinkhole, and Sybil attack.

a. Spoofing

When a malicious node miss-present his identity, so that the sender change the topology

b. Modification

When malicious node performs some modification in the routing route, so that sender sends the message through the long route. This attack cause communication delay occurred between sender and receiver.

c. Wormhole

This attack is also called the tunneling attack. In this attack an attacker receives a packet at one point and tunnels it to another malicious node in the network. So that a beginner assumes that he found the shortest path in the network [1].

d. Fabrication

A malicious node generates the false routing message. This means it generate the incorrect information about the route between devices [2].

e. Denial of services

In denial of services attack, malicious node sending the message to the node and consume the bandwidth of the network. The main aim of the malicious node is to be busy the network node. If a message from unauthenticated node will come, then receiver will not receive that message because he is busy and beginner has to wait for the receiver response.

f. Sinkhole

Sinkhole is a service attack that prevents the base station from obtaining complete and correct information. In this attack, a node tries to attract the data to it from his all neighbouring node. Selective modification, forwarding or dropping of data can be done by using this attack [1].

g. Sybil

This attack related to the multiple copies of malicious nodes. The Sybil attack can be happen due to malicious node shares its secret key with other malicious nodes. In this way the number of malicious node is increased in the network and the probability of the attack is also increases. If we used the multipath routing, then the possibility of selecting a path malicious node will be increased in the network [1, 2 and 3].

Passive attack: The names of some passive attacks are traffic analysis, Eaves dropping, and Monitoring [1, 2 and 3].

a. Traffic analysis

In the traffic analysis attack, an attacker tries to sense the communication path between the sender and receiver. An attacker can found the amount of data which is travel from the route of sender and receiver. There is no modificationin data by the traffic analysis.

b. Eavesdropping

This is a passive attack, which occurred in the mobile ad-hoc network. The main aim of this attack is to find out some secret or confidential information from communication. This secrete information may be privet or public key of sender or receiver or any secrete data.

c. Monitoring

In this attack in which attacker can read the confidential data, but he cannot edit the data or cannot modify the data.

Advance attacks consists of:

a. Black hole attack

Black hole attack is one of the advance attacking which attacker uses the routing protocol to advertise itself as having the best path to the node whose packets it want to intercept. An hacker use the flooding based protocol for listing the request for a route from the initiator, then hacker create a reply message he has the shortest path to the receiver . As this message from the hacker reached to the initiator before the reply from the actual node, then initiator wills consider that, it is the shortest path to the receiver. So that a malicious fake route is create.

b. Rushing attack

In rushing attack, when sender send packet to the receiver, then attacker alter the packet and forward to receiver. Attacker performs duplicate sends the duplicate to the receiver again and again. Receiver assumes that packets come from sender so the receiver becomes busy continuously.

c. Replay attack

It this attack a malicious node may repeat the data or delayed the data. This can be done by originator who intercept the data and retransmit it. At that time, an attacker an intercept the password [4].

d. Byzantine attack

A set of intermediate node works between the sender and receiver and perform some changes such as creating routing loops, sending packet through non optimal path or selectively dropping packet, which result in disruption or degradation of routing services.

e. Location disclosure attack

Malicious node collects the information about the node and about the route by computing and monitoring the traffic. So malicious node may perform more attack on the network.

The security is the main problem in the mobile ad-hoc network. In MANNET [4] node looks like selfishness. A node can use the resources of other node and preserve the resources of own. This type of node creates the problem in MANET there are a number of ways, which guarantee for the safety and security of your network. Perform the following to avoid security loopholes. Must have an updated antivirus program. Don't provide more or unwanted access to any network user. Operating system should be regularly updated.

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SERVICE OF ONLINE FREELANCERS FOR YOUR PROJECT

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Summary: *This paper analyzes the system of several services of freelancer for any projects according to designing, engineering, coding, programming, translating and etc. The paper argues that, freelancing has many advantages. This paper points out the problems about finding jobs or finding a good specialist for realizing projects and offers some important suggestions, which come handy using freelancing system for our community.*

Key words: *freelance, online-jobs, projects, one-time work, free-lancers.*

To begin with, one of the main problems of our country called unemployment. Because of daily growing of cadres there are many unemployed people in Uzbekistan. That is why now heavy actions have been putting into practice to decide the problems of unemployment in our country. For example, the law of youth people or the harangue of our president for honored defenders of Uzbekistan army. Also modern countries to solve the problem use online freelance system.

Initially, freelance is working on a contract basis for a variety of companies, as opposed to working as an employee for a single company. Freelancers are often considered to be self-employed, and have the freedom to choose their projects and companies they would like to be associated with.

In addition, freelancer is someone who works on different projects with different companies instead of being a company employee. A freelancer is an individual who earns money on a per-job or per-task basis, usually for one-time or short-term work. A freelancer is not an employee of a firm, and may therefore be hired to complete different jobs concurrently by various individuals or firms, unless contractually specified to work exclusively until a particular project is completed.

Typically free-lancers are considered self-employed and may do such contract work full-time or as a side job to supplement some other full-time employment, time permitting. Freelancers as independent contractors typically require signed contracts for the job to be done and will agree to a pre-determined fee based on the time and effort required to complete the task. This fee may be a flat fee or per-hour, per-day, per-project, or some other similar measure.

A freelancer tends to work in the creative, skilled or service sector such as in:

- film
- art
- design
- editing
- copywriting
- proofreading
- media
- marketing
- music

- acting
- journalism
- video editing and production
- illustration
- tourism
- consulting
- web site development
- computer programming
- event planning
- photography
- language translation
- tutoring
- catering and many more

An example of a freelancer would be an independent journalist who reports on stories "at large" and then sells his or her story to the highest bidder. Another example is a web designer or app developer who does one-time work for a client and then moves on.

Benefits of freelancing include freedom to work from home, flexibility of work schedule and a better work/life balance. Freelance work can employ workers who have been laid off, reducing the incidence of overall unemployment in an economy.

Drawbacks include uncertainty about future income, job stability and consistency of getting new work, lack of typical employer benefits such as insurance and retirement plans, and typically lower per-hour rates compared to employed wageworkers.

A freelance economy revolves around hiring self-employed workers to undertake specific, short-term jobs in return for an agreed upon wage. These jobs typically are too small or infrequent to hire a full time employee or would be too expensive to contract out to another firm. Freelancers are the individuals who make themselves available to be hired for such temporary work. They may find temporary work through classified ads, online, or through temporary staffing agencies. The internet has made freelancing a more attractive pursuit for many individuals in the fields of writing, journalism, design, artistic pursuits, editing, multimedia, consulting, computer programming, and many more. The freelance economy is closely related to the Peer-to-Peer (P2P) economy. However, it is not uncommon for businesses to hire freelance workers, while a P2P transaction involves individuals.

The freelance economy involves specific, short-term jobs that can last anywhere from less than an hour to more than a year. Jobs can be found advertised in classified ads, websites such as Craigslist, online services such as eLance and through temporary agencies. The freelance economy is predicted to grow as the Internet and information technology make it easier for individuals to be paid for jobs that require their skills. It is estimated that more than 50 million Americans partake in freelance work either full-time or part-time, which is about 1/3 of the entire workforce.

Freelancers often bid for specific jobs and compete to be hired by highlighting their skill and experience, or by reducing the pay, which they will accept. An example would be a new small company needing to design a logo. The job is a one-time opportunity so it does not make sense to hire a full-time employee, and the company is too small to hire a design firm. Instead, the company can post the job offering online or through a classified ad. Freelancers specializing in logo design will respond to the ad and compete for the job, both in cost and quality.

In conclusion, the freelancing system is one the modern and developing occupation. By using this system each freelancers can save their time and could create comfortable opportunities for their jobs. That is why to improve the service there are

several projects that have been put in progress in Uzbekistan. The main purpose of this article is to build novelties in freelancing system.

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VOLTE IN UZBEKISTAN

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***Summary**: This article reports on an ongoing investigation of Information technologies and Communication in Uzbekistan. The article argues Communication development and technology of 4G.*

***Key words**: VoLTE, IMS, HD voice, 3G voice call*

Voice over Long-Term Evolution (**VoLTE**) is a standard for high-speed wireless communication for mobile phones and data terminals. It is based on the IP Multimedia Subsystem (IMS) network, with specific profiles for control and media planes of voice service on LTE defined by GSMA in PRD IR.92. This approach results in the voice service (control and media planes) being delivered as data flows within the LTE data bearer. This means that there is no dependency on (or ultimately, requirement for) the legacy circuit-switched voice network to be maintained. VoLTE has up to three times more voice and data capacity than 3G UMTS and up to six times more than 2G GSM. Furthermore, it frees up bandwidth because VoLTE's packets headers are smaller than those of optimized VoIP/LTE.

With the development of digital technologies in high-demand wireless connection is constantly increasing. With the aim of such a compound in cellular networks has been developed communication standard LTE (Long Term Evolution - long-term evolution). It is compatible with previous generations of 3G networks based on UMTS / HSPA and CDMA, so it can be implemented without major refining infrastructure. But the major drawback is the inability to use LTE switched (telephone) voice communications. To

work with calls in LTE networks, the phone must be switched on for the installation of 3G voice call, or to support VoLTE technology.

VoLTE - Voice technology is through LTE networks (transcript of Voice over LTE and is translated as "voice over LTE»). It allows you to make traditional phone calls in these networks, without having to switch communication technology (so-called FallBack). At the moment, the technology is still under development and active implementation. As operators implement full support for VoLTE for all subscribers - it will allow to organize a high-quality voice communications, since it has clear advantages over 3G and, especially, the GSM.

Advantages of VoLTE

• Higher quality of voice. In networks of the second generation and the third audio data transfer rate is limited. She rarely exceed 16 kbit / s, and this rate is insufficient to obtain a high-quality voice. Using HD Voice codecs VoLTE ensures better sound quality, to sound volume and to reduce the amount of spurious noise.

• Increasing connection speed. When making a call in an LTE network smartphone is switched on GSM or 3G to install the dial-up connection. It takes time, so there is a delay, sometimes reaching more than 20 seconds.

• Increase the capacity of cellular networks. The number of subscribers that can simultaneously communicate with a single base station is limited. Because of this, when the BS overload may be problems with communication, such as the inability to call or receive a call. Application VoLTE increases the maximum number of users supported by the base 3 times, compared to 3G. 4G network capacity up to 6 times higher than that of 2G GSM.

• Simultaneous voice and data transmissions. In the GSM and 3G operators do not normally allow the transfer of data at the time the activity of the phone call. When you receive or make a call by the subscriber internet connection is "frozen". Technical ability to do this, operators have, and tested 10 years ago. However, when using it increases the load on the network and communication quality deteriorates.

• Due to the large capacity of LTE VoLTE application allows you to remove this restriction.

The possibility of free calls. When using VoLTE switching connection is not used. This means that the voice data transmitted through packet transmission system. only Internet traffic costs when you make a call. Thus, for the owners of smartphones with VoLTE (if the operator supports this service), unlimited internet use, calls are free. This applies both within communication network and subscribers with 2G and 3G operators.

Unfortunately, not devoid of VoLTE protocol and several disadvantages. The main one - is to increase the load on the smartphone. To avoid it, you need to implement the chipset level algorithm. For this reason, the technology does not support many of the existing devices. It is implemented in the iPhone, since 5s, flagship Sony, LG,

Samsung, Google Nexus. With regard to the Chinese producers - there should be specified.

Another shortcoming VoLTE - the need to ensure that all operators have moved to use it. LTE subscriber connection to the 2G and 3G users is a complex procedure at a technical level. Because the normal operation of the technology is possible only if all operators to implement it, and will become the dominant 4G generation networks.

4G / LTE from Ucell- easier, faster and more accessible

Mobile operator Ucell has launched into commercial operation svyazichetvertogo generation services (4G) in Uzbekistan. Presentation of the new technology took place in the mall "Next", where guests were corporate clients, the Company's subscribers, as well as hundreds of visitors to the complex, which speed and 4G / LTE advantages have been demonstrated.

Of Ucell, being a part of TeliaSonera group of companies, a world leader in providing advanced technology, launched 4G / LTEv Uzbekistan. The world premiere took place almost five years ago, when TeliaSonera December 14, 2009 launched commercial 4G networks in Stockholm and Oslo. Ucell added the 12th in a row 4G flag on the world map of TeliaSonera presence consist of 17 countries of Scandinavia and the Baltic States to Nepal. On December 1, 2014 the people of Uzbekistan, users of Ucell, will appreciate the advantages of high-speed mobile internet using a 4G network in Tashkent.

What is a 4G / LTE from Ucell?

• High-speed mobile Internet - up to 150 MB / s;

•Convenient use of media services, mobile TV, a variety of online applications;

• Comfortable and clear conditions for the use of mobile access to the Internet for business,

• Profitable and affordable rates to everyone;

• The widest coverage in Tashkent 4G / LTE network

Through 4G from Ucell subscribers are available online viewing HD movies, faster downloads and downloading files from the Internet pages.

The company offers Internet, the speed of which is more than 10 times the speed of 3G. In the demo area, installed in the atrium of the shopping complex, guests and partners can experience the high speed Internet connection using devices that support 4G / LTE standard. 4G from Ucell start the evening memorable and colorful show program with a lot of competitions and prizes from pleasant.

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ELECTRONIC GOVERNMENT-DYNAMIC DRIVER OF THE REPUBLIC OF UZBEKISTAN

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Summary*: This article is devoted to the electronic government –dynamic driver of the republic of Uzbekistan.*

Key words: *electronic government, national program, legal regulation, modernization*

From the first days of independence Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society. Over a short period the authorities created the legal framework conducive to further formation and progress of market of IT-technologies.

In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. President's Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21, 2012 and "On further development of computerization and introduction of information and communication technologies" dated May 30, 2002, became important documents in this direction.
Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy. In 2002, the government prepared a national strategy for information and communications technology (ICT) development that identified education as a priority sector for ICT implementation. The Asian Development Bank (ADB) assisted the government in preparing the ICT strategy, which was deemed to offer potentially multiple gains to the country. In education, benefits included enhancing the quality of education, and improving access to education for children from poor families and in remote areas. In 2004, the government approved the National Program for Basic Education Development for 2004-2009. Within this framework, the government launched an ambitious program to integrate ICT in basic education nationwide.

Kim Nam Seok, the Korean ICT expert who are working as the Deputy Minister of Information technologies and communications of the Republic of Uzbekistan published an article 'Uzbekistan: e-government deepens participatory democracy and state transparency' dedicated to accelerating the development and implementation of

information and communication technologies in all spheres of life of the state and society.

It describes the implementation of the Program for the development of a modern and based on best practices of e-government system for the period until 2020 which was adopted on the initiative of the first President Islam Karimov. It is reported that at this stage there have already been achieved positive results, including the functioning of the Single portal of interactive state services rendering over 290 modern services. It is noted that since the beginning of 2016 the number of applications increased by 2 times and amounted to 800 thousand. Previously, the state had to spend more resources to provide these services manually.

The publication reports that the electronic evaluation system of intervention of legislative acts has become another effective tool for citizens and business participation in public decision-making. So, through this system more than 1,400 publicly available comments and proposals have been received and more than 800 normative-legal acts half of which was taken into account when approving the regulations.

'Commissioning of the new national open data portal, which was used more than 630 thousand times, has become an important tool for the development of business start-ups. The portal includes 1750 sets of public data provided by 109 organizations', - continues The Financial Times. The article notes that submission of tax and statistical reporting, processing of customs declarations, registration of businesses and trade names, running the system 'Electronic visa' became the most popular online services. At the same time, it is effectively functioning single mechanism of electronic trading on public procurement, electronic filing of claims and applications from entrepreneurs in economic courts, by the country's 'one-stop' centers for the collection of documents when applying for government services. Thus, citizens and business entities have access to the most relevant and popular public services through monitors or smart phones.

'Today, in the country with a population of 32 million people, 60% of which are youth, cellular communication is used by 21 million, and the internet - by more than 13 million people, says the publication. As a result of large-scale measures, which were adopted in the country, Uzbekistan has significantly improved position in 2016 UN ranking of on the level of e-government development, entering the 40% of the most advanced countries of the world and took 80 place among countries that use e-government, as well as the 47th place for e-participation index which assesses the effectiveness of the government dialogue with their citizens and businesses. In Uzbekistan this indicator is on the 3rd place among the CIS countries and the first among the Central Asian countries.'

As highlighted in the article, the introduction and development of e-government in Uzbekistan built in the rank of national priority, signed more than 40 governmental decisions on the 'electronic government', developed regulatory framework outlined in

the Law 'On electronic government' and subsequently adopted by the Parliament of Uzbekistan.

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SPEECH RECOGNITION SYSTEMS USE NETWORKS OF NEURONS

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Summary. *The following article discusses the issue of neural network technology using speech recognition. Speech recognition, neural network was studied. Optimal network structures and increase the speed of the speech recognition has been noted as groundbreaking.*

Key words: *speech recognition, neuron networks, neural network technology.*

Introduction

Recognition systems, speech recognition are one of the main issues today. Currently, the existing systems are far from perfect. For example, limited vocabulary, a large percentage of errors allowed the concrete to adapt to the voice of the announcer problems which need to be addressed such issues. In order to solve these problems is the purpose of neural network technologies.

The main part

As it is known, is characterized by the variability of human speech. This is for a number of reasons [1]. First, the sale of units of the same person as the one acoustic spectral composition varies with the pronunciation and tone. The speaker will be connected to the atmosphere and emotional state. Secondly, coarticulation plant availability and phonemes pronounced the word depends on the context. Third, the speech signal changes in different kinds of interference. Taking into account all the facts of real-time speech recognition for the high quality of powerful computing technology required. The demand for neural computerization is used to estimate the use of artificial neuron networks that can be accessed through the putting them in to parallel.

Talk will consider the scheme of simple familiar words pronounced in the opposite direction (Figure 1) [1].

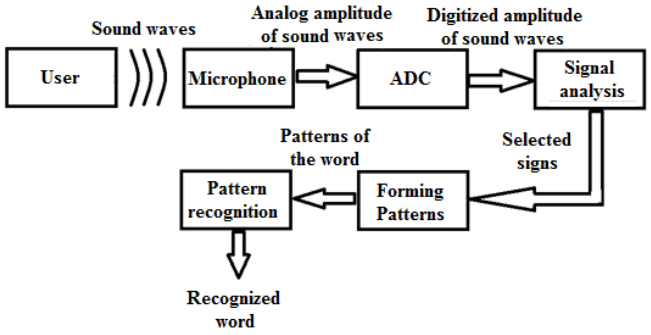

Figure 1. Special Scheme

You may be familiar with the process of this case 3. The first stage acoustic pre processor incoming audio signal into time frames, removable acoustic vector. Typically, these vectors speech signals representing small pieces of spectrum or spectral factors.

Vector, which is playing in the second stage, is compared with the standard model and local metrics or similar aspects.

Vectors third stage playing in a local model of the metric signs and benchmarks are used to compare sequences. This is to compensate for the change of speed.

All of the above operations are exercised maximum Detected phrases will be selected. Integrated speech recognition playing in the second stage of local metric of individual words and phrases used to compare with the original.

Figure (1) shows a familiar pattern of neurons caused by an inefficient use of networks is considered the second stage of the local metrics [2]. Continuous observations, statistical metric vectors autentification function monotonous function of the symptoms of the citizens.

Discrete observations speech identifiers and serves as a vector quant codebook will grasp any clear signs vector symbol. After dressing, the characters possibly monitor each reference vector characters special tables using local sources of metrics. Such estimates standards equal to the number of linear units consisting of perceptron layers (2) by the citizens. This perceptron enter must be equal to the number of available characters.

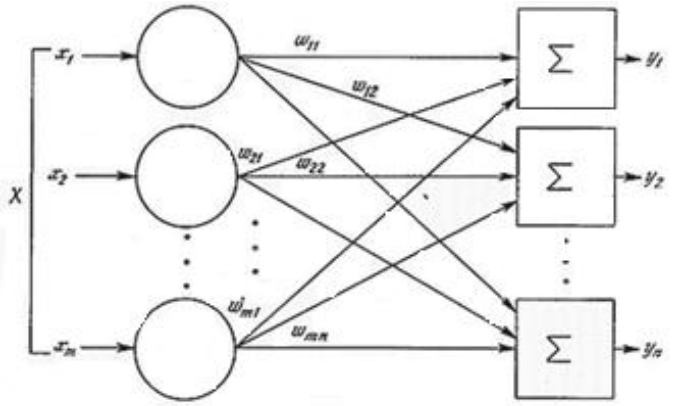

Figure 2. A layer perceptron.

The vector can be achieved, along with the enterprises symptoms, such as card networks (Figure 3). This is the book of codes; such as network-node consists of a two-dimensional array, each node can be one of the characters. Each network node out of appropriate benchmarks to cheat by using the equation of Euclidean distance between vectors, the selected remote sites. Such estimates the enterprises algorithm modifications [1] or other metric Euclidean equation (for example, K-average algorithm) is carried out using a support vector quantify traditional algorithms [1,2].

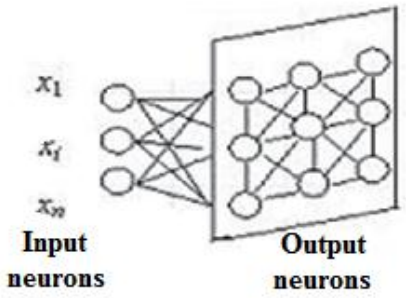

Figure 3. Enterprises neuron network

Multi-layered networks of neurons (Figure 4), the event is considered the first stage processor signs of vectors can be used to zoom out. These networks of neurons with one or more groups of hidden knots, how to enter will be available up to. The neural network learning process through layers of hidden knots out of the vector output is able to re-build. These components after learning of speech processing and recognition [4] can be used later as a small amount of unwanted knots.

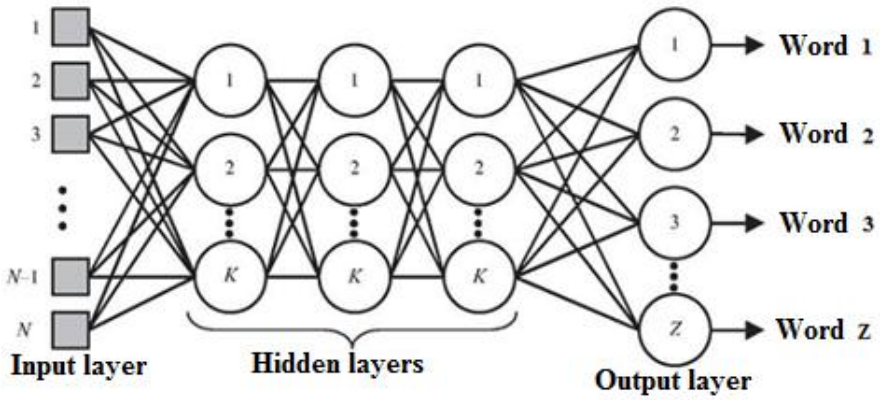

Figure 4. Speech recognition, multi-layered network of neurons

Speech recognition developed specifically for the dynamic neural wave classifiers in the opposite direction of interest. Dynamic neural wave recognition to overcome the shortcomings related to the use of static networks. Research shows dynamic neural wave acoustically similar words, vowel and consonant in the study leads to excellent quality [1.6].

And time delay multi-layered networks of neurons perceptron, the modification of the delay in units of time. T delay 2T ... NT units are shown in Figure 5.

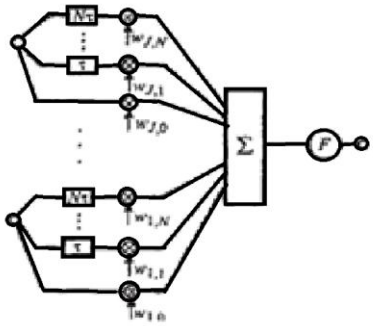

Figure 5. Delays neuron network integration scheme.

To an N + 1 array, J Moments multiples confessant balls. F cumulative deduct the non-linear function of the results.

Three phonemic (or three phonemic class), you know that the three-layered neuron network in Figure 6 (a single-node networks) [6].

6 and figure out the sequence of acoustic vector network processing, the lower layer components shown to be equivalent to the delay time. The bottom layer of these characters sensor inputs, which consists of acoustic vector. Hidden layer nodes symptomatology of mobile detectors, the incoming options to find the desired images. Outgoing units in the second, thanks to the network layer with an equal number of detectors are optional torque are equal. This is the change to standard time phonemes

network flexibility. The time delay on the networks of neurons, simple structure it could build a large scale integrated chip [5].

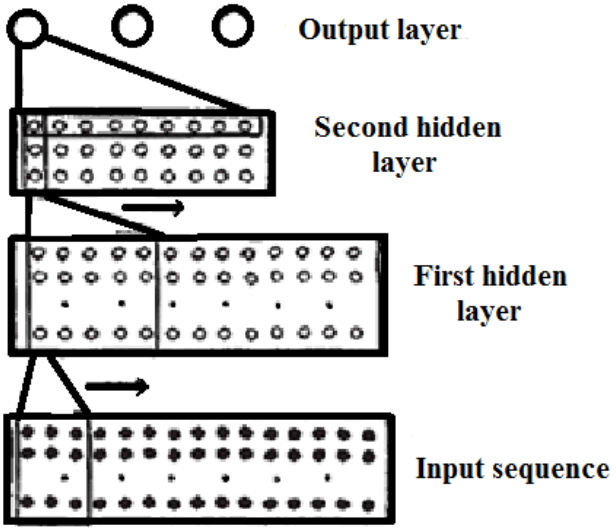

Figure 6. The time delay neuron network architecture

Conclusion

Speech recognition for this article is to consider the possible structures of the different networks of neurons. In conclusion we can say that the estimates parallels led to an increase in the speed of the networks of neurons, thanks to speech recognition. The application of a multi-layered networks of neurons than the number of synaptic connections between neurons, memory usage, and the time to learn the dictionary, such as deterioration of the size and the activities of the network to solve the problem. As a result, speech recognition systems can work in real time frame.

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TWO-DIMENSIONAL PIECEWISE-POLYNOMIAL HAAR'S BASES AND THEIR APPLICATION TO PROBLEMS IN DIGITAL SIGNAL PROCESSING

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Summary. *In this work, two-dimensional piecewise-polynomial haar's bases and their application to problems in digital signal processing are concerned. New types of one-dimensional and two-dimensional fast transformations are offered.*

Keywords: *two-dimensional, piecewise - linear functions, parabolic, polynomial, binary-rational, piecewise-constant, piecewise-quadratic, arithmetic operations.*

Introduction

For construction models of the signals received from real objects, traditional harmonious functions are widely applied. It tells that many signals received from real objects can be easily presented by set sine and cosine waves fluctuations, which is using for the device of Fourier analysis. Result of it is transition from time to frequency functions. However, representation of time function sine and cosine wave functions is only one from many representations [1] [4] [9] [12]. Any full system of orthogonal functions can be applied for expansion in a series, which correspond with Fourier series.

One dimensional piecewise-polynomial haar's bases

Wide distributions to technical appendices have received orthogonal systems continual the explosive basic function, given on the valid axis, which also have algorithms of fast transformations. They can be split in two classes:

1) global basal functions, which value are not equal to zero neither one subinterval. Walsh's functions has a concern to this class [13], numerical [13] [15] [16], sawtooth;
2) localizable basic functions, which nonzero values are set on the enclosed pieces. Examples are Haar [15] [16] and Harmut's [13] [15] functions.

Splitting of the valid axis - is usual binary-rational. In the further we will mainly consider an interval [0, 1] or [0, 1) and we use concept of a binary piece, which recieves division of the set interval on

2^p equal parts (P = 1, 2,...):

$$h_k = h_{pj} = \left[\frac{j}{2^{p-1}} \quad \frac{j+1}{2^{p-1}} \right] \tag{1}$$

where $j = 0,1,...,2^{p-1}$, $k = j + 2^{p-1}$

As examples of binary pieces intervals can serve

[0;1); [1/2; 3/4], [3/8; 4/8] etc.

The length of a binary piece is equal to h_{pj}

$$\left|h_{pj}\right| = \left|\overset{+}{h}_{pj}\right| + \left|\overset{-}{h}_{pj}\right| = 2^{1-p};$$

where $\overset{-}{h}_{pj}$, $\overset{+}{h}_{pj}$ are accordingly its left and right half and also represent binary pieces:

$$\overset{+}{h}_{pj} = \left[\frac{j-1}{2^{p-1}}; \quad \frac{2j-1}{2^p} \right], \quad \overset{-}{h}_{pj} = \left[\frac{2j-1}{2^p}; \quad \frac{j}{2^{p-1}} \right] \tag{2}$$

The system unnormalized Haar's functions defined in a continual form [1]:

$$har_k(x) = har_{pj}(x) = \begin{cases} +1 & x \in \overset{-}{h}_{pj} \\ -1 & x \in \overset{+}{h}_{pj} \\ 0 & x \in h_{pj} \end{cases} \tag{3}$$

It is necessary to note, that $har_0(x) \equiv 1$;

Number P called as order of Haar function

It is known, that Haar's number [13]:

$$f(x) = \sum_{k=0}^{\infty} C_k \cdot har_k(x) \tag{4}$$

can provide as uniform (including the best uniform), and middle quadrate approach. All depends on a way calculation of factors.

Haar and Harmut's bases involve attention of experts for two reasons:

1. Reduction number of the factors necessary for approximation (with the set accuracy) in relation to the general number of binary pieces.

2. Absence of "long" operations in expression (4). Operations of addition, subtraction and shift are used only.

Lack of rectangular orthogonal Haar and Harmut's bases is weak convergence of numbers on piecewise-constant functions, i.e. necessity of storing some hundreds factors for many functions with the purpose maintenance errors of the order 0,1 %.

Searching methods of reduction volume a tables of factors, improvements parameters of "smoothness" by obvious image lead to systems piecewise-polynomial basic functions of higher degree[2][3]. Most simply turn out piecewise-linear basic functions (Shauder's function) as a result of integration with a variable top limit orthogonal piecewise-constant of Haar functions [12] [13]:

$$Shd_k(x) = 2^p \int_0^x har_k(r)dr \qquad (5)$$

It is necessary to consider also, that $Shd_0^0(x) \equiv 1$ and $Shd_0(x) = x$

Often in practical appendices of numbers piecewise - linear functions with the purpose of reception of amplitudes of all basic functions equal to unit, it is convenient to operate with the "normalized" systems [8][15]:

$$\widetilde{Shd}_k(x) = 2^p \int_0^x har_k(r)dr \qquad (6)$$

$$P = 0,1,\ldots; \qquad k = 0,1,2,\ldots$$

On Fig. 1. a. are resulted piecewise-constant Haar's functions, on Fig.1. b. Shauder's - functions and on Fig.1. c. piecewise-parabolic Haar's functions

Functions of $har_k(x)$ can be ordered (along analogy ordering Walsh's functions) in three ways [7] [12]:

1. To arrange binary fractions ***k*** in the natural order increase – Adamarov's ordering;
2. To arrange ***k*** in ascending order inverted code on dyadic ordering;
3. To grouping ***k*** in group a spline by number of categories after a comma 1,2,3, etc., and inside of each group to arrange fractions in ascending order- classical ordering;

Adamarov's ordering of Haar's functions results piecewise-linear to reception of the optimal FHT algorithms, but practical using a specters in adamarov is inconvenient ordering, such as in spectrum is not provided uniform convergence of the partial sums for continuous functions which are usually considered as signals [5][6][10][11].

b) c)

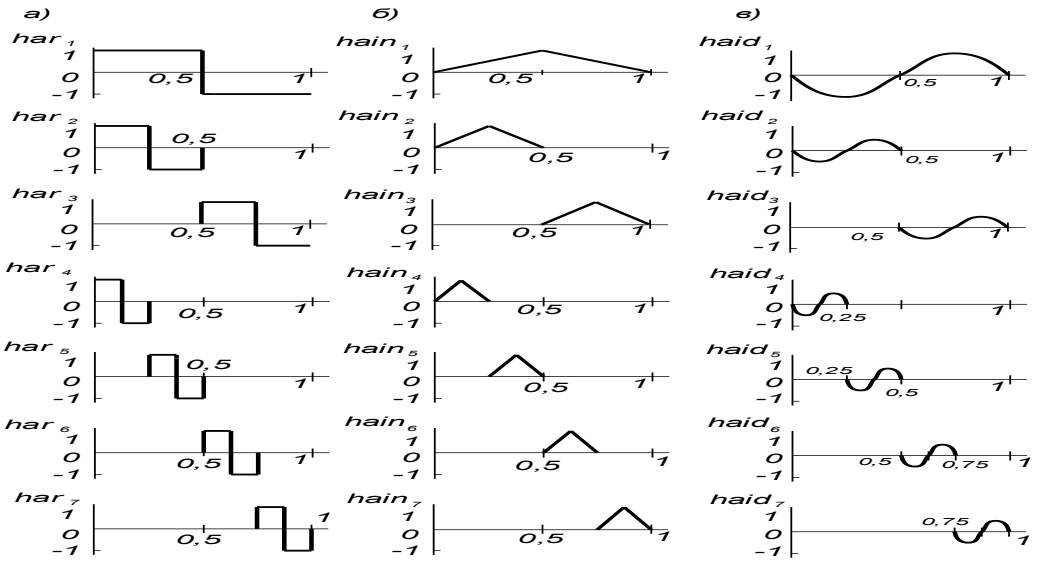


Fig. 1. a) piecewise-constant, b) piecewise-linear and c) piecewise-quadratic basic functions of Haar.

In [15] it is shown, that approach of continuous signals by the partial sums of a spectrum provides uniform convergence with classical ordering Haar's functions. As dyadic ordering differs from classical only an arrangement functions inside of groups, it also has this property. Dyadic the arrangement of Haar functions provides greater uniformity of approach as rejection members of some occurs not on the one hand, and in regular intervals on all range definition.

Two-dimensional piecewise-polynomial haar's bases

The technique of construction of two-dimensional integrated bilinear basic functions of Haara can be based on idea of integration of piecewise-plane orthogonal basic functions [12],[13],[14]. For example, two-dimensional functions of Shauder $Shd_{ij}(x,y) = Shd_i(x) * Shd_j(y)$ as a result of operation of double integration can be constructed:

$$Shd_{ij}(x,y) = \int_0^x \int_0^y har_i(\tau) har_j(\tau') d\tau d\tau' \tag{7}$$

As a result so-called functions - "pagodas" the form of one of which is shown on fig. 2. Factors of discrete spectral transformations in bilinear bases are calculated through so-called "diagonal" two-dimensional final differences:

$$\Delta f_{ij} = f(x_{i+1}, y_{j+1}) - f(x_i, y_j) \tag{8}$$

These differences are hypotenuses of the vertical triangles, as one of which legs of a triangle heights of functions-pagodas (fig. 2.) , and other leg of a triangle – a diagonal of an elementary platform in the size $h \times h$ on a plane (x, y) (fig. 3.). Its length is designated as Δ_{ij} .

For two-dimensional bilinear bases factors of direct discrete transformation are defined under formulas:

$$C_{kl} = \sum_i \sum_j \Delta f_{ij} har_k(x_i) har_l(x_j) \qquad (9)$$

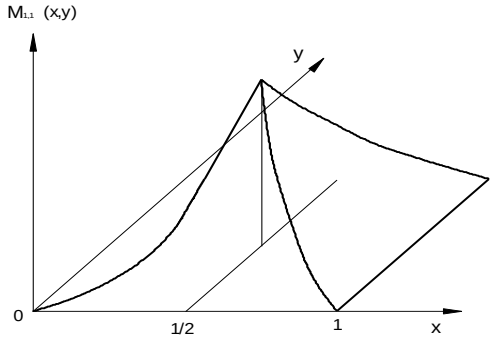


Fig. 2. Two-dimensional M-functions

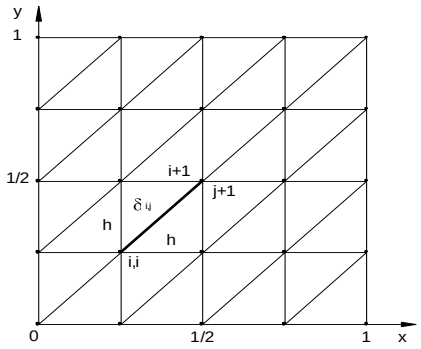


Fig.3. A projection of diagonal differences.

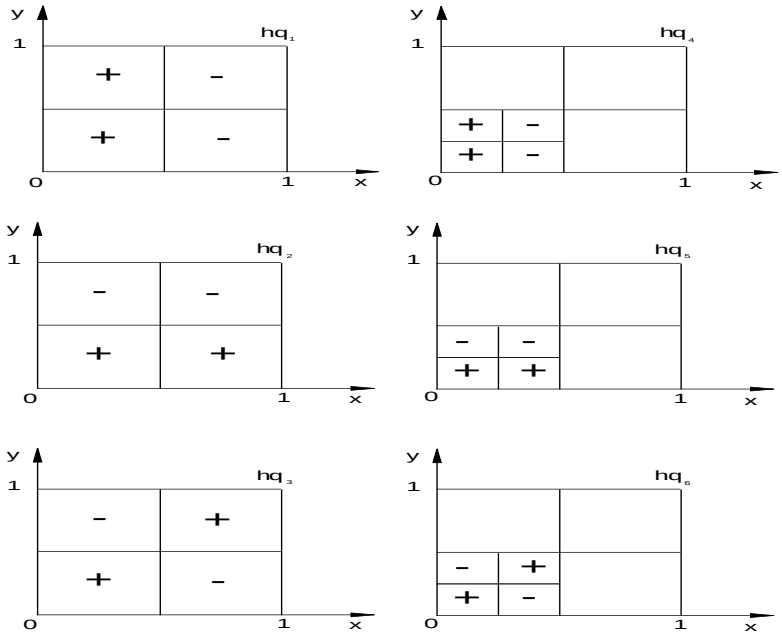


Fig. 4. System of two-dimensional piecewise -plane functions.

We form system of the basic functions depending on one of arguments:

$$a_k(y) = \sum_j \Delta f_{ij} har_l(y) \qquad (10)$$

Then we can write down:

$$C_{kl} = \sum_i a_k(y) har_k(x) \qquad (11)$$

Return two-dimensional discrete transformation owing to material character of basic functions is carried out similarly:

$$\Delta f_{ij} = 4^{-P} \sum_k \sum_l C_{kl} har_k(x) har_l(y) \qquad (13)$$

$$\delta f_i(y) = \sum_l C_{kl} har_k(x) har_l(y)$$

$$\Delta f_{ij} = 4^{-P} \sum_k \delta f_i(y) har_k(x)$$

Two-dimensional discrete transformations to bases of integrated functions of Harmuta turn out similarly. Designations change only.

Function restoration in any point (x, y) can be made under the formula

$$f(x, y) = f(x_i, y_j) + h_x^{-1} h_y^{-1} \delta x \delta y \Delta f_{ij} \qquad (14)$$

Where $\delta x, \delta y$ – the increments of arguments which are not surpassing accordingly h_x and h_y.

The system piecewise -plane orthogonal “Haar- like” functions can be constructed on the basis of the theory of self-similar trees in dynamic discrete space [14]. The process beginning is crushing of an individual square (fig. 4.) on the binary-rational areas which too are squares and on these squares groups of the basic functions accepting values +1,-1 or 0 are under construction.

Any (x, y) point of area Ω $(0 \le x, y < 1)$ belongs to a binary square Q_{psr} if co-ordinates of this point belong to corresponding binary pieces $x \in h_{ps}, \quad y \in h_{pr}$

In each square Q_{psr} four equal parts which in turn are binary squares are allocated. The point (x, y) belongs to dynamically decreasing square under conditions:

$$\begin{cases} (x, y) \in Q1_{psr}, & if \quad x \in h_{ps}^{+} \ and \ y \in h_{p\kappa}^{+} \\ (x, y) \in Q2_{psr}, & if \quad x \in h_{ps}^{+} \ and \ y \in h_{p\kappa}^{-} \\ (x, y) \in Q3_{psr}, & if \quad x \in h_{ps}^{-} \ and \ y \in h_{p\kappa}^{+} \\ (x, y) \in Q4_{psr}, & if \quad x \in h_{ps}^{-} \ and \ y \in h_{p\kappa}^{-} \end{cases}$$

Thus, recursive streamlining with corresponding hierarchical numbering is made. On a square Q_{psr} three orthogonal functions hd_{psrl} of values +1 or-1 with an index l = 1, 2 and 3 are formed:

$$hq_{psr1}(x,y) = hq_{ps}(x) = \begin{cases} +1\ , x \in h_{ps}^{+} \\ -1\ , x \in h_{ps}^{-} \end{cases}$$

$$hq_{psr2}(x,y) = hq_{pr}(y) = \begin{cases} +1\ , y \in h_{pr}^{+} \\ -1\ , x \in h_{pr}^{-} \end{cases}$$

$$hq_{psr2}(x,y) = hq_{pr}(y) = \begin{cases} +1\ , y \in h_{pr}^{+} \\ -1\ , x \in h_{pr}^{-} \end{cases}$$

In group of one order p contains $3*4^{p-1}$ functions.

The comparative analysis of fast transformations algorithms

Advantage of algorithms of fast transformations in bases of Haara and Harmut sharply increases with transition to two-dimensional bases. In table 1 results of the comparative analysis of different one-dimensional and two-dimensional bases are resulted. So for performance of fast transformation of Fure (FFT) 10240 arithmetic operations are required, as much arithmetic operations are demanded by algorithm of fast transformation of Walsh (WFT), but in algorithm WFT there are no operations over complex numbers in difference from FFT. And for performance of fast transformation of Harmut 3068 arithmetic operations are required that 3,34 times are less than FFT and WFT. FT Haara demands 2046 arithmetic operations. These are 5 times less than FFT and WFT and 1,5 times less than Harmut.

Comparison of bases by quantity of demanded arithmetic operations

Table 1.

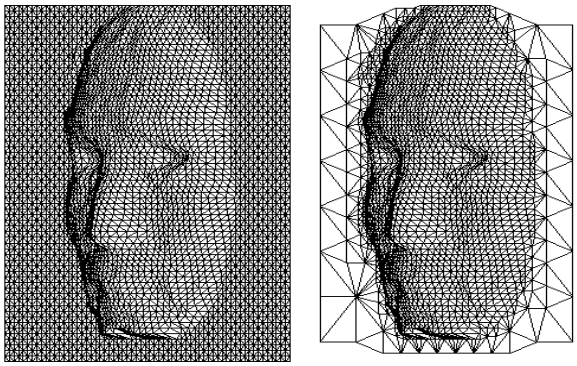
No.	Basis's name	Quantity of demanded arithmetic operations N=1024		Operation over complex numbers
		One-dimensional basis	Two-dimensional Basis	
1	Basis of harmonics of functions (FFT)	**10240**	**209 715 200**	Is present
2	Walsh's basis (FWT)	**10240**	**209 715 200**	Is absent
3	Harmut's basis (Harmut FT)	**3068**	**18 874 368**	Is absent

4	Haar's basis (Haar FT)	**2046**	**8 388 608**	Is absent

Let's compare also these algorithms for two-dimensional bases. So for performance two-dimensional FFT and FWT 209 715 200 arithmetic operations for performance of fast transformation of Harmut 18 874 368 arithmetic operations are required. It in 11,11 times is less than FFT and FWT. For performance of fast transformation of Haar 8 388 608 arithmetic operations that 25 times less than FFT and FWT and therefore are equal are required, 2,25 times are less than FT Harmut.

Example of application of algorithms of fast two-dimensional transformations

One of characteristic scopes of two-dimensional fast transformations is an images processing. On fig. 5.a., b. Results of processing of images are resulted. The size of an initial lattice 64x64 (fig. 5 and.). To a lattice it is applied fast transformations of Haar. Criterion of removal – a threshold of size of Haar-factor. Values in knots are in a range [0, 1], in the same range the threshold is defined also. On fig. 5. b. Results corresponding to a zero threshold are shown. For processing fast transformation of Harmuta is used. Good quality of fast transformation of Harmuta is explained in the big compression factor of this basis.



a) b)

Fig. 5. Results of image processing by means of two-dimensional piecewise-plane bases.

Conclusion

Thus, new types of one-dimensional and two-dimensional fast transformations are offered. Possibilities of distribution of fast algorithms in one-dimensional piecewise-polynomial bases on two-dimensional bases, also advantages the offered bases in comparison with existing are shown. Results of the comparative analysis of the offered bases with other bases by quantity of demanded arithmetic operations, and also an example of application of the offered bases in problems of image processing are resulted.

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TECHNOLOGICAL DEVELOPMENT OF UZBEKISTAN

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Summary. *Advancement in the science and technology in many areas has made the lives of people more advance than the ancient time. Advancement in the science and technology is directly and positively affecting the people's way of living on one hand however, it is also affecting indirectly and negatively on the people's health on the other hand. New inventions in the field of science and technology are very necessary in such a modern world for a country to be strong and well developed country than other countries. In this competitive world, we need more technology to go ahead and become a successful person in the life.*

Key words: *communication technologies, computerization, telecommunication, multimedia services, Internet segment, software industry, interactive public services, Electronic government.*

From the first days of independence, Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society.

Over a short period, the authorities created the legal framework conducive to further formation and progress of market of IT-technologies.

In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. President's Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21, 2012 and "On further development of computerization and introduction of information and communication technologies," dated May 30, 2002, became important documents in this direction.

At present, the Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented. This program was approved by President's Resolution dated June 27, 2013.

Making a statement at enlarged meeting of the Cabinet of Ministers, dedicated to the socio-economic development in 2015 and the most important priorities of economic program for 2016. As First President Islam Karimov noted, that in today's conditions in the era of Internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation of system "Electronic government" are of priority significance. As the head of our state underlined, development of ICT has a direct impact on the level of competitiveness of the country, allows you to collect and summarize vast amounts of information, offers great opportunities for management at strategic level.

The task of regular improving of the governance, strengthening the capacity of IT-industry was entrusted to the Ministry for development of information technologies and communications, created by the Resolution of the Head of our state dated February 4, 2015. In addition, since 2002 a Centre for development and introduction of computer and information technologies UZINFOCOM operates, which assists in the development and implementation of national programs of computerization and introduction of ICT in all sectors of public administration, economic and social spheres. Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy.

The basis for development of ICT in Uzbekistan is the telecommunications infrastructure. The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services.

Over the past 20 years in many regions of the country, more than 2,000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high-speed Internet, watching HDTV-channels and others. Due to the measures taken in 2015, the overall rate of use of international information networks increased by 42.3% compared to 2014 and amounted to 15.5 Gb/s. Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows handling a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT.

In 2014-2015 Program of development of broadband access networks on Wi-Fi technology has been implemented successfully in the Republic of Uzbekistan. Because of comprehensive measures at airports, railway stations, places of frequent-stay travelers, parks, shopping malls and other public places of the capital and each administrative center of republic Wi-Fi points have been created. The high development rates of national Internet segment should be separately noted. Uzbekistan has 10.2 million web users. According to UZINFOCOM center, in January 2016 the number of websites in the UZ zone exceeded 25 thousand, while growth totaled more than 30% compared to same period of last year. The use of ICT and software products in the management and production processes plays a major role in the development of sectors of the economy and the domestic industry. For instance, in 2014-2015 in the framework of a special state program 86 projects have been realized in order to introduce information systems in large joint-stock companies, associations and organizations totaling more than 330 billion sums. Particular attention is paid to development of national market of software products.

In order to stimulate domestic programmers the National register of software developers has been created, which already included 69 companies. A directory of software manufacturers Software.uz has been developed that provides necessary information to citizens and businesses.

According to the Resolution of the President of the Republic of Uzbekistan "On measures of further strengthen the incentives of domestic software developers," dated September 20, 2013 new benefits and preferences for members of software industry were introduced. Thus, they are exempt from customs duties for imported equipment for their own use, components, parts, technical documentation and software until January 1, 2017.

It is known that interactive public services are of particular importance in protection of human rights and freedoms, saving time and expenditures for obtaining necessary information and services.A consistent work on formation of "Electronic government" is carried out in the country. The activity of the Governmental portal of the Republic of Uzbekistan (gov.uz) and the The single portal of interactive state services (SPISS), located on the Internet at my.gov.uz, has been established.Functional of SPISS expands dynamically, 235 kinds of interactive services are being rendered through it. Over the past five years this system received in total more than 200 thousand electronic applications of citizens and businessmen. Making an online appointment with the heads of government agencies, receipt of information on their activities, various inquiries and sending requests became popular. In January 2015, the portal has launched a new system for discussion of draft legal acts related to business activities, and evaluation of existing documents. To date, 80 draft laws have been discussed through this system, 9 of them have been improved taking into account the opinions of

citizens. At this time, the discussion of more than 20 legal acts continues. Information system E-Sud for electronic proceedings is functioning effectively since 2004.

Through its implementation, procedures such as keeping registration books, document management within court, direction of judicial notifications and procedural acts, familiarization of sides with case are completely automated now. All educational institutions of the republic are connected to ZiyoNET network, which is functioning since 2005.In the library of portal, which was updated in 2014, has more than 75 thousand units of informative-educational resources, including textbooks, dissertations, research papers and others. As part of implementation of resolution of Head of our state "On measures on further improvement of foreign language learning system" dated December 10, 2012, "Foreign Languages" section has been created on ZiyoNET, which includes over four thousand materials such as textbooks, interactive lessons, games, relevant video and audio.

The country regularly hosts major events dedicated to the development of hi-tech industry.In particular, Week of information and communication technologies ICTWeek Uzbekistan is being held since 2004. Traditionally it is opened with national exhibition of information technologies ICTExpo, which takes place once in two cities - Tashkent and Samarkand. The exhibition presents existing and future forms of ICT-based services, oriented to business community and authorities, and general population. Among the important events of the week - The Forum for Information and Communication Technologies ICTForum, wh ere representatives of leading companies, industry experts and foreign experts discuss state and prospects of progress in this sphere.

As part of the week conferences BestSoft Uzbekistan are also being held, during which they demonstrate the latest achievements of software developers, and e-Government Uzbekistan dedicated to the strategic objectives in the field of "e-government", results of implemented projects, exchange of experience and ideas in this direction.Training of personnel in the development of ICT sector is topical.

Currently, major domestic centers of integration of education, science and industry - Tashkent State Technical University (TSTU) and Tashkent University of Information Technologies named after Mukhammad al-Khwarizmi named after Mukhammad al-Khwarizmi (TUIT) - train specialists in technical direction and for IT sector. In 2013, TUIT opened two new master's direction - management of the system "Electronic Government", and library science. At the same time, these universities carry out scientific research based on active cooperation with leading industrial enterprises of the country.

From October 1, 2014, the branch of the prestigious South Korean INHA University began its activity in Tashkent. Professionals in areas such as computer and software engineering, computer network engineering are trained here.

Thus, the domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.

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GREAT WORKS FOR THE DEVELOPMENT OF THE ICT IN UZBEKISTAN

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Summary. *Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy. The basis for development of ICT in Uzbekistan is the telecommunications infrastructure.*

Key words: *framework, satellite, informatization, transition, modernization, telecom market, electronic document.*

From the first days of the independence of Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society. Over a short period the authorities created the legal framework conducive to further formation and progress of market of IT-technologies. It should be noted that Uzbekistan attaches great importance to the effective use of modern information and communication technologies (ICT) in modernization of public administration, as well as aspects of democratic renewal of society. This is evidenced by results of international round table dedicated to the development of ICT held in Tashkent with a wide participation of experts from a number of foreign countries.

For 23 years of Uzbekistan's independence information and communication sphere in the country has been rapidly developing, which was especially noticeable in the past few years. As a result, today the Republic has become a full member of the

international telecom market, having 28 areas of direct international channels with the ability to reach out to all countries of the world. These channels operate on the basis of satellite and fiber-optic communication systems.

Among the most important documents that regulate the development of ICT in Uzbekistan, are the laws "On Information", "On Telecommunications", "On electronic commerce", "On electronic digital signature", "On electronic documents" and some others. Currently, work is being oriented at the development of the draft law "On electronic government", as well as a new edition of the existing law "On electronic commerce." . In addition, a program of transition to widescreen and digital TV is being implemented in Uzbekistan. To date the coverage of population with digital TV programs has already reached the level of 45 percent. And in order to provide the staffing needs of the ICT sector, the Tashkent Electro technical Institute of Communications was reorganized in Tashkent University of Information Technologies.

Antonio Loke, Secretary General ISIAMED: - Information on the event held in Uzbekistan for the development of ICT, which was attended by Uzbek specialists and foreign experts from the Republic of Korea, Japan, China, Australia, Latvia and many other countries, has been extremely interesting and useful. Through these activities, which contribute to bringing together industry professionals, academics, entrepreneurs in the innovative development of the country it is possible to assess the prospects for the use of international experience in the development of informatization. I am convinced that the received documents on the results of the discussions will be used in the practical work on the part of government agencies in order to create favorable conditions for further development of active processes using modern ICT in all spheres of social life in Uzbekistan.

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THE FORMATION AND DEVELOPMENT OF JSK “UZBEKISTON POCHTASI”

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Summary: *The article deals with the development of JSK “Uzbekiston Pochtasi” and national postal system of Uzbekistan, the formation of communication system as well.*

Key words*: postal and telecommunication system, postal services, delivery of mailings, postal transportation, automated system of electronic money transfers, Automated system of controlling registered postal deliveries.*

During the years of independence, as it happened in all the spheres of social life, huge work has been done to radically reform and enhance national postal system in accordance with international standards. From the first years of independence, great attention has been drown to separating postal and telecommunication companies, clearly defining goals, responsibilities and activity spheres of each of them, reforming the organizational structure of postal communication system, developing new types of services, implementing modern technologies, and training highly qualified specialists.

In 1991, on the basis of existing branches of postal communication and media distribution companies, independent association of postal services and its regional subdivisions were established. In 1992, according to the decision of the constituent assembly, concern “Uzbekistan Pochtasi” was created. The Republic of Uzbekistan became a full-number of the universal Postal union on February 12, 1994.

In order to improve postal communication management, information and telecommunication system in the country, and to introduce market mechanisms to these spheres, in accordance with the Presidential Decree “On measures to reorganize and improve the management of information system sphere” and the decree of the cabinet of Ministers “On organization of the activity of Uzbek Post and Telecommunication Agency” state joint-stock company “Uzbekistan Pochtasi” was created. According to these documents, 75% of shares belonged to the government, 10% to the employees of the company and 15% was sold to public.

On August 31, 2000, Oliy Majlis of the republic Uzbekistan adopted a law "On postal communication", which not only strengthened the juridical base of the sphere but also facilitated the creation of new types of postal services, improved the efficiency and the competitiveness, advanced the preparation process of specialists for the sphere.

According to the decree No.339 of the Cabinet of Ministers of the Republic of Uzbekistan "On improvement of activities in postal communication sphere", state join-tock company "Uzbekistan Pochtasi" was transformed into open join-stock company into regional join-stock offices became its branches. Currently, Uzbekistan postal services is an extensive network of postal communication objects and postal routs intended receiving, processing and delivery of mailings. It also provides additional service on delivers of republic pensions and periodicals.

JSC "Uzbekistan Pochatsi" includes 14 regional offices consisting of 186 district and city centers, 3200 post office, specialized branches-"Xalqaro pochtamt" and "Xalqaro tezkor pochta" and 34 air, 1 rail and 529 automobile routes ensuring regular transportation of mailings.

The mission of the postal service-delivering an item to its destination, is accomplished by postal transportation. Therefore, it is impossible to imagine main operations of postal services-delivering letters, periodicals, and other mailings without postal transportation. Thanks to the means of postal transportation, the network comprised of many postal enterprises turn into a single system capable of delivering mailings to anywhere. Any error in the postal transportation system, results in malfunction of the whole system, reducing both the speed and the quality of the services.

Introducing information-communication technologies and new service types

Over the past period "Uzbekistan Pochtasi" accomplished the fallowing:

- 1703 postal communication units were connected to **"Automated system of electronic money transfers".** In 2014, post office that do not have data transmission channels were connected to hybrid system which allows to implement electronic system of receiving money transfer everywhere.
- 1709 postal communication units were connected to **"Automated system of monitoring pensions and allowances".** Data exchange was established with the automated system "pension" of the pension fond.
- 1708 postal communication units were connected to **"Automated sytem payment receipts".** Data exchange was established with bilingual system of SJSC "Uzbekenergo".
- Automated system of **"Subscriptions"** and revised program of automated registration of dily postal service was implemented in the branch "Tashkent Pochtamti".

- 600 units of postal communication were connected to **"Automated system of controlling registered postal deliveries".** Implementation of this system allowed to automate mail processing on the basis of barcoding and to control mail deliveries via the internet.

More than 1656 payment terminals were placed in post office in cooperation with "Alokabank" and other banks to enable payments by debit cards.

The website of "Uzbekistan Pochtasi" (www.pochta.uz) is regularly updated with various news and information regarding postal service. Customers of the company can get information about zip codes of post offices, service fees, internal and external deliveries, samples of filling postal forms and others from 4 information reusorces of the company.

JSC "Uzbekistan Pochtasi" together with insurance companies "Alskom", "Uzagrosug'urta", "Uzagroinvest", "Eurasia insuranse", and "Kafolat" introduced a new service the sale of insurance policies.

Special attention is paid to the introduction of information and communication technologies and expanding postal service and rural areas. To illustrate, during 2014-2015, 150 computers were placed in rural post offices to improve electronic money transfers system, which was a port of the project of Agricultural Development.

In the first quarter of 2017, 371 out of 500 computers purchased in 2016 were installed in rural post office and connected to the internet. By the end of 2017, the rest 129 computers will also have been installed.

DEVELOPMENT OF 4G TECHNOLOGY IN UZBEKISTAN AND FUTURE OF 5G TECHNOLOGY

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Summary. *XXI century is the period of Information and technology. Technological breakthroughs and information about big ideas, innovations and the inventors that make progress possible. Every day we hear about innovations and inventions. In Uzbekistan the innovational technologies comes from foreign countries in fast and easily because of confirmable government policy. Therefore, we need to know about latest informational and communicational technologies, innovational projects throughout the world. In this article, we discuss the development of 4G technology in Uzbekistan and the advantages of modern technologies. Moreover, we pay attention to the future 5G technology.*

Keywords: *LTE, 1G, 2G, 3G, 4G, 5G, Internet Providers, Wi-Fi, ICT, 4G*

As you know Uzbekistan`s branch of information technologies always tries to catch up with world`s latest technologies. Therefore, we can discuss the properties of Uzbek mobile and network operators. Uzbek internet providers are working hard to increase internet speed that can be rate of world standards. So these technologies are acquired with our national mobile operators. For proving of my opinion:

"Beeline" for the first time in Uzbekistan launched 4G network commercial exploitation. The largest communication operator "Beeline" ("Unitel" LLC and "Buzton" JV) announced putting into commercial operation the fourth generation mobile network by LTE (Long Term Evolution) protocol. Hardware equipment for "Beeline" 4G was supplied by Huawei Technologies Co., Ltd.

"New technologies along with other factors ensure sustainable development of the country and society, and we are proud to do such an important step these days, when the whole Uzbekistan celebrates the anniversary of Independence, — comments CEO of "Unitel" Alexander Vorobyov. — I am confident that the launch of the first commercial LTE network in the country will go down in history not only our company, but also the whole telecom industry. Leadership, reliability and innovation distinguish "Beeline" work, and these are the values that embody 4G standard".

Commenting on the event, director of Huawei Tech. Investment Tashkent, LLC Zhao Jianping said, "The history of cooperation between "Huawei" and "Beeline" - is, above all, the history of technological development: together we have gone through all stages of networks evolution in Uzbekistan. Today by virtue of this strategic partnership, more than ten million people across the country enjoy a reliable and high-quality communications and access the Internet at high speeds. In addition, we are honored to stand at the origins of the most advanced communication standard together with the leader of the mobile market. I have no doubt that in the near future 4G will obtain a wide circulation through new tariffs and services".

LTE technology — is the main direction of the third generation cellular networks evolution. Today 4G provides the speed of mobile broadband services at maximum speed up to 70 Mbit/s.

Not much time passed, other operators are composed their New Technology internet. After the Beeline, UZTELECOM, UCELL and UMS developed 4G technology. Now all network operators in Uzbekistan can provide consumers with high-speed internet. Not to mention that, Our national IT company ARTEL is producing communicational devices like WiFi routers, AdSl-modems, Mobile phones, USB-modems which can work in 4G.

Uzbekistan`s internet service will cover every sphere of republic. Because government are planning to supply, mass transport and underground transportation with high-speed internet. Apart from fiber cables are connected the remote parts of our republic and this means that mountainy regions also get fastest internet services.

Today 4G network covers the whole territory of Uzbekistan. However, Uzbek IT-specialists are thinking over next generation technology as 5G.

What is 5G? 5G vs 4G and the future of Uzbekistan mobile networks

If you are in the Uzbekistan, you are probably using a mobile phone with 4G internet – or 3G, if you are really in the sticks. Simply put, 5G is the name for the next big leap in mobile connectivity.

It is not properly defined, because there are many possible ways we might go about giving phone users super-fast mobile speeds in the future. However, whatever the industry settles on will eventually be given the 5G branding. It is exactly the same way that the Long-Term Evolution Advanced (LTE-A) standard is now marketed as 4G – that is what the phone industry decided it would use.

That is why lots of phone networks, device suppliers, and governments around the world are hard at work trying to work out a good way of delivering next-generation mobile internet.

1G, 2G, 3G, 4G, 5G. The G in 5G means it is a generation of wireless technology. While most generations have technically been defined by their data transmission speeds, each has also been marked by a break in encoding methods, or "air interfaces," which make it incompatible with the previous generation.

1G was analog cellular. 2G technologies, such as CDMA, GSM, and TDMA, were the first generation of digital cellular technologies. 3G technologies, such as EVDO, HSPA, and UMTS, brought speeds from 200kbps to a few megabits per second. 4G technologies, such as WiMAX and LTE, were the next incompatible leap forward, and they are now scaling up to hundreds of megabits and even gigabit-level speeds.

What Is 5G? 5G is a new network system that has much higher speeds and capacity, and much lower latency, than existing cellular systems. The technologies being used in 5G are still being defined, but there some general themes everyone agrees on.

5G networks will use a type of encoding called OFDM, which is similar to the encoding that LTE uses. The air interface will be designed for much lower latency and greater flexibility than LTE, though.

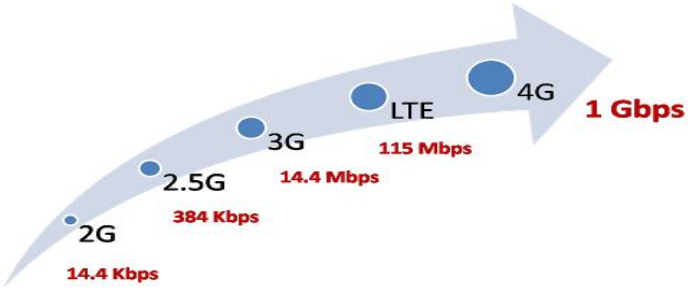
How fast is 5G?

Unfortunately, no one actually knows how fast 5G will be, and that’s because 5G doesn’t technically exist yet.Plenty of organisations are already testing 5G delivery methods. Samsung says it’s managed to achieve 7.5Gbps, while Nokia claims a more impressive 10Gbps. There’s also China’s Huawei, which has managed 3.6Gbps. When you compare that to the best speeds in the UK – EE’s 300Mbps LTE-A network – then we could be talking about a 12-fold speed increase. Of course, the delivery of these speeds could quite easily be skippered by the same old problems as before: thick walls, living in hyper-rural areas, and anything else that would hamper your signal.

5G Technology: Which Country Will Be the First to Adapt?

Countries that want to stay competitive in the global economy are adapting 5G technology. Because technology affects nearly all aspects of life, countries need to stay current with technological developments to improve the lives of their citizens and continue evolving in the global economy. Here are six countries that are leaders in adapting to 5G technology.

1.The United States
2.South Korea
3.China
4.Sweden
5.Estonia
6.Turkey



We hope that our country can get in line with this country in just a little time.

In recent years, Government of Uzbekistan pay attention to IT sphere and carry convertible policy to ICT. After that, Uzbekistan began to invest tremendously to IT companies. For example, associating IT companies with foreign countries whose telecom systems are advanced. This way, HUAWEI, ZTE, SAMSUNG, LG and other advanced companies have opened their subsidiaries in Uzbekistan. Therefore, we can develop rapidly ICT sphere, for the foreign experience.

For above mentioned states, we can conclude that Uzbekistan`s ICT sphere has a great potential. We can say without hesitation that Uzbekistan will have great possibilities in ICT sphere in the nearest future.

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STAGES OF TECHNOLOGICAL DEVELOPMENT IN UZBEKISTAN

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Summary. *Renewed efforts in energy science and technology will open up new avenues for addressing global energy and environmental issues; and exciting new breakthroughs in nanometer science and nanotechnology will usher in a profound technology revolution. Exciting breakthroughs in basic research fields will create completely new horizons for science and technology development and economic growth.*

Key words: *high-tech industry, modern service industry, breakthroughs, substantial gains, mobilizing efforts, allocating resources.*

Since the founding of the Republic of Uzbekistan, especially since the introduction of the policy of reform and opening to the outside world, the nation's modernization drive has attained universally acknowledged achievements. However, one has to be keenly aware that the nation is and will remain at a primary stage of socialism for a long time to come. In our effort to build a well-to-do society, we are faced with both rare historic opportunities and grave challenges. The nation's economic growth shows an excessive dependence on the consumption of energy and resources, with high associated environmental costs. The economic structure is irrational, characterized by a frail agricultural base and lagging high-tech industry and modern service industry; and firms lack core competitiveness and their economic returns are yet to be improved because of weak indigenous innovation capability.

There are whole ranges of problems concerning employment, distribution, health care, and national security that need prompt solution. Internationally, the nation will be for a long period under enormous pressures from developed nations who possess economic and S&T superiority. In order to grasp the opportunities and meet the challenges, we must make all-round efforts, including coordinated overall development, deepening the system reform, improving democracy and the rule of law, and reinforcing social management. At the same time, we need to depend even more heavily on S&T progress and innovation in order to achieve substantial gains in productivity and advance the overall economic and social development in a coordinated and sustainable manner.

As the premier productive forces, science and technology are a concentrated reflection and a major hallmark of advanced productivity. In the 21st century, the new science and technology revolution is rapidly unfolding and gestating significant new breakthroughs, which will profoundly change the economic and social visages. Advances in information science and technology, still in the ascendant, will continue to be the dominant driving force for economic growth; rapid advances in life science and biotechnology will play a key role in improving quality of life; renewed efforts in energy science and technology will open up new avenues for addressing global energy and environmental issue.

Exciting new breakthroughs in nanometer science and nanotechnology will usher in a profound technology revolution. Exciting breakthroughs in basic research fields will create completely new horizons for science and technology development and economic growth. S&T achievements are being applied and transferred at ever faster pace, thus creating new opportunities for catching up and leapfrogging**.** Therefore, we shall embrace the new era, meeting both opportunities and challenges brought on by the new S&T revolution with a global vision. In today's world, many countries have made S&T innovation a national strategy and S&T inputs strategic investments by drastically increasing R&D spending. These nations lead the world in deploying and developing frontier technologies and strategic industries and implement important S&T programs in an attempt to enhance their national innovative capability and international competitiveness.

Confronted with the new international situation, we must have a greater sense of responsibility and urgency, by making S&T progress a major driving force for the economic and social development more conscientiously and resolutely. We must place the strengthening of indigenous innovative capability at the core of economic restructuring, growth model change, and national competitiveness enhancement. Building an innovation-oriented country is therefore a major strategic choice for Uzbekistan's future development.

First, Uzbekistan's sustained fast economic growth and social development creates a huge demand and thus lay a solid foundation for the S&T development.

Second, the nation has a consummate system of academic disciplines, with a huge pool of talented people. It has developed excellent R&D capability in a number of major fields, thus positioning itself for tremendous S&T developments in the future.

Third, our country has continued opening to the outside world has enhanced its S&T cooperation and exchanges with the rest of the world, allowing the country to share the fruits from the new S&T revolution.

Fourth, by adhering to the socialist system, Uzbekistan is able to combine the political advantage of mobilizing efforts to do great things and the basic role of market mechanism in effectively allocating resources. This provides an important system guarantee for the prosperous development of S&T activities.

Fifth, ours is a country with a 2700-year history of civilization and a culture that is both broad and profound, capable of incorporating things of diverse nature, which favors the creation of a uniquely innovative culture. As long as we strengthen our national confidence, hold scientific concept of development, implement the strategies of rejuvenating the nation through science and education, work hard to catch up over

the next 15 years or more, we will be able to produce brilliant S&T achievements live up to the expectations of our times.

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RADIO FREQUENCY IDENTIFICATION BASED LIBRARY MANAGEMENT SYSTEM

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Summary: *Radio frequency identification (RFID) is a term that is used to describe a system that transfers the identity of an object or person wirelessly, using radio waves. It falls under the category of automatic identification technologies. This paper proposes RFID Based Library Management System that would allow fast transaction flow and will make easy to handle the issue and return of books from the library without much intervention of manual book keeping. The proposed system is based on RFID readers and passive RFID tags that are able to electronically store information that can be read with the help of the RFID reader. This system would be able to issue and return books via RFID tags and also calculates the corresponding fine associated with the time period of the absence of the book from the library database.*

Key words: *Radio frequency identification technology; RFID Readers; RFID Tags; Inductive Coupling*

Radio-frequency identification (RFID) is an automatic identification method, which can store and remotely retrieve data using devices called RFID tags. The technology requires cooperation of RFID reader and RFID tag. The RFID based LMS facilitates the fast issuing, reissuing and returning of books with the help of RFID enabled modules. It directly provides the book information and library member information to the library management system and does not need the manual typing. This technology has slowly begun to replace the traditional barcodes on library items and has advantages as well as disadvantages over existing barcodes. The RFID tag can contain identifying information, such as a book's title or code, without having to be

pointed to a separate database. The information is read by an RFID reader, which replaces the standard barcode reader commonly found at a library's circulation desk. For which utmost care, has been taken to remove manual book keeping of records, reduce time consumption as line of sight and manual interaction are not needed for RFID-tag reading and improve utilization of resources like manpower, infrastructure etc.

There is a boom in the industry to use RFID technology in the recent years. Research and development in this field has made this technology to be used in supply chain management, attendance management, library management, automated toll collection etc.

There are multiple RFID standards being used in the industry. The existence of these multiple standards helps the users of this technology to choose between various standards and choose the approach which best suits them and then implement it for communication between an interrogator (RFID reader) and the RFID tag.

In more specific terms relating RFID to library, RFID in libraries was first developed and was proposed to the world in the late 1990s. RFID technology aimed at increasing the overall workflow in the library to the maximum as possible and to make everything like book issuing to book returning automatic. Singapore was the first country to introduce RFID in libraries and the Rockefeller University in New York was the first academic library in the U.S to make use of this technology. Farmington Community Library was the first public institution to use the RFID technology. Both Rockefellers University and Farmington started using RFID in 1999. In Europe, the first public library to use RFID is the Hoogezand-Sappemeer, the Netherlands, in 2001, where borrowers were given options. It was proved in a survey that 70% people adapted to the RFID technology quickly.

Overall, RFID technology is used in United States the most and then in United Kingdom and then in Japan.

But there is an issue that this technology is still costly in today’s market for the smaller organizations as compared to the larger organizations.

RFID system consists of following four components:

- RFID tags
- RFID readers
- Antenna
- Server

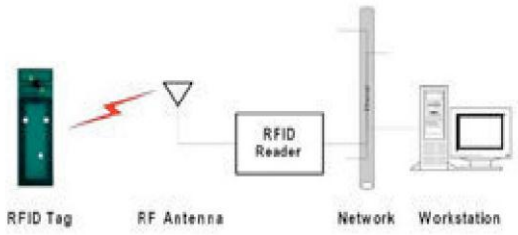

Figure 1. RFID Components

Inductive Coupling: Inductive Coupling is the transfer of energy from one circuit to another through a shared magnetic field which is produced due to mutual inductance between two circuits. In RFID systems based on inductive coupling, the reader antenna and the tag antenna each consists of a coil. An electric current passing through the coil of reader's antenna generates a magnetic field that induces an electric current in the coil present in the tag which is exposed to that field. Inductively coupled tags are said to be operated passively because all the energy required to activate the tag is provided by the reader. Tag does not contain any source for power supply to activate itself. When the tag is in the close proximity of the reader, the magnetic field emitted by the reader penetrates the coil of the tag. The tag then takes energy from this filed. By mutual inductance between the tag and the reader, a voltage is generated in the tag's coil. This voltage serves as the power supply for the microchip carrying the data which is present inside the tag. This voltage is used by the microchip to change the electrical load on the tag antenna. These changes are recorded by the reader antenna and are converted into a unique serial number. This data is stored in the reader's log file as the data read from the tag. Server connected to the reader then takes up this data for processing through Library Automation System.

The process involved is divided into a total of five modules that are described as follows:

Modul 1. Whenever a new book is acquired by the library, an RFID tag is attached into the book with the relevant information like, call number, accession number, book number, etc. The detailed information regarding the book is also captured in the computer database. The computer database also stores all information for individual users (patrons) of the library. Each patron is supplied with registered RFID cards. These cards carry identification data and other associated details like: address, roll no., and telephone no. etc. for each patron.

Modul 2. There is an administrator with special privileges who has a unique master password controlling the GUI of the RFID LMS system. As soon as he powers on the system, the first screen displays the LOGIN dialogue box. The admin then enters the corresponding password and enables the system for further usage.

Modul 3. When a patron needs to get a book issued, he can get it done without any manual intervention. He simply flashes RFID card in front of the RFID reader and it automatically opens his/her login account page. He then flashes the selected books to be issued, one by one in front of the RFID reader. The computer records all these data against his name. Finally, a message is displayed informing the patron that the ISSUE has been successful. The user takes the books for a specified time from the library after which he has to return the books to the library.

Modul 4. When a patron wants to return books, he simply places the books again in front of the RFID controller and the books automatically are adjusted for return against the patron's name.

Modul 5. When a patron wants to return books, he simply places the books again in front of the RFID controller and the books automatically are adjusted for return against the patron's name. For this the patron during the time of returning the book, clicks or activates the fine calculation button on the display area or GUI panel. The same returns the fine.

Radio Frequency Identification (RFID) Systems have been in use in libraries for book identification, for self-checkout, for anti-theft control, for inventory control, and for the sorting and conveying of library books. These applications can lead to significant savings in labor costs, enhance customer service, lower book theft and provide a constant record update of new collections of books.

It also speeds up book borrowing, returning and monitoring, and thus frees staff from doing manual work so that they could be used to enhance user-services task. The efficiency of the system depends upon the information to be written in tag. To yield best performance, RFID readers and RFID tags to be used must be of good quality.

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DEVELOPMENT OF INFORMATION COMMUNICATION TECHNOLOGY IN UZBEKISTAN IN INDEPENDENCE YEARS

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Summary. *This particular article sheds some light on the scale of the development of ICT during the period of Independence in Uzbekistan on top of that what type of laws were issued and what kind of policies have been carried out with the purpose of advancing ICT.*

Key words: *Laws,IT-services, Wi-Fi technology, ZiyoNET, ICT events, ICT Week, IT centers*

With the progress today's globalized world, Information Communication Technology is developing day by day and this development has not fled our country.

Achieving independence, Uzbekistan has been pairing great attention to the continuously development of ICT in all spheres of state and society. Nobody will deny that, Uzbekistan progressing effectively on ICT sphere and in a short period has reached a lot. Legal frameworks contributing to further formation of IT-technologies, which is created by the authorities, plays essential role on that progress.

In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Also the Law "On information" dated 11,2003, President's Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21,2012, "On further development of computerization and introduction of information and communication technologies" dated May 30,2002, became important documents in this direction.

Independence years, in many regions of the country approximately 2000 kilometers of fiber-optic cables have been laid and have supplied IT services like video telephony, high-speed Internet, watching HDTV-channels and so on, which are made more comfort and enjoyment to the all residents. Besides, all mobile operators operating in our country, have implemented fourth generation network 4G LTE, which can

provide quickness and efficiency of sending or receiving a great volume of information, watching videos, download high-quality images or applications for education purposes. According to Netindex.com, Internet speed in Uzbekistan has increased from an average 0.46 Mbps to 2.94 Mbps during the last decade.

Recent years Wi-Fi technology has been implemented successfully in our country. As a result, people have had great opportunity use Internet at airports, railway stations, cafes, shopping centers, where Wi-Fi points have been created. On some buses also have been set Wi-Fi routers and passengers may spend their time usefully by the way.

In Uzbekistan 43.2 percent of houses have computers and 52.6 percent of that are connected to the Internet. To compare those percentage to last year, we can see that the amount raised

5% and 8% respectively. According to UZINFOCOM center, in 2016 the number of Uzbek websites exceeded 25 thousand, while growth totaled more than 30% compared to the same period of 2015.

All educational institutions of the republic are connected to ZiyoNET network, which is functioning since 2005.In this library portal has more than 75 thousand units of informative-educational resources, dissertations, research papers and other information to users who want get knowledge.

In Uzbekistan permanently held major events dedicated to the development of ICT industry. For instance, Week of information and communication technologies ICT Week Uzbekistan is being held since 2004 and is opened with national exhibition of Information Technologies ICT Expo−Tashkent and Samarkand.

Today, Tashkent State Technical University (TSTU) and Tashkent University of Information Technology (TUIT) − are major domestic centers of science and industry for IT sector. In 2013 two new master's direction – management of the system "Electronic Government" and Library Science were opened in TUIT. In October 1, 2014 the branch of the South Korean INHA University began its activity in Tashkent which are computer and software engineering, computer network engineering are trained there.

Thus, the domestic IT-industry is developing successfully, joint ventures are being created, and new software projects are being developed and implemented, Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.

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THE DEVELOPING PROCESS OF THE INFORMATION TECHNOLOGIES IN UZBEKISTAN

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Summary. *The following article is devoted to the developing process of the information technologies in Uzbekistan.*

Key words: *IT, info center, WI-FI, Digital Marketing, Mobile operators*

Developing IT as the knowledge that we must to learn from beginning to advanced level. Information technologies have its own history, own periods of developing too. In the world, it has been developing for a years ago, in Uzbekistan. It started after year when our nationality achieved independence. Glance at Developing Information technologies and Communication technologies, it was our important and necessary aim.

In 1992 year, it started, and started to make a better.

Developing IT (Information Technologies) brings a lot opportunities and possibilities to maximum understanding about it. Everything we use in our real life, it belongs to IT. For example, WI-FI, Mobile operators, Internet, understanding and Working on the PC's and Laptops!

In these days, we can see that all mobile operators in our country works in 4G LTE system that allows to access to internet for open web pages, web photos, web videos, download, uploading, adding in high quality and within high unlimited speed that it must

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In these days, we can see that all mobile operators in our country works in 4G LTE system that allows to access to internet for open web pages , web photos, web videos, download, uploading, adding in high quality and within high unlimited speed that it must be.

And you know, it brings a large volume of the opportunities to internet users to able to work in every time on high level speed of high quality. A Glance at it, we can catch that our students, our new generations have a large volume of knowledge about IT and they can simply make challenge with foreign students.

In 2014-2015 program of development of using and working networks on WI-FI technology has been implement successfully in the Republic of Uzbekistan.

Uzbekistan has million web users. According to "info center", in January 2010 and 2016 the lines of websites in the UZ domain exceeded 25 thousand, while growth totaled more than 30% compared to term of last year. When the words come about WI-FI that 4 words should be familiar at least 90% people in the world. Nowadays, If my memory services me well, the number of users internet, exactly who just exchanged modem to Wi-Fi, it is more than 10 million people in our country.

Digital marketing – is a system of know about bazaar circle and functions of exchanging conversations. Also Marketing is a manager of analyzing and learning of interests, tastes, of customers.

Digital marketing is huge system of internet. It works on the economy, deeply in economic works, sales, making plan, and produce new products which exactly product necessary to life. These days, Digital Marketing is rising sharply and very attractive a large number of interests.

The Great Person's Speech.

Once, one great person that occupied a sphere with his technologies said" If I have a chance to change my life (carrier), I just choose Digital Marketing. He was a Bill Gates, number one ballooner in the world. He occupied world with his info Technologies.

Donald Trump, president of the USA. Once journalist asked if you lose all that you have, what will you choose in carrier", D. Trump said I choose Digital Marketing. And one audience makes smile after the answer, then Trump turned to audience and said, for this I am sitting here, for this you are sitting there programming section of IT.

What is a Programming in this case? Programming is a system of typing codes to make a software, like a drop box, angry birds, Share it, and so on! In a simple way, programming, you type code in writing pad to make apps that you want! Computers understand only [1 and 0] line. So, programming is type of code in our language to make code that computer understands.

There are a lot programming languages in the world! Choose for learning one of the programming language, you have to know about which kind of system you want to go. It means for example you're going to be software programmer, and you need to learn C++, C, C+, and Java.
If you re want to be web programmer, you should know about HTML, PHP, CSS, SQL, MYSQL.

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THE IMPORTANCE OF THE TELECOMMUNICATION PROJECT IN THE SYSTEM OF EDUCATION

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Summary. *The importance of the telecommunication project in the system of education.*

Key words: *telecommunication, training project, communication, research, creative, game activity.*

Telecommucation is the facility of the passing the most important information and their fast exchanging in the modern education system. This project empowers the youth to understand each other, respect the others' ideas, express one's opinion freely and decide the problem together. As a result the telecommunication project goes with the unified international educational system. Today`s Kid link and I Earm programmers are working as the international project in the Internet.

The telecommunication training project originated in the 80th of the last century and is using as a convenient and fast communication net in the science and other educational system.

By the international experience in the comparing of the ordinary work of the telecommunication project with the special organized and well-aimed projects, in the Internet the working of the students fellowship gives the big pedagogical effectual.

The telecommunication training project is the net where the students from different cities, continents and countries organize their training activities.

The telecommunication training project is a project which associated with computer telecommunication, general problems, aim, approval methods and has activity methods, it means to understand scientifically, research, creative and game activity of the students which achieves the result of working activity together.

The solution of any problem in the project demands the integral knowledge. In the telecommunication project especially international need much more knowledgeable integration, not only exploring problem but also the national cultural features of the commonwealth, its knowing the world and understanding, its beliefs. And this raises the culture of the dialogue.

For the telecommunication project in the foreign language (if there given in the programmer) it would be better to organize the course where the project significance and content must be fitted to the foreign speech and improve the reading.

If the projects like these consist of special or vocational subjects and their problematical topics don`t fit to the language programme, there can be organized extra classes. As you know, the exchanging of the information in the telecommunication projects are used in the written form. These help the students to think of their opinion, it gives the opportunity to publish it and in the process of student`s education, to develop the culture of communication. The main term or obstruction of this project is the level of knowing the foreign language . So, the new resolution of the President of Uzbekistan Republic PQ -1875 on the 10th December, 2012 is about "The system of further developing of learning the foreign languages " was given out in time, there are a lot of conditions to learn foreign languages for the educators and learners in all sphere of education.

In the pedagogical sphere to organize the telecommunication project should be followed the next:

- to solve the problem it should be observed a lot , systematically , once or for a long its natural, physical, social and other phenomenon and to collect the information from other continents ;

- to study the specific tendency for comparing learning about the phenomenon , facts , events and adjudge and give the propose;

-to take under the control the project participants` cultural, ethnic, the difference between the geographical terms in order to study the comparing of the ways of solving problems;

- to analyses comparatively its cultural, traditional, religious specificity and also social or cultural outlook;

-to study in detail in order to work out some creative(practical, creative, research and etc) ideas;

- to direct the connection of spending interesting adventure computer games and competitions and its appeared problems which is connected with cultural, educational traditions and sport;

"The seminars of Shakespeare "which is done in the programmers IEARN (http//www.iearn.org) and KIDLINK (http//www.kidlink.org) in the net by the

professor V. Gezer hood of Illinoi, Ohio can be an example to the international project which has been existing for more than 10 years.

The youth from nearly 40 countries participate there.

Exactly in continental or international telecommunication projects can be used the secret coordination , it means the coordinator or some of them as a participant of the project send the task to the "secret" coordinator.

In order to organize the telecommunication projects demand some good preparations. For instance, how can be found the fellowship to study the concrete problem?– appeared the question like this. Paying attention to the programmers IEARN(http//www.iearn.org) and KIDLINK (*http.www.kidlink.org*) given bellow , there can be found the partners from foreign countries .Or you can offer your project to the teachers ` professional fellowship sites: Europe cooperation (http.www.eun.org) or Russia (*http.www.ioso.ru./distant/community*) sites. Of course, in any case the students activity by teachers coordination should be required. It is important to introduce the fellowship. For this, the project participants must send the short information about themselves with photo in order to meet with fellowship on the site. Because it's important to know what kind of fellowship are they and their interests.

To deal with foreign fellowships require the knowing their cultural traditions. That`s why, firstly in the regime of off-line or on-line paying attention to the language, in the most literary, to respect the fellowship and then make up the correspondence. Especially, the communication language of the government representatives demand the social and cultural attributes and the culture of speech and its important the coordinator`s advice .

If the telecommunication project is the research project and it spends in different levels , the general results of the effective project depend on its organization. In this case it unnecessary to put exact sign. If the project organizing during the lesson it can be encouraged.

For example, "OK, go on", "Stop and think, something is wrong, consult and discuss" and etc.

Following factors are the account for the external estimate the project:

- the importance and significance of the problem, the themes are suitable to each other;
- the appropriation of the methods of research and its results;
- the activity of the project participants according to their possibility;
- adopting the resolution should be in disposition of community;
- studying the problem deeply, the possibility of using another subjects;
- mutual understanding of participants of the project and helping each other;
- the prove of adopting the resolutions, explaining with the argument of the opinions and results;

- to produce and give an account of results of project aesthetically;
- to answer the question of participants to the opponents and their answers should be proved with evidences;
- The capability of imagination of the results of adopted resolutions;

To sum up, the educational telecommunication project is high pedagogical technology and it claims from teacher and student a good preparation and coordination in whole studies. At the same time this technology helps to improve intellectual, critical and creative ability of the student. Such systematical collaboration develop independence and responsibility of the student. For the reason of this, concerning educational telecommunication educational projects are able to use the norm of modern educational upbringing system should be applied as the one of the most productive methods according to the aim using these projects in the process can be a great contribution to our educational system .

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HOW TO LEARN ENGLISH EASY WITH ICT

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Summary. *The following article is devoted to how to learn English easier with the means of ICT. The author shows the newest ways of having foreign classes more interesting and entertaining.*

Key words: *ICT, music, scrabble, fun YouTube channels,* TV, *Real-World Videos FluentU, New Location, Conversation Partner, Movies, Blogs, App for your, Phone, "Giveit100".*

Many people want to learn foreign languages but every person meets difficulties to learn foreign languages. For example, it might be boring, difficult and so on. Every

English learners not only English but also every foreign language learners want to learn easy. Followed by there are same advice about how to learn easy for you.

1. Add Some Music

Listening to music while you study English can wake up your mind and put you in a better mood to learn. Happy songs can help you feel re-energized and motivated if you are getting bored, while calming music can help you feel more relaxed if you are feeling nervous about an upcoming test.

Keep in mind, however, that listening to music with lyrics can actually distract you from what you are studying. The words of the song can take your attention away from the English words you are trying to learn. If this bothers you, then you can study with music that does not have lyrics, like jazz or classical.

2. Play Scrabble

Scrabble is a classic board game in which players use random lettered tiles to create words in a crossword fashion. It is a fantastic way to strengthen your English vocabulary. Playing Scrabble challenges you to really think in English as you try to "come up with different words with your set of letters. If you are taking an English class, buy the board game and invite your classmates to play with you. You can "also play Scrabble online through websites like Facebook, where the game is called Words with Friends.

3. Learn English with Fun YouTube Channels!

Not only does YouTube have funny entertainment videos, but there are also some excellent resources for learning English!

4. Learn English with TV

You can use TV channels in English. If you use these kind of ways it will bring benefit.

5. Study in a New Location

Sitting in the same place, in the same room, every time you study can start to get boring very quickly. If you always study at home, try going to a library or a coffee shop. The change of scenery will improve your enthusiasm, plus changing locations has been shown to improve memory. Your brain makes connections between what you are studying and where you are. When you study somewhere different, you force your brain to make new connections to what you are studying. The more connections your brain makes, the more likely you are to remember what you learned

6. Find a Conversation Partner

Get more English conversation practice by searching for English friends online. You might be able to connect with another language learner in your area, or even just exchange emails, instant messages or have Skype conversations in English. Try Conversation Exchange, a free website that helps language learners connect for language exchange. In a language exchange, you have conversations with an English speaker who is studying your native language. This way, your partner practices

speaking your native language with you, and then you get to practice speaking English with him or her.

7. Learn English with Movies

Who does not enjoy a great movie? And if you can watch a movie while learning English, even better! To get started, use this complete guide to learning English through movies and films.

8. Learn English with Real-World Videos on FluentU

FluentU lets you learn with engaging videos like commercials, news and TV shows. Now you can throw away your dictionary because FluentU provides captions that let you -immediately look up any word. Definitions include multiple example sentences that show you how the word is used. Of course, you can add words to your own vocabulary list. Not only that, FluentU‘s “Learn Mode” turns videos into learning experiences. Learn Mode teaches you new vocabulary by using video clips that "are personalized for you. How are they personalized for you? Based on the words that you have been learning.

9. Get a Book of English Jokes

While at the library, you could also look for joke books, which are surprisingly useful learning tools. In order to have English conversations, not only do you need to speak the language, but you also have to understand English culture. Humor is very culture-specific; something that is funny in one country might not make sense in another. Reading a joke book is also a good way to practice tricky concepts like puns and idioms. You might find the joke book entertaining, and they will teach you how English speakers laugh and have fun.

10. Sing Karaoke

Learn a few English songs and sing along with them. It might be interesting to final learn the meaning of the lyrics to some of your favorite English songs. Both FluentU and Lyrics Training are great online platforms to learn the lyrics to your favorite English song. You can sing at home while you are cooking or taking a shower, or gather-some friends and go sing at a karaoke bar. Singing English songs is a great way to practice speaking and intonation, plus you can have fun singing songs that you already know and enjoy.

11. Read Blogs about Learning English

Following a blog is an excellent way to add some fun to your English learning. And lucky for you, there are lots offantastic blogs out there about learning English! With a selection that spans from ESL Hip Hop to English with a Twist, you are sure to find a blog that interests you.

12. Start Your Own Blog in English

Once you are familiar with the idea of a blog, why not start your own in English? Spend a little time writing in English every day. It does not have to be exciting; you could write about what you did that day or how your English studies are going.

While you certainly could publish the blog for all to see, keep in mind that you can always keep it private too -or you could even just write in a journal. This exercise is a perfect way to become more comfortable describing your interests and hobbies in English.

13. Get an English App for your Phone

You are probably constantly on your phone, right? So why do not you use it as an opportunity to practice English? There are dozens of great apps, and so the hardest part is simply narrowing it down to just a few.

14. Track Your Progress on "Giveit100"

"Giveit100" is a community of people all striving to get better at something in 100 days. Simply record a 10-second video every day that you practice study English, and upload it to the site. Not only will you be able to see and hear your progress over time, but the supportive community will encourage you along, while also creating some accountability! Even more, you will get practice writing in English to real people through the comments on your videos.

OPTIONS OF ISPRING SUITE

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Summary. *The article describes the features of the software for creating training courses and electronic textbooks for new generation. Also, the authors emphasize the focus on creating electronic textbooks and using systems based on the use of general purpose tools with Microsoft Office.*

Key words: *electronic textbooks (ET), basic requirements for ET, hyperlink, Power Point, iSpring Suite.*

The development of society led to the creation of new discoveries. Of course, the computer is one of the greatest discovery of the twentieth century. It is part of the rapid changes taking place in the development of their society and has an impact on the area of computer science and information technology. This effect is so strong that in the field of information technology changes over the years, not months, transformed and enriched.

At present, no one doubts the fact that electronic teaching aids allow enriching the educational process, supplementing it with various possibilities of computer technologies, and make it thus more interesting and attractive for students.

iSpring suite is a professional tool for creating e-learning courses in PowerPoint. Using iSpring, you can create and publish a training course in several stages:

1. Building a training course on the basis of a PowerPoint presentation.
2. Creating audio and video accompaniment.
3. Development of interactive tests.
4. Creation of interactive blocks.

Building a training course on the basis of a PowerPoint presentation.

iSpring tools for creating courses are installed in the form of an add-on for PowerPoint. All iSpring functions are available on a separate tab, which allows you to turn presentations into educational materials right into PowerPoint.

The basis of the iSpring training course is a presentation created in PowerPoint. When converting a course to Flash, iSpring provides excellent support for all PowerPoint effects: animations, transition effects, SmartArt shapes and even trigger animations and hyperlinks. Full support for the trigger animation is a unique feature of iSpring products. One of the advantages of the e-course is the possibility of active use of multimedia resources. ISpring allows you to add objects to the multimedia presentation in one click, which is difficult (or impossible at all) to insert using PowerPoint. Along with the information included in the training course, your students will certainly need additional materials on the topic. It can be methodical instructions, books, and drawings. The "Links" button on the iSpring toolbar allows you to easily attach files and web links to the course.

You can attach to the presentation files of various formats, including .doc, .pdf, .jpg and many others. For Web links, you can set the opening method: in the same window or in a new browser window. Attached files will be available for download while viewing the published presentation in the player. The published training course is displayed in a special player. Appearance and functionality of the player can be customized for your course. In addition, you can add a logo and information about speakers and authors to the player. When downloading a training course on the Internet, it is important to protect the content from unauthorized access. ISpring offers four types of course protection:

1. Password. Using a password allows you to limit the number of users who have access to the course.

2. Watermark sign. Using the watermark, we can limit the free viewing of the presentation.

3. Time limit. You can specify the time period during which your course will be available for viewing.

4. Domain restriction. This type of protection allows you to allow the playback of the course only on the sites specified by the user.

Creation of audio and video accompaniment

Using the iSpring toolbar in PowerPoint, you can easily record or import audio and video, and synchronize it with slides and presentation animations.

1. Recording accompaniment. You can quickly and easily record an accompaniment for your training course and synchronize it with the content of the course.

2. Insert the accompaniment. With the insert function, you can import audio or video files recorded using third-party programs and applications.

3. Synchronization of accompaniment. Editing accompaniment takes place in the media editor. Using the timeline, you can synchronize audio and video with slides, change the volume, and replace and delete recorded clips.

After you finish working in the media editor, you can go into the editing mode of the presentation.

Development of interactive tests

An effective e-course includes not only slides with teaching materials, but also tests to test students' knowledge. ISpring allows you to quickly create interactive tests and polls with the built in tool iSpring QuizMaker. The most simple and effective way to test a student's knowledge is through an evaluation test. This type of test allows you to assess the correctness of the student's answers and assign points for passing the test. The following types of questions are available:

-*True / false*. Evaluation of the validity of the statement.
-*A single choice*. Choosing the right answer.
-*Multiple choice*. The choice of several correct answers.
-*Entering a string*. Enter the answer to the question in a special field.
-*Conformity*. Comparison of suitable elements.
-*Order*. Arrangement of the proposed options in the correct sequence.
-*Enter the number*. Enter the correct answer in numerical form.
-*Omissions*. Fill in the blanks in the text with the appropriate answers.
-*Nested answers.* Select the correct answers from the drop-down lists.
-*Bank of words.* Fill in the gaps with options from the "bank of words."
-*Active area*. Specify the correct area in the image.

Each test question can be supplemented with an image, audio, video or Flash movie, as well as a formula. In addition, you can customize the text style and insert hyperlinks (Figure 1). Variants of answers can also be supplemented by an image or formula. ISpring QuizMaker allows you to create branch scripts for each test. You can specify a specific action for cases of correct, incorrect and partially correct answers. So, if the answer is correct, the student can move on to the next question, and in the case of a wrong answer, go to the slide with information on the matter. In addition, you

can set up messages about the correctness of the answer to each test question. With these messages, you can give hints and further instructions.

Fig. 1. Types of multimedia resources supported in iSpring QuizMaker.

You can publish your test for upload to SDL (Blackboard or any other with support for SCORM / AICC standards) or include it in the course as a separate slide.

Creation of interactive blocks

Using iSpring, the information in your e-learning course can be presented in an interesting and convenient form. You can quickly and easily create interactive blocks (interactivity) using interactive button on the iSpring toolbar.

1. The book. With this interactivity, you can quickly create your own three-dimensional book, decorate it with images, decorate the cover and set the texture of the pages. The effect of turning pages makes the book especially realistic.

2. Frequently Asked Questions. Interactivity allows you to create a list of frequently asked questions and answers to them. The ability to search by keywords provides a quick search for the right information.

3. The catalog. With the help of the "Catalog" interactivity, you can create a glossary, a directory or a catalog of titles. It is possible to insert images, audio and video files, Flash movies. Search by keyword is available.

4. Timeline. This interactivity allows you to visualize the timeline of events in the form of a timeline. The description of periods and events can be accompanied by images, as well as audio and video. Any interactivity can be inserted into the training course or published as a separate Flash file.

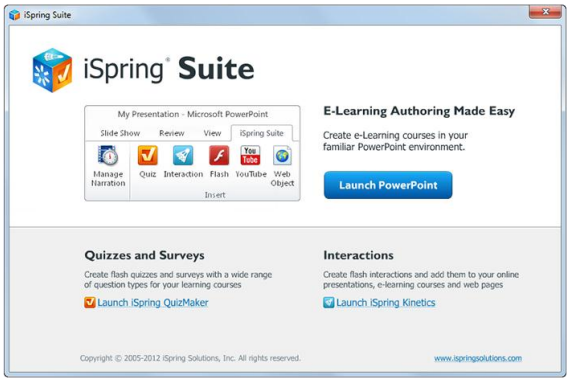

Figure 2. Users interface of iSpring Suite.

Today iSpring Suite is the most powerful tool for developing educational materials in PowerPoint in its class, which combines the possibilities for creating interactive simulators, video lectures, screencasts and tests. Everyone can easily begin to work in it without prior training and solve the maximum tasks for distance learning (e-Learning). As everyone knows, manuals that have an electronic form differ significantly from their traditional printed counterparts. Submission of educational materials with the inclusion of multimedia components: graphics, animation, video, audio, simulation in the dynamics of real situations, involve the student in the active learning process and make the learning process profound and comprehensive.

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PYTHON IS A GENERAL-PURPOSE LANGUAGE

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Summary. *This article is devoted to the studying of Python programming language and its function. The author shows the wide range of usage of this language.*

Key words: *Python, programming concepts, syntax-learning stress, update cycle*

Python was designed to be easy to understand and fun to use (its name came from Monty Python so a lot of its beginner tutorials reference it). Fun is a great motivator, and since you'll be able to build prototypes and tools quickly with Python, many find coding in Python a satisfying experience. Thus, Python has gained popularity for being

a beginner-friendly language, and it has replaced Java as the most popular introductory language at Top U.S. Universities.

Easy to Understand. Being a very high level language, Python reads like English, which takes a lot of syntax-learning stress off coding beginners. Python handles a lot of complexity for you, so it is very beginner-friendly in that it allows beginners to focus on learning programming concepts and not have to worry about too much details.

Very Flexible. As a dynamically typed language, Python is really flexible. This means there are no hard rules on how to build features, and you will have more flexibility solving problems using different methods (though the Python philosophy encourages using the obvious way to solve things). Furthermore, Python is also more forgiving of errors, so you will still be able to compile and run your program until you hit the problematic part.

Scalability Not Easy to Maintain. Because Python is a dynamically typed language, the same thing can easily mean something different depending on the context. As a Python app grows larger and more complex, this may get difficult to maintain as errors will become difficult to track down and fix, so it will take experience and insight to know how to design your code or write unit tests to ease maintainability.

Slow as a dynamically typed language, Python is slow because it is too flexible and the machine would need to do a lot of referencing to make sure what the definition of something is, and this slows Python performance down.

At any rate, there are alternatives such as pay Pay that are faster implementations of Python. While they might still not be as fast as Java, for example, it certainly improves the speed greatly.

Community. As you step into the programming world, you'll soon understand how vital support is, as the developer community is all about giving and receiving help. The larger a community, the more likely you'd get help and the more people will be building useful tools to ease the process of development.

5th Largest Stack over Flow Community

Stack Over flow is a programming Q&A site you will no doubt become intimate with as a coding beginner. Python has 85.9k followers, with over 500k Python questions. Python questions are also the 3rd most likely to be answered when compared to other popular programming languages. 3rd Largest Meetup Community

At meetups, you can generally network and learn from fellow developers. Meetups often offer mentorship to those who want it as well. There are 1300+ Python groups on Meetup.com, totaling 608k+ members. Thus, in terms of programming languages, Python is the 3rd largest community.

4th Most-Used Language at GitHub. The more useful projects there are, the more likely someone has already built a function you need and built it well, which will greatly speed up your development process. Over 950 Python projects have over 500 stars.

Python is also known to have an abundance of libraries that assist with data analysis and scientific computing. In addition, PyGames is a neat game engine to build games with if you want to make simple games.

Career Opportunities. Salary information from googol. On Angel List, Python is the 2nd most demanded skill and also the skill with the highest average salary offered. With the rise of big data, Python developers are in demand as data scientists, especially since Python can be easily integrated into web applications to carry out tasks that require machine learning.

According to the TIOBE index, Python is the 4th most popular programming language out of 100 with the rise of Ruby on Rails and more recently Node. Python's usage as the main prototyping language for backend web development has diminished somewhat, especially since it has a fragmented MVC ecosystem. However, with big data becoming more and more important, Python has become a skill that is more in demand than ever, especially it can be integrated into web applications. As an open source project, Python is actively worked on with a moderate update cycle, pushing out new versions every year or so to make sure it remains relevant. A programming language's ability to stay relevant also depends on whether the language is getting new blood. In terms of search volume for anyone interested in learning Python, it has skyrocketed to the 1st place when compared to other languages. Interest in learning Python grew by 22.1% in 2015 Clearly, Python will continue to reign in terms of relevance, and has a pretty good future thanks to its large community.

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THE ROLE OF MODERN MEANS OF COMMUNICATION IN TEACHING PROCESS

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Summary. *From this topic we can learn modern means of communication, effect to our life and other important things. Modern means of communication is developing day by day. We cannot imagine our life without it.*

Key words: *modern communication, text massage, mobile line.*

According to Webster's Dictionary communication is "A sending, giving or exchanging of information, ideas etc." Thus talking about modern means of communication I would mention two things-mobile phones and the Internet. When I use all these things every day I sometimes recollect people who invented them. Without the work of John Neumann, Charles Babbage, Tim Bernes-Lee, Zhores Alferov, Al Gore and many others. We won't be able to enjoy all modern means of communication.

Modern means of communication have introduced relevant changes in our life. Mobile phones give us an opportunity to stay in touch and to be reachable everywhere. Now it's difficult to imagine how people lived without mobile phones in the past.

The mobile phone is a very useful device. Thanks to it, I can access people I need: my parents, my friend and teachers. I can never miss anything important. If I need some help, I just call for help. If I'm late some reason I may send a message to inform about it. What is more, with the help of mobile phone? I can access the Internet, listen to music and what not. A mobile phone give us freedom. Furthermore, mobile phones offer the possibility of texting. Text messaging is the most convenient and the cheapest form of communication when we need to pass a quick note containing only a few words.

But telephones are no longer the only device used to communicate with other people. For example, using new software applications like Skype is undoubtedly one of the popular ways for communication. In this way we can surf the net and chat with our friends at the same time.

Others suggest that such trend of communication can make people's social skills degenerate. As time passes, people forget how to talk to each other naturally when it comes to the necessity of face-to-face communication.

Modern means of communication: a critical approach among the most powerful forces that have affected cultural change in the world, from the beginning of the twentieth century, are the modern means of communication, widely known as mass media. Mass media, an expression introduced by the Americans, is used throughout the world; the Church in Vatican II, however, has preferred the expression "Instruments of social communication". With the advent of techniques and technology, mass media has undergone enormous changes.

Mass media like the press, newspaper, radio, TV, internet, mobiles and other hi-fi digital media are among the wonderful technical inventions which foster communication between human beings in leaps and bounds. The prominent role of mass media in society is to inform, to educate and to entertain–and that it has met these ends is beyond doubt. It has, however, also influenced and affected the value priorities drastically, for it promotes good and bad values simultaneously. Other than just values and drawbacks of media, we also see that it has affected the lives of thousands of people. If we see the advantages or pros of mass media, then its first merit is to foster a greater closeness of people, drawing them nearer and binding them together.

Mass media also promotes social causes such as environmental cleanliness, abolition of child labor, equal rights of the girl child, etc. During natural catastrophes the newspapers and television news channels carry appeals for national and international aid. Other than these, mass media promotes a new and creative education which can arouse in young people the ability that will enable them to discover positive values. Like the two sides of one coin mass media has its pros as well as cons. As George Bernard Shaw says, "The problem with communication is the illusion that it has been accomplished, it has only accomplished investing our lives with artificial and arbitrary values".

The cons of media are that it is managed and controlled by the government and the richer classes of society. Therefore, the news that was added into newspapers, or see on television is sometimes manipulated by these people with their power and money. Secondly, mass media is generally oriented on entertainment. Earlier, for entertainment radios were used through which people relaxed from exhaustion; nowadays TV and mobiles have become the main source of entertainment; although their primary use was different. Similarly, the internet has become an indispensable part of our lives. Though it has become very powerful and successful, as it is the fastest and the quickest means to acquire information, send emails and so on, it has also become a failure due to a rise in cybercrimes, cyber bullying, fake Id, hacking and spam messages, transmission of viruses etc. When mass media, first made an impact on the world it was a tool used for advertising and broadcasting news. And now it rules the life of the people right from children to adults.

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SOFTWARE MODELING IN EDUCATION AND INDUSTRY OF UZBEKISTAN

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Summary. *The following article is devoted to software modeling in education and industry of Uzbekistan.*

Key words: *software modeling, graph-like data structures, software models, modeling artifacts, synchronize*

I. Introduction

Software engineering is "*the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software […]"* [1], and its study. Software engineering [7] has long since become an integral and indispensable part of computing science. It ranges over all phases of software development, starting from requirements elicitation and management, to software specification, architecture, design and implementation, as well as testing and verification, maintenance and evolution. **Software modeling** (e.g. in UML – Unified Modeling Language [8]) is a key field of modern day software development activities which is well-suited to design, develop and produce large-scaled software projects. Modeling techniques in software engineering allow for viewing complex systems from a more abstract level, or focusing only on selected and detailed aspects, making the development and evolution of very large software systems feasible. Models on all abstraction levels enable traceability, synchronization, and proper co-evolution of requirements, design decisions, test cases, and implementation artifacts. Software engineering is the engineering means to achieve higher levels of integration and automation in software development and evolution.

In Uzbekistan, research activities in software development focus more strongly on technical aspects, solid programming skills, and a well-founded mathematical basis. In most other developed countries, software engineering practices on the university and industry level has an emphasis on imparting general concepts such as integrating software engineering disciplines, developing large integrated systems, and best practices of model-driven software development. Therefore, applying modern software modeling principles and technologies to software engineering education and industry in Uzbekistan is quite important and beneficial. This paper addresses to application of modern software engineering and modeling methods and technologies in both academia and industry.

In the following, the main objectives and goals of the problem area are portrayed in Section II. In Section III, the current issues and problems are presented as well as benefits and proposed solutions are demonstrated in the same section. This paper ends up in Section IV by drawing some conclusion and outline for future work.

II. Motivation

In standard software development life-cycle (requirements analysis, designing, implementation, testing and validation), software models are firstly have to be designed and secondly have to be maintained. Unlike source code, software models have rich

and complex graph-like data structures. To that end, designing and maintaining such software models is a challenge. Additionally, maintenance and development of the large-scaled evolving software models require real-time collaboration of several designers on the shared modeling artifacts. During the collaborative modeling process, collaborators apply various changes to the shared model in parallel. Since several users collaboratively work on shared artifacts, the collaborative modeling application needs to provide sharing of modeling artifacts and synchronize the user changes among collaborators when new artifacts are created or existing ones are deleted or changed.

Collaborative modeling has to be capable of handling a huge amount of the shared modeling artifacts and control their versions by storing the histories of these models. Changes of shared models have to be exchanged between collaborative modelers in real-time. Software models are the one of main designing and documentation techniques. They are the best aid for software managers for communicating with software customers and stakeholders as well as with their employees such as developers and testers. All model designing and maintenance activities require certain tools with real-time model designing, version control and model history analysis features. All these discussions show that there is a need for software modeling and modeling tools in both academia (education) and industry.

III. Software Modeling

As mentioned in Section II, there is a need for real-time modeling, model version control and model history analysis tools. This section is dedicated to present the results of research work in the field of model version control, real-time collaborative modeling and model history analysis.

In the beginning we have introduced a generic model difference representation approach ***DOL – Delta Operations Language*** in [5] for representing differences between subsequent versions of an evolving software model. As application areas of the research work, real-time collaborative modeling tool is introduced in [3] and [4], model version control systems is introduced [7] and model history analysis tool is introduced in [6].

Real-time collaborative tool (Kotelett) [2] is enables modelers designing the shared modeling artifact at real-time. Usually software models are designed and maintained by a team of modelers at real-time and they might be located in different places geographically. In such situations, synchronization of model changes made by each team member is a challenge, especially at real-time. Kotelett tool shows high performance and speed while collaboration of several model designers. This tool allows for designing UML Class diagrams [8].

Model Version Control System (GMoVerS) [3] is a generic tool for storing model differences and the model histories. The differences between subsequent model versions are efficiently stored in **modeling deltas** and designers can revert to any other

versions of a model if needed. Currently, GMoVerS is capable of version control of UML class and activity diagrams.

Model History Analysis (MoHA) [5] is a tool for analyzing the histories of a model or its artifacts. For instance, designers might ask questions like when was a model element created, how often does an element change, when was an element deleted, which element did exist in the initial model version, etc. Modelers can find answers such questions using MoHA tool.

IV. Conclusion

This paper expressed the general application areas of the DOL approach using the DOL statements for representing model differences. In collaborative modeling, exchanging model changes made by designers is eased by exchanging only modeling deltas which contain only the change operations. The model histories can be handled by generic model version control system. The change histories of software models can be analyzed using the model history analysis tool. Using such methods and technologies brings a lot of advantages to both academician and industry people in the field of software management and engineering. Software models are used to define requirements specification, design specification and documentations of planned and realized software systems. As an integral part of software engineering, software modeling is the best aid for project managers and students for designing their projects in our country.

All collaborative modeling, version control and history analysis applications are planned to be extended for further UML diagrams as future work.

The client side of the real-time collaborative modeling tool Kotelett can be downloaded at [9] and it can also be demonstrated in the workshop

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COURSE SCHEDULE IN ANDROID

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Summary. *The work is dedicated to the course schedule in Android.*

Key words: *course schedule, card details, attach photos, valuable feature.*

The actual schedule of your group is always with you and is available offline - you do not need to remember anymore or look for a schedule.

What does the student try to learn first when entering a technical school or university / institute? Correctly, the schedule of subjects, and also the schedule of calls. In this case, all use smartphones, and no one is trying to somehow automate this process, or at least make it easier.

“Dars jadvali” - is a handy Android program for managing your school time. The program is easy to navigate. It is very easy to master. Color schedule helps you to understand your plans for the day easier and faster. And advanced settings allow you to optimize the schedule of classes to suit your needs. The program automatically compiles the main schedule, allows you to keep daily changes in the schedule, keep records of completed hours, and generate various reports. The full version has no limitations on the functionality of the program and is installed on one smartphone. The program "Dars jadvali" is designed specifically to automate the work of the head teachers and dispatchers of institutes, universities, academies, and, thanks to the wishes of users, is constantly being improved and "overgrown" with a lot of additional opportunities.

Capabilities:

- ✓ Perfect display of the schedule:
  - numbering of weeks
  - weekly schedule view
  - card details of the pair

- marking of types of pairs

✓ Manage the schedule - make changes directly to the application

✓ Teachers schedule

✓ Add assignments to subjects - keep everything in one place

✓ Set the deadline for assignments, attach photos and items to make it all and forget nothing

✓ Odd and even weeks.

Figure 1. Interface of project

The interface is as simple as possible and very convenient. In the center of the screen there are 6 tabs, which correspond to 6 days of the week (you can select only those days in which you study), and just below the tabs is a list of items, the schedule of calls. On the top panel there is a switch between the first and second weeks.

Figure 2. Navigation drawer of project

In the navigation drawer you can go to the settings section, import / export the schedule, see the last date of saving the schedule, and also in the same section there is the possibility to check the updates in the schedule. Since after saving the schedule, you will receive an email to your e-mail address with a link to edit the schedule, and you can give it to anyone in your group. If the schedule is updated, anyone who has a schedule for this link will be able to update it quickly, and not change everything manually (this is a very valuable feature that I have not seen in other applications).

Add / Edit:

Figure 3. Adding a new course.

Figure 4. Editing a course.

Figure 5. Editing window

To add or edit a new item, hold your finger on the desired item. Then, after opening the editing window, you can change the time, select the subject, the teacher and the audience, and save for one or both weeks. If you select, for example, an item, you will see only one item in the list – this is a "directory". Click on it to add your own entries, which you can use when creating / editing schedule items. You can write anything there, anything, most importantly, that you understand. In the settings of the application you can change the theme of the design, set up the schedule of calls, choose the number of classes and other options that you will easily understand. To sum up:

"Dars jadvali" is one of the best applications for students and schoolchildren, which will only have to suffer a little time, and then with joy and comfort to use. Pleasant use!

ICT AN IMPORTANT FACTOR OF NATIONAL PROGRESS IN UZBEKISTAN

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Summary. *This article is devoted to the issue of implementing ICT into national progress of our country.*

Key words*: industry, joint ventures, ICT, Uzbekistan, development, information technologies, national progress.*

The domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, and Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.

From the first days of independence Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society.

Over a short period the authorities created the legal framework conducive to further formation and progress of market of IT-technologies. In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. President's Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21, 2012 and "On further development of computerization and introduction of information and communication technologies" dated May 30, 2002, became important documents in this direction.

At present the Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented. This program was approved by President's Resolution dated June 27, 2013.Making a statement at enlarged meeting of the Cabinet of Ministers dedicated to the socio-economic development in 2015 and the most important priorities of economic program for 2016, President Islam Karimov noted that in today's conditions in the era of Internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation

of system "Electronic government" are of priority significance. As the head of our state underlined, development of ICT has a direct impact on the level of competitiveness of the country, allows you to collect and summarize vast amounts of information, offers great opportunities for management at strategic level.

The task of regular improving of the governance, strengthening the capacity of IT-industry was entrusted to the Ministry for development of information technologies and communications, created by the Resolution of the Head of our state dated February 4, 2015. In addition, since 2002 a Centre for development and introduction of computer and information technologies UZINFOCOM operates, which assists in the development and implementation of national programs of computerization and introduction of ICT in all sectors of public administration, economic and social spheres. Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy.

The basis for development of ICT in Uzbekistan is the telecommunications infrastructure. The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services. Over the past 20 years in many regions of the country more than 2,000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high-speed Internet, watching HDTV-channels and others. Due to the measures taken in 2015, the overall rate of use of international information networks increased by 42.3% compared to 2014 and amounted to 15.5 Gb/s.

Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business.

Currently, major domestic centers of integration of education, science and industry - Tashkent State Technical University (TSTU) and Tashkent University of Information Technologies (TUIT) - train specialists in technical direction and for IT sector. In 2013, TUIT opened two new master's direction - management of the system "Electronic Government", and library science. At the same time, these universities carry out scientific research on the basis of active cooperation with leading industrial enterprises of the country.

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CREATING THE METHOD OF PROTECTION INFORMATION SIGNAL AGAINST ILLEGAL ACCESS IN THE FIBER-OPTIC COMMUNICATION LINE

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Summary: *In this article it is investigated existing modern methods and the means, applied with a view of illegal access to the information in a line channel of fiber-optical communication systems, their principles of work. Also in this work the analysis of these methods are carried out. As a result of research and the analysis necessary conclusions for realization of measures on maintenance information security in fiber-optical communication systems becomes.*

Key words: *Optical networks, illegal access to information, confidentiality of illegal access to information.*

On the basis of the carried-out analyses of the existing methods and means of ensuring of information security in the fiber-optic communication line counteraction methods to the modern technical means of unauthorized information retrieval in VOSS are offered.

The information security method from illegal access in fiber lines of communication is created and it can be used in fiber transmission systems of confidential information [1].

The method of protection of an information signal against illegal access in a communication fiber line realized in the device for detection of connection to a communication fiber line, consisting in detection of connection to a communication fiber line by formation of the transmitted information signals restricted on the power level, their input in a fiber line of communication, transmission on a fiber line of communication, reception on other end of a fiber line of communication, measurement of levels of the accepted signals, detection of connection to a fiber line of communication and formation of an alarm bell is known. A lack of this method is the

high probability of false alarm caused by low accuracy of monitoring of attenuation of information signals in a fiber line of communication and instability of their average level.

The method of protection of an information signal against illegal access in a communication fiber line consisting in detection of connection to a communication fiber line by formation of the information and control optical signals restricted on the power level, their input in a fiber line of communication, reception of the specified signals, separation of a control signal and comparing of level of its power with the power level of a reference signal, detection of connection to a fiber line of communication and formation of a signal of transmission control of information is known. Lack of this method is the low performance of information security from illegal access in a communication fiber line as there is a possibility of unauthorized connection to a fiber line of communication and an output from it the transmitted information and control optical signals in case of high reserve of interception, especially when the method optical information retrieval tunneling is applied [2].

The most close to offered on set of signs is the method of protection of an information signal against illegal access in a communication fiber line which is in what on the transmitting end of a fiber line of communication is created by the original information signal and the masking sync create the normalized inverse masking sync with opposite characters synchronized with the masking sync create the transmitted information signal by multiplication of the original information signal and the normalized inverse masking sync with opposite characters, create a summed signal by mixing masking a sync and transmitted an information signal, create by modulation by a summed signal subject to transmission of optical radiation and enter into a communication fiber line, and on the receiving side of a fiber line of communication bring out of it the accepted optical radiation, define the mean power level of the accepted optical radiation, select the masking sync from the accepted optical radiation by its demodulation and filtering, create the inverse masking sync synchronized with the selected masking sync, modulate inverse masking a sync additional auxiliary optical radiation, set the mean power level modulated additional auxiliary optical radiation equal to the mean power level accepted optical radiation, creates resulting optical radiation by mixing, accepted optical radiation and modulated the additional auxiliary optical radiation then select an information signal from resultant optical radiation by its demodulation and filtering.

Lack of the known method is low efficiency information from illegal access are sewn up in couple connections to the fiber-optic communication line with the similar receiving device [3].

For elimination of the specified shortcoming it is necessary to use a noise signal with the accidental nature of change which nadat an opportunity to select from a

summed signal an information signal from - for absence of an inverse noise signal in a communication fiber line.

The goal is achieved by the fact that in the known method of protection of an information signal against illegal access in a communication fiber line which is that on the transmitting end of a fiber line of communication create an information signal, create a summed signal by mixing of a noise and information signal, create by modulation by a summed signal of the optical radiation which is subject to transmission and enter into a communication fiber line, and on the receiving side of a fiber line of communication bring out of it the accepted optical radiation, create a summed signal from which select an information signal of the accepted optical radiation the following operations are entered: before formation of a summed signal on the receiving side create the original and inverse noise signal, modulate the original noise signal of optical radiation and enter into a communication fiber line, and on the transmitting end of a fiber line of communication bring out of it the accepted optical radiation, create a noise signal which is subject to offset of an information signal of the accepted optical radiation, and separation of an information signal on the receiving side makes by mixing of the detainee of an inverse noise signal to a summed signal and delay period of an inverse noise signal is defined by expression $t_{\text{delay}} = 2L/v$ where: L-length of an optical fiber; v-speed of optical radiation in an optical fiber.

On figure.1. It is shown the flowchart of one of possible versions of the device realizing the offered method of protection of an information signal against illegal access in a communication fiber line. The device realizing the offered method of protection of an information signal against illegal access in a communication fiber line contains: on the transmitting end 1 generators 2 of an information signal, the adder 3, a source 4 transferred optical radiation, the photo detector 5 of a noise signal, the directional coupler 6 with inputs 6-2 and an output 6-1, a fiber line 7 communications, on receiving to the 8th side the directional 9th coupler with inputs 9-1 and an output 9-2, the photo detector 10 of a summed signal, the adder 11, lines of a time delay 12, the generator 13 of an inverse noise signal, a source of the 14th noise optical radiation and generator15 a noise signal.

In case of implementation of the offered method of protection of an information signal against illegal access in a fiber line of communication execute the following operations [4]:

- on the receiving side of the 8th fiber line 7 communications:

1) create a noise signal by means of the generator 15,

2) create an inverse noise signal by means of the inverter 13,

3) by means of the line of a time delay 12 make time delays of an inverse noise signal for a while,

4) modulate a noise signal the transferred noise optical radiation in a source of the 14th optical radiation,

5) enter through an input of 9-1 directional coupler 9, into a fiber line 7 communications the transferred noise optical radiation.

- on the transmitting end of 1 fiber line 7 communications:

1) create the transmitted information signal by means of the generator 2,

2) bring through an output of 6-1 directional coupler 6, out of a fiber line 7 communications of the accepted noise optical radiation,

3) by means of the photo detector 5 create a noise signal of the accepted noise optical radiation,

4) create a summed signal by mixing by means of the adder 3 of information and noise signal,

6) modulate a summed signal the transferred optical radiation in a source 4 transferred optical radiation,

7) enter through an input 6-2 directional couplers 6, into a fiber line 7 communications the transferred optical radiation,

- on the receiving side of the 8th fiber line 7 communications:

1) remove through an output 9-2 directional couplers 9 of a fiber line 7 communications the accepted optical radiation,

2) by means of the photo detector 10 create a summed signal of the accepted optical radiation,

3) the delayed inverse noise signal select with the adder 11 by offset to a summed signal an information signal When using of the offered method of protection of an information signal against illegal access in a communication fiber line in which before formation of a summed signal on the receiving side the noise signal which is transmitted to the transmitting end of a fiber line of communication for mixing to an information signal is created.

On the receiving side in the course of offset to a summed signal the delayed inverse noise signal occurs complete phase coincidence of noise and its inverse signal. As a result of which the noise signal is completely compensated, are selected an information signal and information security in a communication fiber line from illegal access is provided.

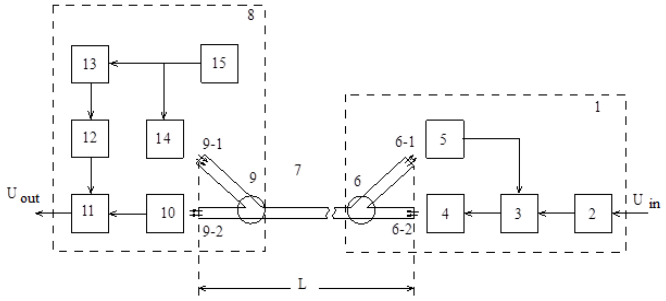

Figure.1. Flowchart of the device

Method of protection of an information signal from unapproved access to the fiber-optical communication line, consisting that on the transferring party of the fiber-optical communication line form an information signal, form a total signal by mixing of a noise and information signal.

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APPLYING THE ABNORMAL PHOTO TENSION (APhT) ELEMENTS WITH DOUBLE BIREFRINGENCE TO IMPROVE THE OPERATION OF INFORMATION TECHNOLOGIES

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APhT-elements are oscillator type light-sensitive detectors. Thus, they work independently, that's without source of supply. Moreover, there are huge photo electrostatic fields upraise at lightening of them. These kinds of fields could be used in quantum group devices and radio electronic devices as microminiaturized supplies. They turn up an opportunity of microminiaturization of such devices.

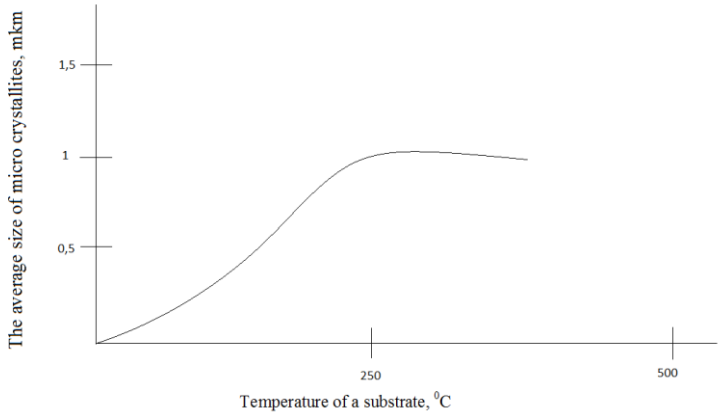
Scientific interest causes its abnormal character photo-electric, photo magnetic and also magneto-optical properties of APhT-elements.

In operation it is carried out research about influence of the cluster type heterogeneity on properties of APhT-elements on the basis of $CuZnSe_2$ with double refraction.

For maintenance of satisfactory accuracy of influence of nonstoichiometrity, heterogeneity of APhT-elements on their photo electric and other properties it is

necessary special processes for APhT-elements. The fact is that the heterogeneities commonly are at fault in anisotropies of photo electric consequences and in their abnormality, more so in heavy electrical and magnetic fields and are able to wholly distort the results of measurements. It forces to look in a new fashion at some abnormal results on APhT-effect. Detailed research of heterogeneities influence on properties of APhT-elements is poorly investigated. It is necessary to ascertain, that the problem of creation and heterogeneity on APhT-elements generally is not solved. The technology of reception of APhT-elements with double refraction is considered for the first time. For this purpose we develop technological measuring system to provide heterogeneity on structure and on substance. Heterogeneity on structure and substance is reached with doping isovalent impurity during reception of APhT-elements. All work cycle of evaporation occurs at variable temperature of a substrate, at a corner of sputtering. Change of temperature of a substrate and corner of sputtering the sample in a work cycle of evaporation in vacuum is carried out by increase continuously under the linear law by means of an automatic regulator. It is established, that the size of micro crystallites increases at rise in temperature. Bigger crystallites are formed at temperature nearby 250^0C. Grains consist of numerous doubles with the characteristic sizes ˜15nm which form alternating layers with hexagonal highly-packed and cubic side-centered the lattices, located along the extended grains.

Specially developed scheme sets to the sample necessary temperature and a corner of sputtering, sets sequence of operations of submission isovalent alloying impurity. As a result in a uniform work cycle heterogeneity on structure on structure on a surface and volume of the APhT-element is achieved. According to electro-microscopic research (picture-1), that chains of micro crystallites, the planes of falling focused perpendicularly, is shown more precisely when the corner of falling of a molecular beam becomes bigger. In $CuZnSe_2$ films the existence of such chains specifies supervision optical dichroism. Usually twice refracting micro crystallites possess property of dichroism, i.e. various absorption of light depending on orientation.



Picture-1. The relation of the average size of the micro crystallites from the temperature of a substrate.

Knowing of the degree heterogeneity of materials rather essentially not only in manufacturing APhT-elements and also at manufacturing various semi-conductor devices, but also at research of the materials. The polycrystalline structure is a vivid example of heterogeneity of a material. The polycrystalline structure with hexagonal lattice can be observed easily in an electronic microscope in polarized light (picture-2). It is natural to expect, that properties of the crystals can differ considerably from properties inter granular layers. Polycrystalline structure most typical for thin films any type, even with mono crystal structures, with coherent orientation of micro blocks. If crystallites of the micro blocks might attribute the properties similar to volumetric properties of the given semiconductor concerning inter granular layers can be the most various. Formations inter granular layers can be caused by the following:

a) "with bight" taken out crystallites at them recrystallizing and representing various impurity and inclusions;

b) The extraneous connections formed of components of the basic material and separate impurity

c) Polyphasal nature of films 'structure, to peculiar complex semi-conductor connections, thus on border of section of phases can arise "P" transitions;

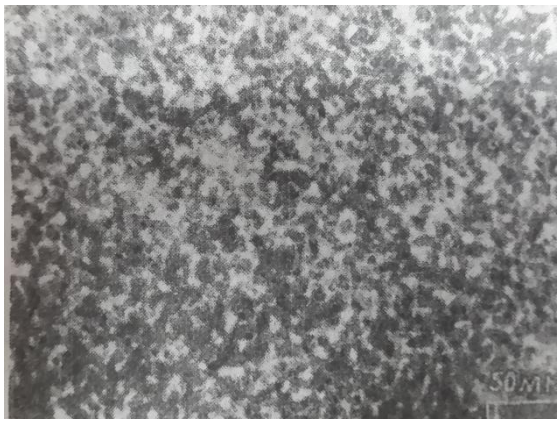
d) Loss of one of components of structure, for example, metal in connection $A^{III}B^{V}$

e) We distinguish structures of phases, for example amorphous and crystal;

f) Oxide of a superficial layer of crystallites;

g) The impoverished layer caused by capture of bearers by superficial levels of crystallites;

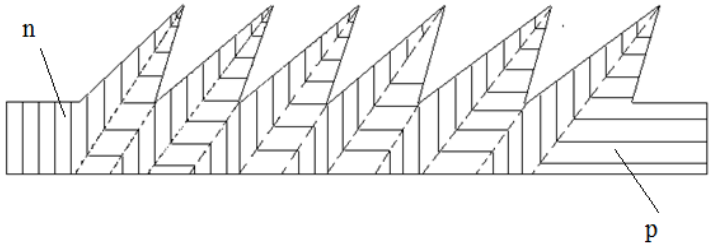
h) Incomplete contact of crystallites on all to their thickness;



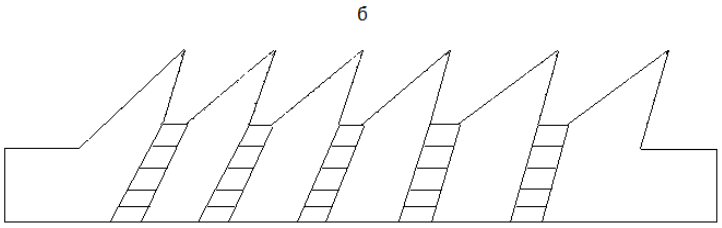
Picture-2. Polycrystalline structures with hexagonal lattice.

Obviously, layers can be formed by set of the listed factors. Quite often layers can determine semi-conductor properties of a polycrystalline material completely. Complexity of interpretation of results of measurements on semi crystalline materials is aggravated with that often there is no full clearness concerning the nature of inter granular layers and their parameters in a concrete material.

It is known, that the APhT-effect basically is observed in polycrystalline films. Observable anomalies carry, mainly, to influence inter granular layers (pictures 3, 4): one is based on the theory complex electro circuits, another on the barrier theory [pictures 1, 2]. It is one of the first authors who have considered the photo-electric equivalent scheme.



Picture-3. Barrier model.



Picture-4. Dember model.

APhT-films at the analysis APhT-effect, was Mastov [3]. In the simplified model crystallites are divided by high intelligent layers. In turn high intelligent areas can be not only interring granular layers, but, most likely micro crystals [4].

As layers have some inclination in relation to a plane of a substrate the current proceeding through a film is forced to cross border of layers. As a result bearers of charge test dispersion not only on inter granular barriers, but also on barriers of layers of updating. Thus, not only the polycrystalline non-uniform structure, but deficiency most crystallites' factors are abnormal in APhT-elements. As it was mentioned in above

very sensitive to inhomogeneity in APhT-elements electro optical effects are APhT, APhMV and others magnetic-optical. Therefore there are doubts in a correctness of results of job [5], in which they on size APhT-effect in a film.

In many theories on the physics of semiconductors thickness of a layer is to the important parameters, and for this reason of a film often is good means of experimental check of such theories. However to receive unequivocal results, it is necessary to save constant various structural properties of films, and often it is very difficult task. In this respect considered method is convenient that it enables to investigate some effects simultaneously.

Experimental check according to a variation method spent in connection with occurrence of theoretical jobs [5, 6] has shown that if thickness of a layer is great in comparison with length of free run, superficial recombination of renders small influence on APhT-films. In that case for APhT by the Damber mechanism it is possible to use expression for the analysis.

$$V = \frac{(b-1)BL}{\mu_n(n_0+p_0)(1+\alpha_1)}$$

B- Intensity of light,

L- Length of diffusion

α- Speed of the superficial recombination on the lightened surface.

From the given expression it is visible, that anomaly in APhT-elements depends on optical heterogeneity since for occurrence of dispersion of light it is necessary, chaotic the centers of dispersion (particle) allocated in the environment have defended from each other on distances at least the order of length of a wave (particles can be less lengths of a wave of light). If distance centre to centre dispersion there is less than length of a wave, dispersion (double refractions) it is not observed also environment is represented optically homogeneous. For supervision of anomaly in APhT-elements it is necessary optical anisotropism. The heterogeneity, created [5,6] separate micro crystalline, on the size there is less than length of a light wave, therefore as light "is not felt", APhT-effect do not arise. Anomaly arises only with the advent of heterogeneities surpassing on the size length of waves of light.

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TECHNOLOGICAL REVOLUTION OF UZBEKISTAN

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Summary: *this article reviews the current status of the ICT sector and tendencies in the basic areas of the Uzbek knowledge-based economy, including policies and policy instruments, institutional mode, ICT infrastructure, information system, innovation opportunities and the perspective and challenges faced by Uzbekistan in the area of the ICT development.*

Key words: *ICT infrastructure, information system, ICT development, Government, knowledge based economy.*

The article was prepared by a national expert, nominated by the Government, and represents an overview of the present situation and an assessment of the emerging trends in all the major areas, constituting the foundation of the knowledge-based economy, such as policy and policy instruments, institutional regime, ICT infrastructure, information system, national innovation capacities and capabilities.

In the last decade of the 20th century, information and communication technologies (ICT) became one of the major factors influencing the development of society and the life of people. Many countries understand the enormous advantages brought about by the accelerated development and proliferation of information-communication technologies. The economic activities associated with the manufacturing and use of information technology have become a driving force of the steady economic growth of these countries. A new era of knowledge-based economy has begun.

Knowledge-based economy is not only the digital economy that comprises the manufacturing and use of computers and telecommunication equipment. It is not only the networked economy, whose elements are connected and operate through telecommunications.

There are various aspects of the knowledge-based economy:

• The knowledge-based economy is enabled and driven by powerful technology, ICT.

A new ICT generation appears every three - four years. Today, ICT companies are in line with the largest corporations. The ICT sector is considered to be one of the most rapidly growing economic sectors;

• A telecommunication network, integrally connected with ICT growth, has spread its roots throughout all spheres of human activity, forcing them to change their methods of operation and the conditions under which they operate;

• Knowledge based on information and supported by cultural and spiritual values has become an independent force and decisive factor in a social, economic, technological and cultural transformation;

• A global information society has becoming a reality. The knowledge-based economy has allowed a fast integration of the huge intellectual resources of the transition countries into a global pool, stimulating the development of everyone;

• The knowledge-based economy continues to influence other spheres of public life of countries, including the institutional and innovation systems, development of human resources, etc.

The ICT sector has become a major component of the economy of Uzbekistan and a force of its growth. The basic aspects and strategic goals of the country with respect to ICT and the Internet are highlighted in the Statement by the President of Republic of Uzbekistan, May 2001.

As of May 2003, several National Programs targeted to ICT and Internet network development in Uzbekistan have been developed:

«A National Program of Reconstruction and Development of Telecommunication Network of the Republic of Uzbekistan for the Period up to 2010» (Resolution of the Cabinet of Ministers № 307, 1 August 1995). The purpose of the Program is to create a National Telecommunication Network on the basis of digital transmission systems and digital switching equipment, stipulating a deep integration into the global telecommunication system and providing comprehensive satisfaction of the needs of the economy and the population in communication services.

The main objectives of the Program are:

• Defining priority directions of the telecommunication development;

• Formulating the State principles for support of the telecommunication development;

• Attracting investment resources from non-governmental sources, including foreign investment, for telecommunication network development;

• Creating a material and technological basis of communication that meets international requirements, organization of production of telecommunication equipment, optical fiber cable with the participation of foreign investors;

• Observance of sovereign rights of the country and the interests of regional structures in forming the technical basis of telecommunication and organization of their interaction during the creation and operational stages of development of the telecommunication system.

«Program of Modernization and Development of National Data Transmission

Network of the Republic of Uzbekistan for the Period 1999-2003» (Resolution of the Cabinet of Ministers № 193, 22 April 1999.)

The purpose of the Program is to define basic organizational and technical measures to stimulate modernization and development of the National Data Transmission

Network for the period 1999-2003 and a network expansion in Tashkent, Nukus and province centers within the period 1999-2001 and in the Regional Centers during 2000-2003.

The primary objectives of the Program are:

• Basic technical requirements for the construction and organization of the National Data Transmission Network; Country Readiness Assessment Report – Uzbekistan

• Technical means, ways of perfection of communication basis for the creation of a single information space and expansion of the opportunity for integration of the

Republic of Uzbekistan into a global information space;

• Measures on centralized connection of data transmission networks of the Country operators (providers) to global information networks, including the Internet, and long-distance networks of the Republic of Uzbekistan, as well as identifying directions and stages of network modernization and development;

• Identifying sources and mechanisms of financing network modernization and development, including utilization of the National Operator-UzPAK finances, attraction of foreign investments, and the utilization of budgetary resources.

«Program of Computerization and Information Technologies Development for 2002-2010» (Resolution of the Cabinet of Ministers № 200, 6 June 2002). The main purpose of the Program is satisfaction of information needs of society and raising the competitiveness of domestic producers on global markets.

The following are foreseen as goals:

• Accelerating the development of modern telecommunication infrastructure and digitalization of networks and the development of mobile networks;

• Development of an Internet National Segment;

• Creation of conditions stimulating the development of computerization, domestic industry and exports of software;

• Training of highly qualified personnel in ICT;

• Development of a competitive environment in the ICT sector;

• Further perfection of the normative and legislation base, standardization and certification.

The State Programmers have the assistance of donor countries: United Kingdom, Germany, United States of America, Switzerland and Japan. These countries bring an essential contribution to the development of the Uzbekistan ICT sector by supporting scientific research institutes, educational establishments, small and medium-sized businesses, and non-governmental organizations.

General long-distance channels of the telecommunication network of the country are based on fiber-optic and microwave (radio relay) communication lines (TAE FOCL, FOCL and radio relay lines), and they allow creation of high-speed data transmission lines (from 64 Kbps up to 2048 Kbps) between Tashkent, Nukus and the regional centers of Uzbekistan. Communication between the regional centers and areas

essentially varies throughout the territory of Uzbekistan. A modern network is already established in the northern areas of the country: in Karakalpakstan Republic, Bukhara, Navoi, Khorezm and Syr-Darya provinces. Almost 40 per cent of these areas have digital channels. In other areas, the analogue channels connecting the regional centers with areas remain in place. Data transmission networks in Uzbekistan are constructed on the currently existing telecommunication network. Leased circuits (mainly digital) are being used to organize data transmission long-distance and at central-office level. International connection (output) of networks with international information networks, including the Internet, is organized by direct communication, using satellite and terrestrial digital international channels.

Nowadays, in Uzbekistan many innovation technologies are being developed very rapidly. The reason why is the support of our Government to increase Education system.

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NETWORK DATA MANAGEMENT OF COMMUNICATION SYSTEMS

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Summary. *The following article is dedicated to a network data management of communication systems.*

Key words: *network data, communication systems, ATM net*

At first we can shortly consider optical communication systems. Later we conduct research of ATM stream and I/O Processor for Handling media Data Stream. A surprising majority of smart grid optical network (ON) projects neglect the network management system requirement. Sometimes, element managers are purchased to support ON, but that is not always the case and all too often they do not include integration with other network aspects like point-to-point microwave links, point-to-multipoint wireless networks, and baseband routing and switching to name a few. It is critical to view all of the ON elements as one seamless network fabric. Therefore, a manager of managers is needed to orchestrate the many element managers into one harmonious solution that interacts well together and "makes and breaks" connections upon demand. This manager should also include an out-of-band diagnostic system that feeds troubleshooting back to the network operation center. The manager often supports network upgrades and pushing new images to the end devices, such as firewalls. [1].

How the traffic connects to the network is always challenging for smart grid networks since there are so many legacy interfaces that need to be respected in the design. Therefore, encapsulation / de-encapsulation is used for NGN (IP/MPLS) and Carrier Ethernet. This process can add latency to the link. Therefore, great care is needed to respect the latency issue for some smart grid applications. There are several ways to interface.

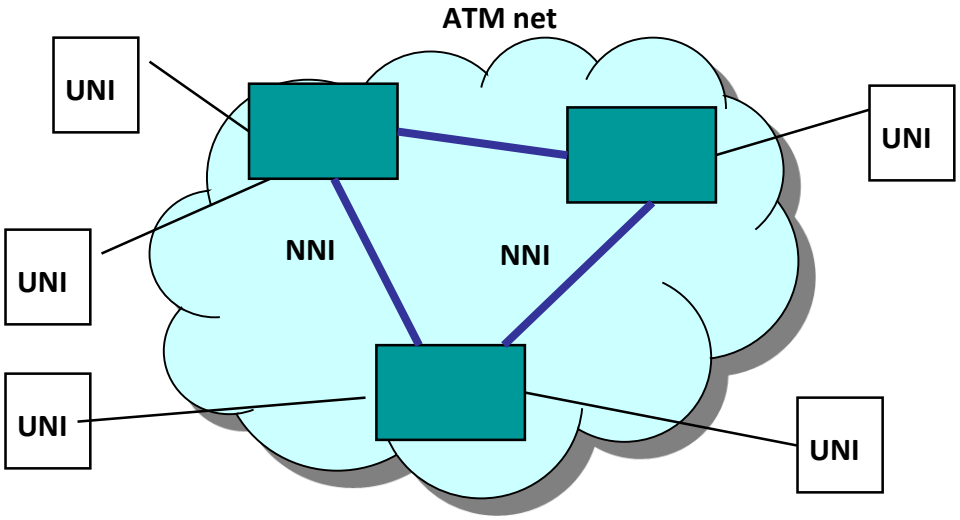

Figure.1. Principle of organization ATM network stream.

Some baseband routers and switches can accommodate a direct connection and other need to be connected via an intermediary device, most often a statistical multiplexer. There are many excellent statistical multiplexers available today that are well suited for the smart grid applications and are loaded with features to make traffic flow management and grooming easier. These devices need their own element manager in the network management system. If we research other networks technologies such as ATM in figure 1. We see imagine of cloud control, but they are really not cloud, but they are physical devices of exact companies [2] .

On the top example, we present the design of an I/O processor for the movement of MPEG-1 encoder data from its origin at the output of the encoder to the memory of the decoder. The encoded data obtained from the source is transferred to the VME-bus through a slave interface module which performs the proper handshaking. Upon receiving a request for data (AS low, WRITE high) and a valid address, the data is presented on the bus in the specified format (the mode of transfer is dictated by the VME signals LWORD, DS0, DS1 and AM [0..5]). The VME DTACK signal is then driven low by the slave indicating that the data is ready on the bus after which the master accepts the data. It repeats this cycle if more data transfer is required, otherwise it releases the bus. In the simulation of the I/O architecture in Fig. 78.19 a Quad-Byte-Block Transfer (QBBT) was done. The architecture of the I/O processor is described below. The link ports were chosen for the design since they were an existing element in our design library and contain the same functionality as the link ports on the Analog Devices 21060 digital signal processor. The circuit's ASIC controller is designed to interface to the VME bus, buffer data, and distribute it to the link ports. To achieve a fully pipelined design, it contains a 32-bit register buffer both at the input and outputs.

The 32-bit data from the VME is read into the input buffer and transferred to the next empty output register. The output registers send the data by unpacking. The unpacking is described as follows: at every rising edge of the clock (LxCLK) a 4-bit nibble of the output register, starting fromthe LSB, is sent to the link port data line (LxDAT) if the link port acknowledge (LxACK) signal is high. Link ports that are clocked by LxCLK, running at the twice the core processor's clock rate, read the data from the controller ports with the rising edge of the LxCLK signal. When their internal buffers are full they dessert LxACK to stop the data transfer. Since we have the option of transferring data to the link ports at twice the processor's clock rate, four link ports were devoted to this data transfer to achieve a fully pipelined architecture and maximize utilization of memory bandwidth. With every rising edge of the processor clock (CLK) a new data can be read into the memory. Figure 78.20 shows the pipelined data transfer to the link ports where DATx represents a 4-bit data nibble. As seen from the table, Port0 can start sending the new 32-bit data immediately after it is done with the previous one. Time multiplexing among the ports is done by the use of a token. The token is transferred to the next port circularly with the rising edge of the processor clock. When the data transfer is complete (buffer is empty), each port of the controller desserts the corresponding Lx CLK which disables the data transfer to the link ports. Lx CLKs are again clocked when the transfer of a new frame starts. The slave address, the addressing mode, and the data transfer mode require setups for each transfer. The link ports, IOP registers, DMA control units, and multiport memory models were available in our existing library of elements and they were integrated with the VME bus model library element. However, the ASIC controller was designed in-cycle to perform the interface handshaking. In the design of the ASIC, we made use of the existing library elements, i.e., I/O processor link ports, to improve the design time. To verify the performance and correctness of the design, the comparison mechanism we used is shown in Fig. 78.21. The MPEG-1 encoder data is stored in a file prior to being sent over the VME bus via master-slave handshaking. It passes through the controller design and link ports to local memory. The memory then dumps its contents to a file which is compared to the original data. The comparisons are made by reading the files in VHDL and doing a bit by bit evaluation. Any discrepancies are reported to the designer. The total simulation time required for the transfer of a complete frame of data (28Kbytes) to the memory was approximately 19 min of CPU time and1hofwallclocktime. These numbers indicate the usefulness of this abstraction level in the design hierarchy. The goal is to prove correctness of design and not simulate algorithm performance. Algorithm simulations at this level would be time prohibitive and must be moved to the performance level of abstraction.

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A BUDGET COMPUTER: MYTH OR REALITY

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Summary. *This article describes problem of creation low-cost computers caused by high prices on hardware and software and solve of this problem on the base of Raspberry Pi microcomputer.*

Keywords. *Low-cost computer, microcomputers, raspberry PI, OLPC, laptops.*

Are computers really common and ordinary in our modern life? And if it is true, do computers widely spread everywhere? It is sounds like nonsense, but even in the 21 century some regions of the world still has serious difficulties with computerization. This problem divided world into 2 groups: first group think that computers are not so important when we have starving and leak of drinking water, second one think that there is no opportunity for computers with such high prices for software and hardware.

Many articles, marks, stories and even jokes had already written about attempts to defeat global food and water crisis and WE hardly can say anything you haven't heard about this theme. Because of this fact let me better tell you about attempts to defeat prices of computers.

The first trouble in question of computerization is question of software. Depending on system requirements and software version it’s cost maybe vary from 20 to 50 percents of summary value. Of course computer corporations have preferential licenses, but its value is still not guarantee full computerization and limit system’s possibilities. Nowadays this problem had been fully solved by Red Hat alike programming societies by creating “free for use” operating Systems like Linux Family Operating Systems.

Appearance of Free Operating Systems definitely made easier process of computerization, but it has nothing common with problem of high prices of hardware. Moreover, process of fabrication of hardware is different that OS programming: programmers can share own projects for free while hardware components anyway need money for resources. But if we cannot create free computer, we still can create computer with minimal spends.

First idea of making “mass computer” appeared in late 1990 – early 2000. That time all organizations linked with world of computer’s hardware and software had own ideas about such kind of computers. Let’s take a glance at some of them.

One Laptop per Child (OLPC) is a non-profit initiative established with the goal of transforming education for children around the world; this goal was to be achieved by creating and distributing educational devices for the developing world, and by creating software and content for those devices.

Its primary goal continues to be to transform education, by enabling children in low-income countries to have access to content, media and computer-programming environments. At the time that the program launched, the typical retail price for a laptop was considerably in excess of $1,000 (US), so it was infeasible to achieve this objective without also bringing a low-cost machine to production. This became the OLPC XO Laptop, a low-cost and low-power laptop computer. The project was originally funded by member organizations such as AMD, eBay, Google, Marvell Technology Group, News Corporation, Nortel. ChWe MeWe Corporation, Red Hat, and Quanta provided in-kind support.

Everyone, who has even a little knowledge about world of IT, looking at the list of members can say that if such kinds of computers really could be created, OLPC will be the first organization who would make it. Frankly, this product partially failed… But, anyway, let’s take a brief look at it.

The OLPC XO, previously known as the $100 Laptop, Children's Machine, and 2B1, is an inexpensive laptop computer intended to be distributed to children in developing countries around the world, to provide them with access to knowledge, and opportunities to "explore, experiment and express themselves" (constructionist learning). The XO was developed by Nicholas Negroponte, a co-founder of MIT's Media Lab, and designed by Yves Behar's Fusebox Company. The subnotebooks are designed for sale to government-education systems which then give each primary school child their own laptop. These rugged, low-power computers use flash memory instead of a hard drive, and come with an operating system derived from Fedora Linux as their pre-installed operating system with the Sugar GUI. Mobile ad hoc networking via 802.11s Wi-Fi. We mesh networking is used to allow many machines to share Internet access as long as at least one of them can see and connect to a router or other access point.

The OLPC project has been the subject of extensive praise and criticism. It was praised for enabling low-cost, low-power machines; for assuring consensus at ministerial level in many countries that computer literacy is a mainstream part of education; for creating interfaces that worked without literacy in any language, and particularly without literacy in English. It has received criticism both specific to its mission, and criticism that is typical of many such systems, such as support, ease-of-use, security, content-filtering and privacy issues. Officials in some countries have

criticized the project for its appropriateness in terms of price, cultural emphasis and priority as compared to other basic needs of people in third-world settings.

Idea of “computer for third world countries” was “not so good” idea just because people there really have more important things that computers and this computer don’t meet the requirements of modern users in other regions. Despite the fact that new models of XO are still in production, future of this project is unclear.

Developers from ASUSTeK Corporation had taken into account the bitter experience of colleagues from OLPC when they were working on own alike project. That’s why their project was a bit more successful.

The Asus Eee PC is a netbook computer line from ASUSTeK Computer Incorporated, and a part of the Asus Eee product family. At the time of its introduction in late 2007, it was noted for its combination of a lightweight, Linux-based operating system, solid-state drive (SSD), and relatively low cost. Newer models added the options of Microsoft Windows operating system, rotating media hard disk drives (HDD).

The first Eee PC was a milestone in the personal computer business, launching the netbook category of small, low cost laptops in the West (in Japan, subnotebooks had long been a staple in computing). According to Asus, the name Eee derives from "the three Es", an abbreviation of its advertising slogan for the device: "Easy to learn, Easy to work, Easy to play".

In January 2013, Asus officially ended production of their Eee PC series, citing declining sales due to consumers favoring tablets and Ultrabooks over netbooks. However, they subsequently restarted the line with the release of the EeeBook series in 2015.

Engineers from ASUSTeK were right when declined idea of “computer for third world countries” and reoriented this idea to “budget computer” for scholars, students and office workers. But scholars growing up, students graduating, office workers need more computing power and as the result of all of this EEE PC exhaust oneself.

By this way if you want to create cheap, comfortable and useful computer, just create it for yourself. WE think it is reason of Raspberry Pi success.

When the decline in numbers and skills of students applying for Computer Science became a concern for a team that included Eben Upton, Rob Mullins, Jack Lang and Alan Mycroft at the University of Cambridge’s Computer Laboratory in 2006, a need for a tiny and affordable computer came to their minds. Several versions of the early Raspberry Pi prototypes were designed but were very limited by the high cost and low power processors for mobile devices at that time.

In 2008, the team started collaboration with Pete Lomas, MD of Norcott Technologies and David Braben, the co-author of the seminal BBC micro game Elite, and formed the Raspberry Pi Foundation. Three years later, the Raspberry Pi Model B was born and it had sold over two million units within in two years of mass production.

The Foundation expected that children would program using Scratch and that the input/output functionality would be used to control external devices. Additionally, the low power requirement facilitates battery-powered usage in robots, while the video capabilities have led to interest in use as a home media centre.

History of IT shows us that when hardware Foundation meets software Foundation, something really weird appearing. In case of Raspberry Pi it really happened: programmers from Red Hat and some other Programming Foundation with pleasure had mastered this platform and create nearly everything from mobile phone to web – server based on it (you can find Laptops, XBOX alike media centers and even PlayStation alike consoles).

The final argument for Raspberry Pi was "plug and play" system which allows you just suitable OS, write it on SD-card and plug it into Raspberry Pi. All the rest procedures will be similar to work on desktop or laptop.

Is budget computer myth? It's still difficult question: from the one hand bitter history of OLPC's XO laptops and short but bright success of Asus EEE PC shows us that major part of users choose computer by price/quality method which make such kind of systems not so popular. But from the other hand amazing story of Raspberry Pi shows us that cheap, but universal and easy-to-use system is always needed. That's why Raspberry Pi is not just budget computer. It's atomic particle which can be turned into any computer technology you need.

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III SECTION

VIRTUAL REALITY IN UZBEKISTAN

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Summary. *The present article is devoted to the Virtual Reality, which is coming to Uzbekistan. The author describes the functions, character and the usage of it in different spheres.*

Key words: *virtual reality, three-dimensional environment, simulation*

Virtual reality (**VR**) typically refers to computer technologies that use software to generate the realistic images, sounds and other sensations that replicate a real environment (or create an imaginary setting), and simulate a user's physical presence in this environment. VR has been defined as "...a realistic and immersive simulation of a three-dimensional environment, created using interactive software and hardware, and experienced or controlled by movement of the body or as an "immersive, interactive experience generated by a computer". [1]

Virtual reality can be used in different spheres, such as medicine, education, military service, spaces and many others. If we have a look at medicine sphere, the simulated surgeries allow surgeons to practice their technical skills without any risk to patients. Numerous studies have shown that physicians who receive surgical training via VR simulations improve dexterity and performance in the operating room significantly more than control groups. Through VR, medical students and novice surgeons have the ability to view and experience complex surgeries without stepping into the operating room.

In education VR is used to provide learners with a virtual environment where they can develop their skills without the real-world consequences of failing.

The first person who used VR for military training was Thomas A. Furness III in 1982, he presented the Air Force with a working model of his virtual flight simulator the Visually Coupled Airborne Systems Simulator (VCASS). Furthermore, his work was developed and modernized and then the United States military announced the Dismounted Soldier Training System in 2012. It was cited as the first fully-immersive military VR training system.

NASA has used VR technology for twenty years. Most notable is their use of immersive VR to train astronauts while they are still on Earth. Such applications of VR simulations include exposure to zero-gravity work environments and training on how to spacewalk. Astronauts can even simulate what it is like to work with tools in space while using low cost 3D printed mock up tools.

Also the VR is widely used in Uzbekistan. The publishing and digital market of Uzbekistan has taken a new step. A new project by Uzbek developers presents the possibility of a virtual trip across the country with a full immersion, thanks to panoramic photos and 360-degree video.

On the day of Independence of the country, the application "Uzbekneftegaz360" was launched. Its appearance in the markets of Apple and Google became possible within the framework of the project of the National Holding Company "Uzbekneftegaz" "Energy of Creation: The Latest History of the Oil and Gas Industry of Uzbekistan". In the course of the project, a collector's book was created that tells about the country's achievements in the oil and gas industry, as well as an innovative mobile application.

With the application, you can access more than 100 panoramic videos and photo files across the country. In addition to production and oil production reviews, the user

can also be acquainted with the social infrastructure, urban panoramas, social, cultural and sports facilities built in 25 years of Independence. The output of the project is not coincidentally timed to the jubilee date. Developers have put together an unaccustomed puzzle of modern Uzbekistan.

Photos for the application are made for the first time not with the help of traditional cameras, but with the newest photo and video cameras specially designed for 360-degree viewing. This allowed strengthening the «presence effect» and updating the very concept of panoramic photography. The material can be viewed both in the normal mode on smartphones and tablets, and in the "dive" mode using the Virtual Reality glasses (VR). Within the framework of the project, cardboard brands branded with the symbolism of the holding are also exclusively developed.

The application was an innovation not only for Uzbekistan, but for the region as a whole, and in the format of the country presentation in virtual reality - the first in the world. Until now, VR applications have been developed exclusively for advertising and commercial purposes, for example, based on orders from world automakers such as BMW, Mercedes-Benz and multinational companies.

Virtual reality (VR) or artificial reality is the world (objects and subjects) created by technical means and transmitted to a person through his senses: sight, hearing, smell, touch and others. Virtual reality simulates both impact and response to the impact.

Having created the application "Uzbekneftegaz360", the developers once again demonstrated the country's technological and innovative potential in this area.

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ICT IS BEGUN FROM THE STUDENT'S EVERYDAY LIFE

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Summary. *Making a little conclusion to the article we can say that every no how may have both positive and negative sides. The other point is your choice or your approach to it and the primary factor is to elicit maximum profit or benefit from each innovative appearance for example ICTs in your life.*

Keywords: *ICT, role, Net, refer, knowledge, benefit, information, study-process.*

Nowadays people even don't imagine their life without ICTs as they have already connected all their activities with its participation. We can meet ICT in everyday life of US. But we would like to focus your attention on children who already let ICTs close (deep) come into their life. With the help of parents' control ICTs' role in their children's everyday life, they can easily refer their interest to ICTs for useful, effective process of becoming students in future and planning their future profession and perspective career. In this case, we are going to analyses some areas, divisions of ICTs.

The digital divide is not the only area where there is a considerable public interest in the consequences of ICTs. As ICTs from the TV, through videos, games and computers to the Net have appeared, so there has been a history of concerns about the effects on children. Yet at the same time, some technologies have been perceived as holding out the promise of better options for future generations. At least they may change in the experience of children and youth, for example by affecting their degree of independence. [1, 2]

Of course, young generation is now more successful, more progressive, quicker smarter due to ICTs, than their parents, teachers, and the people surrounded them when they were children. Such changes happen not relatively but directly because of ICTs. Yet children are not simply passive in the whole process of getting moments with ICTs into their life.

Still the students now (who manage or succeed in referring their knowledge of ICTs for their benefit) have great chance and opportunities in getting degrees of bachelor or master's abroad, in any University they prefer and have appropriate knowledge and skills.

But the negative moments of ICTs are also existing. We can say it has such a great influence on youth that we may bravely call this moment an addiction: games with fatal final or attracting them to doubtable sessions and sections. But today's article we hope is about more positive existence of ICTs in students' life:

1) getting information, material for study-process;
2) sharing the skills and experience with students from universities all over the world;
3) in future with their peers;
4) passing exams, tests on line and getting certificates (IELTS, CEFR and others);
5) entering different Universities and studying there;
6) learning languages;

and many other opportunities.

It's up to us how to make work ICTs in our life in order to make it easier, more beneficial and more effective.

So let's do it together!

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IMPACT OF ICT ON HUMAN RESOURCE MANAGEMENT IN THE FUTURE OF UZBEKISTAN

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Summary. *The article deals with ICT development in Uzbekistan's human resource management and includes some beneficial information about Electronic Human Resource Management System.*

Key words: *HRIS, HRMS, IT, ICT, HRM, E recruiting, litigation, decision making, e benefit, HRD*

Leading management thinkers suggested that, "It is not technology, but the art of human and human management" that is continuing challenge for executives in the 21st century.

Many HR executives and managers are so busy taking care of their daily duties, which are generally administrative, that they neglect to consider important issues that are coming down the road. This is a trap that any department can fall into, but it can be especially devastating for Human Resource, which must battle decades of preconceived notions about the department's ability to contribute to corporate planning. Thus, today with an increase in the number of organizations, Human Resource is now viewed as a source of competitive advantage. It is necessary for firms to have highly skilled human capital to provide them with a competitive edge. So, an effective management of Human Resource in a firm is to gain advantage in the marketplace which requires timely and accurate information on current employees and potential employees in the labor market.

With the changing world and evolution of new technology, meeting this information requirement becomes important. Human Resource managers need to be aware that the change in technology will not only increase the quality of employee information, but also will have a strong effect on the overall effectiveness of the organization. To reduce the routine transaction and traditional Human Resource

activities and to deal with the complex transformational ones, the organizations began to electronically automate many of these processes by introducing specialized HRIS (human resource information system) or HRMS (human resource management system).

Human Resource Information System refers to the systems and processes at the intersection between HRM (human resource management) and information technology. It is a system used to acquire, store, manipulate, analyze, retrieve, and distribute information regarding organizations human resource. An integrated Human Resource Information System is a database shared by all Human Resource functions that provide common language and integrates all Human Resource services. Data base nuclear containing information about the competency is required of jobs and competencies of people by all Human Resource functions. It has been scientology proven that one of the supporting pillars which can contribute to the fulfillment of the personal policy is the usage of IT technologies in Human Resource. Information Communication Technology is spreading throughout every sector of the economy and has implications for almost every enterprise.

Information Technology (IT) as a structural factor and instrument transforms architect of organizations, business processes and communication and is increasingly integrated intoHuman Resource Management. While Information Technology has impacts on Human Resource at the same time managers, employees, customers and suppliers increase their expectancies for Human Resource functions. The importance of knowledge and human capital make extra suppression on Human Resource functions and new competencies for Human Resource professionals are expected. With the arrival of information technology, human resource management practices are changed.

Since the dawn of the information era, organizations are increasingly incorporating Information Communication Technology [ICT] in their work processes through different tools and techniques. With the evolution of Human Resource Management [HRM] from largely a maintenance function to a source of sustainable competitive advantage, it has become a challenge for Human Resource to transform from Human Resource to electronic Human Resource.

Human resource processes should be focused on the strategic objectives. These strategies are led to prepare an IT strategic plan that in turn translates into an appropriate human resource strategic plan in the field of IT. Human Resource managers are facing many challenges in present business scenario like Globalization workforce diversity, technological advances and changes in political and legal environment change in information technology. All these challenges increase the pressure on Human Resource managers to attract, retain and nurture talented employee.

Electronic Human Resource Management System (E-HRM) System as a web-based solution that takes advantage of the latest web application technology to deliver

an outline real-time human resource management solution. It is comprehensive but easy to use, feature-rich yet flexible enough to be tailored to your specific needs.

The purpose of the HRIS is to provide service, in the form of accurate and timely information, to the "clients" of the system. As there are a variety of potential users of HR information, it may be used for strategic, tactical, and operational decision making (e.g., to plan for needed employees in a merger); to avoid litigation (e.g., to identify discrimination problems in hiring); to evaluate programs, policies, or practices (e.g., to evaluate the effectiveness of a training program); and/or to support daily operations (e.g., to help managers monitor time and attendance of their employees). All these uses mean that there is a mandatory requirement that data and reports be accurate and timely and that the "client" can understand how to use the information. The main goals of E- HRM are as follows:

E-HRM is seen as offering the potential to improve services (e.g. e-recruiting, e-selection, pension management, e-benefit, e-compensation, storage of employee data) to Human Resource Department clients (both employees and management).

Improve efficiency and cost effectiveness within the Human Resource Department, and allow Human Resource to become a strategic partner in achieving organizational goals. Traditionally Human Resource goals have been broken into three categories; maintaining cost effectiveness, the enhancement of service for internal customers and addressing the tactics of the business.

With E-HRM there is a fourth goal added to the three categories and that is the improvement of global orientation of human resource management.

E-HRM also has relational impact for a business: enabling a company's employees and managers with the ability to access Human Resource information and increase the connectivity of all parts of the company and outside organs. This connectivity allows for communication on a geographic level to share information and create virtual teams.

And finally E-HRM creates standardization and with standardized procedures this can ensure that an organization remains complaint with Human Resource requirements, thus also ensuring more precise decision-making.

The e-HRM is useful in reducing the cost in the organization. e-HRM is using of information technology for both networking and supporting at least two individuals or more than two in their shared performing of Human Resource activities and practices. E-HRM is different from HRIS (Human resource information system) and Virtual Human Resource Management. E-HRM is mediated by information technologies to help the organization to acquire, develop, and deploy the intellectual capital. It is a web-based solution that uses the latest web based application technology it is online and real-time

Human Resource Management Solution is possible through e-HRM. The e-HRM technology provides a portal which enables managers, employees and Human Resource professionals to view extract or alter information which is necessary for managing the Human Resource of the organization and for making decisions quickly. The World Wide Web has helped modify many Human Resource processes including human resource planning, recruitment, selection, performance management, work flow, and compensation. These new systems have enabled Human Resource professionals to provide better service to all of their stakeholders (e.g., applicants, employees, managers), and it can reduce the administrative burden in the field. And it is very cost effective.

To sum up, E-HRM is a web-based tool to automate and support Human Resource process. The implementation of E-HRM is an opportunity to delegate the data entry to the employee. E-HRM facilitates the usage of Human Resource market place and offers more self-service to the employee. E-HRM is advance business solution which provides a complete on-line support in management of all processes activities, data and information required to manage human resource in a modern company. It is an efficient, reliable, easy to use tool, accessible to a broad group of different users. With the various advantages and little disadvantages it can be recommended that all the organs use E-HRM technology, that promises to provide a useful, efficient and increase performance through this E-Human Resource Management technology in spite of all barriers it has to face. E-HRM is a way to implementing Human Resource strategies, policies, and practices in organs through a conscious and directed support of and /or with the full use of web-technology based channels. It covers all aspects of Human Resource Management like personnel, administration, education and training, career development, corporate organization, job description, hiring process, employee's personal pages and annual interviews with employees. Therefore, E-HRM is a way of doing Human Resource Management.

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FUTURE OF UZBEKISTAN IN ICT

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Summary. *The following article deals with the development of Information Communication Technologies of Uzbekistan.*

Key words: *ICT, fiber-optic lines, video telephony, Internet TV, high speed internet, HD broadcast format TV, long-distance and local telephone exchanges, telecommunication networks*

Our great first President Islam Karimov said that in order to build the future, we need to know our past. So based on these words, let's try to remember what is it that has made our homeland in the years of its independence in the field of ICT?

The framework program for the development of national information and communication system of the Republic of Uzbekistan for 2013-2020 17 projects for the development of telecommunication technologies and communications infrastructure worth more than 2 trillion sums, as well as 30 projects for development of e-government framework and a set of data information systems are being implemented.

All trunk, zonal and inter-exchange forms of communication used fiber-optic lines, which is the result of the implementation of the telecommunications structure of advanced broadband technologies. Expanding the coverage area of such links can increase the range available on the market of ICT services, improve the quality of service for video telephony, Internet TV, high speed internet, HD broadcast format TV.

Along with this, now we implemented digital technology on all long-distance and local telephone exchanges, telecommunication networks are reconstructed, the level of development, which meets the requirements of our time. Dramatically expanded Internet access channel, increase the speed. This, in turn, allowed for the last five years, more than six times lower prices offered by operators and channel providers.

Strengthening the capacity of high-speed Internet helped pad in 2015 on the territory of the country, more than 1,800 kilometers of fiber-optic lines. To date, the length of these lines is about 18 thousand kilometers in the Republic, which significantly increased the quality of broadband Internet access service provision. Launched DWDM communication network standard capable of transmitting up to 100 Gb of data per second. This network, which provides conduction growth backbone networks and the introduction of high-speed Internet services, is the first in Central Asia, the telecommunications system having a high-speed.

Rapidly expanding mobile network. If 10-15 years ago, we used it only for negotiations, but today this modern form of communication helps to get the latest information through the media, to correspond, communicate, including photos and video. Over the past 10 years the number of mobile subscribers increased by 7.5 times. Today, operators are establishing a network of its fourth generation, which will further expand the range of telecommunications services, improving access to high speed internet.

All of the above I want to add that in the future smart homes will be created with the help of ICT and their ubiquitous association in a single centralized system. And to ensure the safety of the population of our country, at the expense of online monitoring and surveillance - will create facial recognition database. And vehicles are installed GPS tracking sensors for the purpose of traffic safety and control.

For law enforcement officers to protect the citizens will be available quadrocopters. That will transmit information about the situation and the situation on the streets of our country. With their help, be possible early detection - fires, fights, fights, illegal collection of people in the squares. That in turn will inform the various ministries, and will help to prevent unnecessary sacrifices and devastating consequences.

Due to the rapid development of ICT and mobile technology in our country, will be available in the future technology of the fifth generation of mobile systems. The data transfer speed through 5G will reach more than 10 Gbit / s, which will enable services such as:

- Ultra Mobile Broadband (Extreme Mobile Broadband, xMBB) - the realization of ultra broadband to transmit "heavy" content;
- Mass inter-machine communication (Massive Machine-Type Communications, mMTC) - support for Internet of Things (ultra narrowband connection);
- Ultra reliable inter-machine communication (Ultra-reliable MTC, uMTC) - providing a special class of services with very low latency.

Speaking about the future of Uzbekistan in the field of ICT, I want to note how things have changed in the educational institutions and gaining knowledge in general. in one of the largest universities - the Tashkent Technical University - on the basis of faculty "Computer technology" and "Electronics and Automation", the Institute of Computer and Information Technology (CITI). Training of qualified personnel for this sphere will be conducted in collaboration with the Technical University of Hamburg-Harburg (Germany), Aalborg (Denmark), Twenty (Netherlands).

Creating a new institution in the country is seen as an experiment, conducted in the framework of the planned measures by the Government on the development of computer and information technologies for 2001-2005 years. In accordance with the government decision of Tashkent University of Information Technologies (formerly the Institute of Communications) beginning with the 2002/2003 academic year began to prepare professionals in the field of software development, network technology, mobile telephone communications, as well as e-commerce and information security. In addition, training services for computer and information technologies, the implementation of software and services for their services are exempt from value added tax until January 1, 2006. "

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ICT Development in Uzbekistan

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Summary: *From the first days of independence, Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society.*

Keywords: *information and communications technologies, fiber-optic cables, fourth generation network, broadband, national market of software products, electronic proceedings.*

Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy.

The basis for development of ICT in Uzbekistan is the telecommunications infrastructure.

The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services.

Over the past 20 years in many regions of the country more than 2,000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high-speed Internet, watching HDTV-channels and others. Due to the measures taken in 2015, the overall rate of use of international information networks increased by 42.3% compared to 2014 and amounted to 15.5 Gb/s.

Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT.

The high development rates of national Internet segment should be separately noted. Uzbekistan has 10.2 million web users. According to UZINFOCOM center, in January 2016 the number of websites in the UZ zone exceeded 25 thousand, while growth totaled more than 30% compared to same period of last year.

The use of ICT and software products in the management and production processes plays a major role in the development of sectors of the economy and the domestic industry. For instance, in 2014-2015 in the framework of a special state program 86 projects have been realized in order to introduce information systems in large joint-stock companies, associations and organizations totaling more than 330 billion sums.

Particular attention is paid to development of national market of software products.

In 2014-2015 Program of development of broadband access networks on Wi-Fi technology has been implemented successfully in the Republic of Uzbekistan. As a result of comprehensive measures at airports, railway stations, places of frequent-stay travelers, parks, shopping malls and other public places of the capital and each administrative center of republic Wi-Fi points have been created.

A consistent work on formation of "Electronic government" is carried out in the country. The activity of the Governmental portal of the Republic of Uzbekistan (gov.uz) and the single portal of interactive state services (SPISS), located on the Internet at my.gov.uz, has been established.

Information system E-Sud for electronic proceedings is functioning effectively since 2004. Through its implementation, procedures such as keeping registration books, document management within court, direction of judicial notifications and procedural acts, familiarization of sides with case are completely automated now.

All educational institutions of the republic are connected to ZiyoNET network, which is functioning since 2005.

In the library of portal, which was updated in 2014, has more than 75 thousand units of informative-educational resources, including textbooks, dissertations, research papers and others.

The country regularly hosts major events dedicated to the development of hi-tech industry.

In particular, Week of information and communication technologies ICTWeek Uzbekistan is being held since 2004. Traditionally it is opened with national exhibition of information technologies ICTExpo, which takes place once in two cities - Tashkent and Samarkand. The exhibition presents existing and future forms of ICT-based services, oriented to business community and authorities, and general population. Among the important events of the week - The Forum for Information and Communication Technologies ICTForum, wh ere representatives of leading companies, industry experts and foreign experts discuss state and prospects of progress in this sphere.

As part of the week conferences BestSoft Uzbekistan are also being held, during which they demonstrate the latest achievements of software developers, and e-Government

Uzbekistan dedicated to the strategic objectives in the field of "e-government", results of implemented projects, exchange of experience and ideas in this direction.

Thus, the domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.

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ICT AS A CARDINAL COMPONENT OF NATIONAL PROGRESS

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Summary. *This article reveals the last and subsequent processes of technological revolution of Uzbekistan in some areas.*

Key words: *Information and communication, modernization, necessary information, development, IT-industry, internet.*

From the first days of independence Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society. Over a short period the authorities created the legal framework conducive to further formation and progress of market of IT-technologies.

In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. President's Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21, 2012 and "On further development of computerization and introduction of information and communication technologies" dated May 30, 2002, became important documents in this direction.

At present the Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented. This program was approved by President's Resolution dated June 27, 2013.

Making a statement at enlarged meeting of the Cabinet of Ministers dedicated to the socio-economic development in 2015 and the most important priorities of economic program

for 2016, President Islam Karimov noted that in today's conditions in the era of Internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation of system "Electronic government" are of priority significance. As the head of our state underlined, development of ICT has a direct impact on the level of competitiveness of the country, allows you to collect and summarize vast amounts of information, offers great opportunities for management at strategic level.

The task of regular improving of the governance, strengthening the capacity of IT-industry was entrusted to the Ministry for development of information technologies and communications, created by the Resolution of the Head of our state dated February 4, 2015. In addition, since 2002 a Centre for development and introduction of computer and information technologies UZINFOCOM operates, which assists in the development and implementation of national programs of computerization and introduction of ICT in all sectors of public administration, economic and social spheres.

Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy.

The basis for development of ICT in Uzbekistan is the telecommunications infrastructure.

The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services. Over the past 20 years in many regions of the country more than 2,000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high-speed Internet, watching HDTV-channels and others. Due to the measures taken in 2015, the overall rate of use of international information networks increased by 42.3% compared to 2014 and amounted to 15.5 Gb/s.

Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT.

In 2014-2015 Program of development of broadband access networks on Wi-Fi technology has been implemented successfully in the Republic of Uzbekistan. As a result of comprehensive measures at airports, railway stations, places of frequent-stay travelers, parks, shopping malls and other public places of the capital and each administrative center of republic Wi-Fi points have been created.

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The use of ICT and software products in the management and production processes plays a major role in the development of sectors of the economy and the domestic industry. For instance, in 2014-2015 in the framework of a special state program 86 projects have been realized in order to introduce information systems in large joint-stock companies, associations and organizations totaling more than 330 billion sums.

In order to stimulate domestic programmers the National register of software developers has been created, which already included 69 companies. A directory of software manufacturers Software.uz has been developed that provides necessary information to citizens and businesses.

According to the Resolution of the President of the Republic of Uzbekistan "On measures to further strengthen the incentives of domestic software developers" dated September 20, 2013 new benefits and preferences for members of software industry were introduced. Thus, they are exempt from customs duties for imported equipment for their own use, components, parts, technical documentation and software until January 1, 2017. It is known that interactive public services are of particular importance in protection of human rights and freedoms, saving time and expenditures for obtaining necessary information and services.

A consistent work on formation of "Electronic government" is carried out in the country. The activity of the Governmental portal of the Republic of Uzbekistan (gov.uz) and the The single portal of interactive state services (SPISS), located on the Internet at my.gov.uz, has been established.

Functional of SPISS expands dynamically, 235 kinds of interactive services are being rendered through it. Over the past five years this system received in total more than 200 thousand electronic applications of citizens and businessmen. Making an online appointment with the heads of government agencies, receipt of information on their activities, various inquiries and sending requests became popular. In January 2015, the portal has launched a new system for discussion of draft legal acts related to business activities, and evaluation of existing documents. To date, 80 draft laws have been discussed through this system, 9 of them have been improved taking into account the opinions of citizens. At this time, the discussion of more than 20 legal acts continues.

Information system E-Court for electronic proceedings is functioning effectively since 2004. Through its implementation, procedures such as keeping registration books, document management within court, direction of judicial notifications and procedural acts, familiarization of sides with case are completely automated now.

All educational institutions of the republic are connected to ZiyoNET network, which is functioning since 2005.

In the library of portal, which was updated in 2014, has more than 75 thousand units of informative-educational resources, including textbooks, dissertations, research papers and others.

As part of implementation of resolution of Head of our state "On measures on further improvement of foreign language learning system" dated December 10, 2012, "Foreign Languages" section has been created on ZiyoNET, which includes over four thousand materials such as textbooks, interactive lessons, games, relevant video and audio. The country regularly hosts major events dedicated to the development of hi-tech industry.

In particular, Week of information and communication technologies ICTWeek Uzbekistan is being held since 2004. Traditionally it is opened with national exhibition of information technologies ICTExpo, which takes place once in two cities - Tashkent and Samarkand. The exhibition presents existing and future forms of ICT-based services, oriented to business community and authorities, and general population. Among the important events of the week - The Forum for Information and Communication Technologies ICTForum, wh ere representatives of leading companies, industry experts and foreign experts discuss state and prospects of progress in this sphere.

As part of the week conferences BestSoft Uzbekistan are also being held, during which they demonstrate the latest achievements of software developers, and e-Government Uzbekistan dedicated to the strategic objectives in the field of "e-government", results of implemented projects, exchange of experience and ideas in this direction.

Training of personnel in the development of ICT sector is topical.

Currently, major domestic centers of integration of education, science and industry - Tashkent State Technical University (TSTU) and Tashkent University of Information Technologies (TUIT) - train specialists in technical direction and for IT sector. In 2013, TUIT opened two new master's direction - management of the system "Electronic Government", and library science. At the same time, these universities carry out scientific research on the basis of active cooperation with leading industrial enterprises of the country.

From October 1, 2014 the branch of the prestigious South Korean INHA University began its activity in Tashkent. Professionals in areas such as computer and software engineering, computer network engineering are trained here. Thus, the domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.

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ICT AND UZBEKISTAN: TODAY AND TOMORROW

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Summary. *Since our independence, our motherland has made a huge progress, especially in ICT. This progress took place in economics, politics, and of course in technology, by the leadership of government and its laws. They are simultaneously altered with the process going on the world, stemming from globalization. It cannot be imagined without the role of internet. Analyzing pros and cons of internet, this article aims to propose a new national youth site.*

Key words: *legal framework, "Electronic government", IT industry, high-tech, media, information, communication, social sites.*

Throughout history, mankind has come up with ample numbers of alterations, upgrading lifestyle, broadening people`s horizons, enriching their outlook. The previous century reached many goals that simplified our life, technology entered daily routine in a great dial. Yet, how was its introduction in our motherland, what kind of features it has and what we are expecting in future in the field of information and communication technology? This article is directed to search possible answers to the aforementioned.

Without a shadow of doubt, there is nothing more complex than starting something from scratch in this green planet. Thus, it is vital to recall personnel who foremost dared at introducing us new era, and opened the doors of globalization. Every time when I deem about it, our first leader appears in my mind. From the first days of independence and on Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all fields of life of state and society. Over a short period of time, the legal framework was created conducive to further formation and progress of market of IT-technologies. In particular, in 1992 the Law "On telecommunications" was adopted,

which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. President`s Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21, 2012 and "On further development of computerization and introduction of information and communication technologies" dated May 30, 2002 became important documents in this direction.

Currently, the Complex program of development of National information and communication system of the republic of Uzbekistan for 2013-2020 is being implemented. This program was approved by President`s Resolution dated June 27, 2013.

Making a statement at enlarged meeting of the cabinet of Ministers that is dedicated to the socio-economic development in 2015 and the most important priorities of economic program for 2016, first President Islam Karimov noted that in today`s conditions in the era of internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation of system "Electronic government" are of priority significance. As the first leader of our state underlined, development of ICT has a direct impact on the level of competitiveness of the country, allows you to collect and summarize vast amounts of information, offers great opportunities for management at strategic level.

The task of regular improving of the governance, strengthening the capacity of IT-industry was entrusted to the Ministry for development of information technologies and communications, created by the Resolution of the Head of our state dated February 4, 2015.

Over the past years, the country carried out systematic work on development of internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy. All of these technologies enable internet users in Uzbekistan to expand their usual ability to work with ICT.

Thus, following this pattern, there is an essential consideration arising: what is Uzbekistan expecting in the future? Prior to get an exact hypothesis, current statistical data should be analyzed. In fact, in 2000 only a tiny amount of Uzbekistan`s population, namely 0.1% accessed to the internet. However, this pattern kept a dramatic growth, reaching 30.2% in 2012. According to the last numbers, in the beginning of 2016, approximately 53% population used the World Wide Web, meaning that majority are connected wirelessly to it.

From the statistical deductions, currently global internet is lifting new grade, meaning that global internet traffic is going to account for more than 1 zeta bite. According to Cisco experts, this figure will increase twice in 2019. Guesses made it clear that after 3 years, the normal volume of accepting data for one person throughout the world will be 18 Gb, that`s twice as much as the figure in 2014. It is remarkable to

note that almost 66% traffic is shared via wireless network. Added to, in our planet the number of devices connected to internet is expected to double by 2019. As a result the "consumption" of traffic will undoubtedly surge.

On the other hand, we have to take the drawbacks of such progress into account, as everything has its pros and cons. It means that the internet serves simultaneously for best as well as worst. Through it, various data is accessible, even some of them find users automatically and independently. It is clear by considering the game of "Blue whale" as a drop of ocean! This problem is going to take more serious color coupled with the increase in the number of internet users, specifically in Uzbekistan. So, how we can solve it? Surprisingly the answer is given earlier by our first president that we should struggle against idea with idea, against thought with thought, against ignorance with education! Indeed, I offer to create a site involving all youngsters of Uzbekistan in one group.

Origin. When I read about the origin of social site "Facebook", its original aim was to connect students of two universities, for educational purposes. Now it become enough popular, but it has become to serve more for fun than for science, for the lack of hard and tough rules. Therefore the site I am offering does not repeat these faults.

Main target. This site is created for sharing media, recreational facilities which are analyzed and controlled by administrator. They are controlled for users` and government`s safety. Furthermore, each user is registered by entering their personal data, in order to be sorted by social groups. According to their group, suitable information is send firstly, but it is optional to have all data. Moreover, users can create programs e.g. charity, hasher as well as ask a favor of others. The foremost purpose is to unite all Uzbek young people.

In a nutshell, I feel a great confession in depth that I am grateful to God for living in heaven. In my humble opinion, it is my responsibility to protect Uzbekistan and to make it outstanding. In this politically complex world, we must reach our goals, without losing our originality.

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ICT AN IMPORTANT FACTOR OF NATIONAL PROGRESS IN UZBEKISTAN

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Summary. *This article is devoted to the issue of implementing ICT into national progress of our country.*

Key words*: industry, joint ventures, ICT, Uzbekistan, development, information technologies, national progress*

The domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, and Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.

From the first days of independence Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society.

Over a short period the authorities created the legal framework conducive to further formation and progress of market of IT-technologies. In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. President's Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21, 2012 and "On further development of computerization and introduction of information and communication technologies," dated May 30, 2002, became important documents in this direction.

At present, the Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented. This program was approved by President's Resolution dated June 27, 2013.Making a statement at enlarged meeting of the Cabinet of Ministers dedicated to the socio-economic development in 2015 and the most important priorities of economic program for 2016, President Islam Karimov noted that in today's conditions in the era of Internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation of system "Electronic government" are of priority significance. As the head of our state underlined, development of ICT has a direct impact on the level of competitiveness of the country, allows you to collect and summarize vast amounts of information, offers great opportunities for management at strategic level.

The task of regular improving of the governance, strengthening the capacity of IT-industry was entrusted to the Ministry for development of information technologies and communications, created by the Resolution of the Head of our state dated February 4, 2015. In addition, since 2002 a Centre for development and introduction of computer and information technologies UZINFOCOM operates, which assists in the development

and implementation of national programs of computerization and introduction of ICT in all sectors of public administration, economic and social spheres. Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy.

The basis for development of ICT in Uzbekistan is the telecommunications infrastructure. The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services. Over the past 20 years in many regions of the country more than 2,000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high-speed Internet, watching HDTV-channels and others. Due to the measures taken in 2015, the overall rate of use of international information networks increased by 42.3% compared to 2014 and amounted to 15.5 Gb/s.

Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business.

Currently, major domestic centers of integration of education, science and industry - Tashkent State Technical University (TSTU) and Tashkent University of Information Technologies (TUIT) - train specialists in technical direction and for IT sector. In 2013, TUIT opened two new master's direction - management of the system "Electronic Government", and library science. At the same time, these universities carry out scientific research on the basis of active cooperation with leading industrial enterprises of the country

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THE ICT IN UZBEKISTAN AT PRESENT AND IN FUTURE

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***Summary:** This article is devoted to the issues of present condition and future of ICT in Uzbekistan is being considered.*

***Key words:** development, mobile broadband access, video telephony, national Internet, multimedia services, software products.*

From the early days of independence Uzbekistan has paid great attention to the development of information and communication technologies and their wide application in all spheres of life of state and society.

The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services.

Over the past 20 years in many regions of the country more than 2,000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high-speed Internet, watching HDTV-channels and others. Due to the measures taken in 2015, the overall rate of use of international information networks increased by 42.3% compared to 2014 and amounted to 15.5 Gb/s.

Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT.[1]

In 2014-2015 Program of development of broadband access networks on Wi-Fi technology has been implemented successfully in the Republic of Uzbekistan. As a result of comprehensive measures at airports, railway stations, places of frequent-stay travelers, parks, shopping malls and other public places of the capital and each administrative center of republic Wi-Fi points have been created.

The high development rates of national Internet segment should be separately noted. Uzbekistan has 10.2 million web users. According to UZINFOCOM center, in January 2016 the number of websites in the UZ zone exceeded 25 thousand, while growth totaled more than 30% compared to same period of last year.

The use of ICT and software products in the management and production processes plays a major role in the development of sectors of the economy and the domestic industry. For instance, in 2014-2015 in the framework of a special state

program 86 projects have been realized in order to introduce information systems in large joint-stock companies, associations and organizations totaling more than 330 billion sums.

Significant measures on developing information and communication technologies are taken for the last few years in our Republic.[2]

Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented.

According to the Resolution, the Tashkent University of Information Technologies has been named after Muhammad al-Khorazmiy, and from the academic year 2017/2018 it is planned to carry out activities related to the study of the priceless legacy of our great ancestor. It is quite symbolic that modern achievements in mathematics, geometry, trigonometry, geography, information and communication technologies confirm the inviolability of the solid scientific basis founded by Muhammad al-Khorazmiy. To provide reliable links between science, production and education in the field of information and communication technologies, the leading sectors of the economy, the special significance is placed on the organization and conduct of traditional scientific and practical conferences of the republican and international levels, the establishment of a scholarship named after Muhammad al-Khorazmiy for gifted university students. Well-known scientific figures will be actively involved in holding these events. Electronic resources of the university will also advance. In them there will be installed the tasks of competitions and Olympiads conducted among students, in particular, on the creation of software products, the development of modern educational literature in such areas as mathematical modeling, algorithmization, cryptology, computer and software engineering, telecommunications, television technologies and information security, the creation of multimedia versions of educational literature for free use by students, scientists and teachers. The Center for the Development of Software Products and Hardware and Software Complexes at the University will be transformed into the Scientific and Innovation Center of Information and Communication Technologies at TUIT. The main task of the Scientific and Innovation Center of Information and Communication Technologies was the elaboration of high-quality domestic software products that are competitive on the domestic and foreign markets, taking into account the real needs of the leading fields and sectors of the economy of the country with the involvement of students of the Al-Khorazmiy Tashkent University of Information Technologies. In accordance with the Resolution, the Center provides for a systematic and scientific analysis for the automation of business processes and other areas, management, production based on the requests of the leading networks of the economy sectors of the republic, as well as the creation of mechanisms for the implementation and development of their models and algorithms. One of the essential aspects of the adopted resolution is the organization of the Foundation for Scientific and Innovation Development at the University. It will

provide covering the cost of creating and publishing textbooks and scientific literature for TUIT, including the acquisition of foreign literature, as well as scholarships for Muhammad al-Khorazmiy for talented students and financial support for the publication of the scientific journal «Muhammad al-Khorazmiy Avlodlari». On the expenses of the fund there will be financed the research and development works of the university and the Center in the field of information and communication technologies development, provision of their scientific and training laboratories with modern equipment, necessary consumables and accessories on a competitive basis. The Foundation will also prepare, retrain and upgrade the skills of gifted students, faculty and young researchers in leading foreign higher educational institutions and research centers. The attraction of highly qualified specialists and scientists for teaching at the university and conducting scientific researches at the Center will level up to the priority.

A consistent work on formation of "Electronic government" is carried out in the country. The activity of the Governmental portal of the Republic of Uzbekistan (gov.uz) and the single portal of interactive state services (SPISS), located on the Internet at my.gov.uz, has been established.[3]

Functional of SPISS expands dynamically, 235 kinds of interactive services are being rendered through it. Over the past five years this system received in total more than 200 thousand electronic applications of citizens and businessmen. Making an online appointment with the heads of government agencies, receipt of information on their activities, various inquiries and sending requests became popular. In January 2015, the portal has launched a new system for discussion of draft legal acts related to business activities, and evaluation of existing documents. To date, 80 draft laws have been discussed through this system, 9 of them have been improved taking into account the opinions of citizens. At this time, the discussion of more than 20 legal acts continues.

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CHALLENGES OF ICT IN ENGLISH LEARNING

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Summary: *The role and challenges of ICT in learning English are described in the article. The importance of enhanced language learning is mentioned here. The implementation of technology-supported learning is shown as well.*

Key words: *ICT, prospects in English, globalized World, innovations, created programs, enhanced language learning, interactive, integrated, self-study, technology, flexible, changing, real-life needs.*

Information and Communication Technology (ICT) opens great prospects in learning the English language. And , there are new expectations for students: beyond basic skills, they need proficiency in collaboration, communication, and information management – all 21st century skills –, and access to the learning tools that put these skills within reach.

New information technologies provide more complete and accurate information on subject matter that facilitate the training quality improvement .That said, the present curriculum should still provide students with a very sound basis for informed and reflective practice in all areas of ICT and education**.**

We are witnessing the development of Information Technology (IT) in the globalized World, with fast steps beyond anyone could have imagined. **O**ur life becomes more and more difficult because of excessive information technologies. We must keep huge amount of information in our brain. But at the same time those information technologies help us to make life easier. Nowadays we can use many programs that can help students to remember all information they need. We, the group of students can offer the program named as "Virtual tutor ", it is a very useful recourse for those, who are preparing for taking IELTS. All necessary information on topic – related materials, home tasks, explanations, glossary, dictionary and the virtual teacher itself are included into this program. It is a convenient application, as it can be updated automatically .IT is everywhere we are, and it serves us. The creation of language learning programs could further substantiate the link between Information and Communication Technology rich environment and improved English learning. The design and implementation of technology-supported learning are addressed at a variety of levels and provide a degree of direct practical experience.

Computers have been used in learning process since the 1980s, and now it has become a precondition to the development of the education. At the beginning of the 21st century totally new innovations in studying are being introduced. Different virtual learning environments emphasize the active and responsible role of the students themselves. Information search and taking control of already collected information requires students to act in a flexible and responsible way. To make this interaction between students and information work as efficiently as possible, technical and pedagogic support is needed such as:

- Multimedia studio: digital video, image and sound processing, desktop publishing -programs and multimedia programming

- Classroom mainly for studying using different software

- Study classroom and accommodation for independent study, individually or in groups

- Videoconferencing

- Creating motivation in the virtual classroom: tools, techniques and observations in learning English using the web.

The World Wide Web offers an enormous resource for learners in all fields of knowledge, not least of all in language learning. The possibilities for creating web-based materials with a high-educational content to be incorporated within the Internet or intranet site are endless. In addition, of course, learners should concentrate on the choice of materials downloaded from the Internet, which once analyzed and elaborated, have formed the basis of original self-learning activities devised ad hoc and incorporated within newly created programs.

A number of language and imaging tools (spelling and agreement checkers, speech recognition tools) have been incorporated in the process of learning. These tools can be used to foster more effective learning of lexical and grammatical knowledge and more efficient language practice, by means of reading and writing aids. To achieve these goals, the program provides the necessary tools and resources, in order to encourage the users' active participation and involve them in the language learning challenge. This study will also investigate the feasibility and efficacy of such an environment, provide predictions, and create new pathways for more research within the fields of technology and web enhanced language learning and environment design.

The primary objective is to increase the amount of class time available for communicative activities, while enhancing the amount and quality of student participation in such activities. It is very important to transfer various traditional activities, such as text reading and reproductive drills, from the classroom to student self-study on computers. The computer assisted language learning materials also provide students with additional language and cultural input and interactive practice activities, as well as resources to help them gather information and prepare for communicative activities. Moreover, annually several groups of students and their

teachers create materials for various types of courses, including four integrated skills: reading, writing, listening and speaking. Samples of created materials such as multimedia programs for students with majors in IT and Telecommunications are usually collected and presented at conferences and innovation fairs. It is a very good tradition to hold students' conference at TUIT every year , as such kind of conferences teach students the fundamental skills of using English in academic writing, analytical response, synthesis, using sources as evidence, and referencing of sources.

Learning English via technology is ideal preparation for students, it helps those who hope to use English in their work to develop vital higher-level skills in the English language which will likely be required in their future workplace.

Summing up, it can be said that new technology can be integrated with dynamics of conventional methodologies and instructional practices. It can inject an element of vitality into learning and motivate students as they communicate in a medium that is flexible, constantly changing and connected to their real-life needs.

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VIRTUAL REALITY IN EDUCATION

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Summary. *Article is devoted to philosophical judgment of the virtual technologies in the modern educational system, which introduce new forms and methods of teaching and submission of information. Education in the 21st century shall develop on the virtual model to which synergy, dialogical and communicative aspects are peculiar. The principal advantage of new model – visualization and a possibility of visualization.*

Key words: *virtual reality, visualization, educational institutions, environment, information society, virtual technologies, education reform*

Transition from industrial to information society involves also cardinal changes in education. Constantly developing scientific and production technologies, integration of education, science and innovative activities result in need to enhance the professional

level. In education, because of rapid development of computer technologies, the new prospects of implementation of ICT in educational process open.

It is proved on experience: complete involvement in educational process increases motivation and progress in knowledge acquisition. Observation for the most realistic picture stimulates brain activities. And it means that with VR technologies we move to qualitatively new level of information processing

Virtual reality - the technology of human-computer interaction providing "immersion" of the user in the three-dimensional (3D) interactive environment of the studied phenomenon (process) with a possibility of natural interaction with objects (artificial and/or real) in the virtual environment.

The scope of technology of virtual reality in education can be presented as follows:

– visualization of difficult objects, models of engineering constructions, physical phenomena;

– organization of intersubjective integration and network interaction of educational institutions;

– carrying out teleconferences, videoconferences, educational broadcasting;

– creation of 3D electronic educational resources;

– creation of the virtual museums, lecture halls, laboratories and practical works.

For example, the hardware and software is set in one of offices of educational institution where training will be provided. At the same time authors can physically be in other cities and the countries. Operation over the general project becomes possible thanks to network interaction. Similar experimental laboratories are already actively used in many educational institutions.

It is possible to allocate several distinctive opportunities of virtual technologies in education:

– possibility of an intensification of educational process; activation of cognitive activity of students; significant increase in level of independent activities;

– development of creative capabilities, logical thinking, memory;

– virtual technologies allow to realize the ideas of individual and differential approach in training process;

– fundamentalizations of subject preparation, due to formal and logical reflection of causes and effect relationships of functioning of objects in virtual models promote;

– development of procedural knowledge that implies not only knowledge of the theory, but also its use in practice; are an effective remedy for working off of skills in various situations which are possible in future professional activity.

Important are special applications. One of the best for education call VR Cardboard. Development consists of the list of images from various fields of

knowledge: mathematics and biology, anatomy and stories, engineering and architecture. Its uniqueness that division of the screen is possible on two parts what will allow the student to see the volume image from various foreshortenings, having twisted for this purpose the head.

New opportunities for informal training are provided in the virtual world of Second Life numbering more than 20 million users. Immersion on 3D Wednesday allows users to communicate, communicate and move in space.

The lack of virtual reality is that the user in general is completely excluded from reality, turning into an element of the world of computer illusions for which there are no restrictions that leads to deserialization, a dehumanization of human essence. It can be avoided using technology of the augmented reality allowing combining the real world and the virtual, created by the computer objects

Virtual technologies, virtual reality as sociocultural phenomenon, is important means of cognitive activity which influences the mental world, culture and spirituality of the identity of the third millennium.

Education reform, thanks to new bio information, virtual technologies, will allow bringing forming of intelligence, and development of creativity in students in information society. But already today, at the first stages of development of virtual technologies it is necessary to deliver them under social and moral control. Understanding of the place and a role in the society of new educational strategy and virtual and bio information technologies will lead to reducing the period of training of students, education content change.

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IMPLEMENTATION OF ICT IN DIFFERENT SPHERES OF UZBEKISTAN

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Summary: *A marvelous changing in the sphere Information and Communication Technology, its influence on every field of life is widely described in this article. Furthermore, comprehensive development of information and communication technologies and their wide application in all spheres of state life and society are considered in it.*

Key words: *pad, mobile phone, colour touch screen, smart phone, technology, communication, device, virtual, 4G LTE,*

Information and Communication Technology is a marvelous changing force in 21st century. Technology has its influence and reshaped every field of life. ICT has changed our life a lot nowadays and it is still developing. From black and white number pad mobile phone to colour touch screen smart phone, from national map book to online portable map, from having a talk with a friend by visiting to simply sending a text message for a talk. All these changes show the rapid development has been made throughout the years. The most significant change on ICT probably is mobile phone. People used to have to carry a heavy landline phone with them when they go out, because it was the only communication device available to them. As the technology slowly changing, human invented mobile phone which is a smaller, lighter size of a landline phone.

At the present time, one cannot do anything without such gadgets as mobile phones, computers and other electronic devices, because of the fact that information and communication technology is being used in variety of ways to promote productivity, communication and business among other things. No one can deny that technology has provided routine tools of all people's life. ICT has become an indispensable part of one's lifestyle. A person who is not technology savvy is a rarity in today's fast paced globalized era. The one thing that is driving the information technology to take leaps and bounds is communication. Communication has never been easier. Information technology is penetrating even rural areas and people are becoming technologically savvy throughout. Communication facilitated on a real time basis and the future is all about the virtual world.

Collaborative development will be highly dominant in the future with customers and companies teaming up to create more specialized and personalized solutions. Level

of access to ICT resources will determine the withstanding and competence of the companies.

Collaboration and data flexibility will be the highlights as a scalable and dynamic infrastructure will breakthrough traditional enterprise architecture. Cloud computing is the future of information technology which has been stated time and again and is making major breakthroughs. Cloud infrastructures will make it possible to offer secure extranets that organizations will be able to leverage securely and also facilitate more specialized services which will act as catalyst for efficiency. From the first days of independence, Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society. Over a short period the authorities created the legal framework conductive to further formation and progress of IT-technologies.

At present, the complex program of development of National information and communication system of the Republic of Uzbekistan is being implemented. It is said that in today's conditions in the era of Internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation of system "Electronic government" are of priority significance. Development of ICT has a direct impact on the level of competitiveness of the country, allows people to collect and summarize vast amounts of information, and offers great opportunities for management at strategic level. Over the past years, the country carried out systematic work on development of internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy.

Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video steaming and high-quality photos, use online applications in education purposes and fore business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT.

Scientists predict that in the nearest future it will be possible to smell a new perfume using the internet and watch 3D scenes at home like we do in the movie theater. According to forecasts machines will replace jobs of cashiers, and civil and military pilots. Some corporations in Japan are already selling housewife-robots, to keep their homes clean.

Key drivers in the development of ICT itself, include future network technology such as 5G, Internet of Things, Sensor Networks at the communication layer and Cloud Computing at the information-processing layer such as Software as a Service and Big Data Processing and Analytics. The main challenge here is to deal with the huge amounts of heterogeneous data both from a communication as well as an information processing perspective. When it comes to the application of ICT in various domains,

we see huge disruptions occurring both now and in the future in domains such as social networks, healthcare, energy, production, urban life, and mobility. Here the main challenge is to find a blending that simultaneously drives economic growth and quality of life. There are many domain-specific technical challenges, such as sensor technology for continuous health monitoring, cyber-physical systems for the industrial internet, 3D-printing, smart-grids for energy supply, tracking and tracing solutions for mobility. Social, economic, and legal challenges are keys to successful innovation in this area.

More items will move from physical to virtual. Today, we download e-books and movies, rater than bound books and DVDs. A technology called 3D printing will allow us to instantly manufacture any physical item, from food to bicycles, using printer technology.

Different technologies might help us unlock the solutions to some of the biggest social challenges we currently grapple with. The ICT underpinning these technologies, in consort with the transformational power of big data, could support smart systems that will help tackle climate challenges. Connected homes, factories and farms leveraging smart energy management systems could mean dramatically lower energy use, which would contribute to the DE carbonation of our economies.

In Uzbekistan, people say that the future belongs to the younger generation. This phrase has a lot of sense and truth. Our government pays special attention to the support and development of young talents and professionals of the ICT sector.

There are different opening companies, organizations and academies whose goal is to prepare high-level professionals and experts in important areas such as information security, network development and information and communication technologies.

Such kind of organizations and companies actively promote the idea of cloud technology, the development of broadband access, solutions for safe cities, the digitization of Uzbekistan and the development of data centers. The development of these technologies and solutions in the country will help to lift such areas as: E-education, E-commerce, and E-health and, of course, E-government. The creation and development of these platforms will be directly connected with the development of economic potential of Uzbekistan and well-being of the population, as the worldwide ICT development is directly linked to GDP growth.

To sum up, I would like to say that people should continue to learn and develop ICT, but they must do it wisely. Moreover, we should do everything possible to develop Information technologies, which will contribute to improving the lives and well-being of this beautiful country as Uzbekistan.

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ABOUT COMPUTER ENGINEERING AND INFORMATION TECHNOLOGY

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Summary. *This text is about Computer engineering and Information Technology. The information about software and hardware of computer is given. Some words about mobile computing and Web designing are mentioned in this text.*

Key words: *Technology, Engineering, Communication System, Information Technology, Computer Science, Software, Hardware.*

Computer engineering and Information Technology is a peer-reviewed scholarly journal and aims to publish the most complete and reliable source of information on the discoveries and current developments in the mode of original articles, review articles, case reports, short communications. In all major themes pertaining to advances in Computer Engineering and making them available online freely without any restrictions or any other subscriptions to researchers worldwide.

Journal of Computer Engineering and Information Technology focuses on the topics that include such kind of parts. They are Computer Science, Informational Technology, Mobile computing, wireless sensor networks, Web Designing, Cloud Computing, Big Data Analysis, Visual Communication System, Robotics, Embedded systems, E-Marketing, Natural Networks, Artificial Intelligence VLSI design and testing. The Journal is using Editorial Manager System for quality in review process. Editorial Manager is online manuscript submission, review and tracking system. Review processing is performed by the editorial board members of Journal of Computer Engineering and Information Technology or outside experts; at least two independent reviewers' approval is required for acceptance of any citable manuscripts and track their progress through the online tracking system, hopefully to publication.

Computer Science is the research arena which includes fundamentals of computer, hardware, software and associated fields such as Electronics, Medical, Mathematics and Linguistics. In short Computer Science is the study of storage and transfer of information. Journals related to Compute Science. Journals Applied Bioinformatics and Computational Biology, Global Research in Computer Science, and Security, Computer Science and Security, Computer and operations Research, Future Generation Computer Systems.

Software Testing and Hardware Technologies. Software Testing is the process of evaluating or validating the proper functioning of software program defined

by specific requirements. Hardware Technology is the science of exploring the physical components of computer.

Journals related to software Testing and Hardware Technology Information Technology and software Engineering, IEEE Transaction on software Engineering and Method agy, Information and Software Technology, Automated Software Engineering, Software and Systems Modeling, Journal of Systems and shortly. It is the science of application of computer hardware, software networking and distribution of date, Information Technology is rooted to fields of Telecommunication, Healthcare and Business Firms.

Journal related to information Technology. Information Technology and Software Engineering, Information Technology and Software Engineering, IEEE Transactions on Information Theory, International Journal of Advancements in technology, Research and Reviews: Journal of Engineering and Technology Journal of the Association of Information Systems Research, Journal of Information Technology, Information Systems Journal.

Mobile Computing is the advanced and developing computer application that allows voice and video transmission in the form of date through computer or wireless devices without any further linking. Mobile Computing in the break-through in the computer Technology.

Journals related to Mobile Computing.

IEEE Transactions on Mobile Computing, Pervasive and Mobile computing, Mobile computing and communications Review Wireless Communication and Mobile Computing.

Web Designing is the part of designing the website Web Pages from its creating with appropriate architecture, layout, content generation graphic look and updating Web Designing is based on Markup Language especially HTML.

Journal related to Web Designing. Advances in Robotics and Automation Global Research in computer science; International Journal of Advancements in Technology and Software Engineering.

Cloud Computing is a type Internet based computing where different server's storage and applications in an organization are delivered through internet. Cloud Computing helps in sharing the Computational applications rather than having local severs and personal devices.

Journals related to cloud computing. Journal of cloud computing, International Journal of cloud Application and computing. International Journal of Next Generation Computing International Journal of cloud computing and services science, Open Journal of cloud Computing.

Big Date Analysis Big Date Analysis is the science of examining large datasets consisting of different type of date to discover patterns trends in market and other business information. Big Date assignment requires predictive analysis with

extensive date mining. Embedded system is the area of computer science with the focus on larger mechanical or electrical system using real time computing constraints with the embedded association of hardware and mechanical parts.

Computer engineering is a combination of elements of electrical engineering and computer science which deals with the design and utilization of computer engineering seeks to match efficient digital devices with appropriate software to meet the scientific, technological and administrative needs of business and industry in a global economy. Computer engineering has grown and matured into a dynamic major helping to propel the wave of technological growth in the world. Computer engineering programs provide students with a background that prepares them for careers as lifelong learners since it is imperative that computer engineers maintain their technical competence in a field that is developing and changing rapidly.

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ICT – AN IMPORTANT FACTOR OF NATIONAL PROGRESS

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Summary. *For 23 years of Uzbekistan's independence information and communication sphere in the country has been rapidly developing, which was especially noticeable in the past few years.*

Key words: *Computerization, software, ICT, modernization, telecommunication, international channels*

As a result, today the Republic has become a full member of the international telecom market, having 28 areas of direct international channels with the ability to reach out to all countries of the world. These channels operate on the basis of satellite and fiber-optic communication systems. In addition, for targeted and effective development of the telecommunications sector regulatory and legal framework has been developed, a network of independent international channels created, and modernization of telecommunication networks based on digital technology launched. All this, together with the attracting of large investments into the sector, allowed carrying out drastic structural changes in it. Among the most important documents that regulate the development of ICT in Uzbekistan, are the laws "On Information", "On

Telecommunications", "On electronic commerce", "On electronic digital signature", "On electronic documents" and some others. Currently, work is being oriented at the development of the draft law "On electronic government", as well as a new edition of the existing law "On electronic commerce." The result of the measures taken in the country, the number of users of cellular services increased dramatically, and their number in Uzbekistan today is about 20 million. Compared with 2000, this figure increased 200 times. A total number of citizens, who use the Internet, are more than 10 million people.

From the first days of independence of Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society. Over a short period the authorities created the legal framework conducive to further formation and progress of market of IT-technologies. In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. President's Resolutions "On measures for further implementation and development of modern information and communication technologies" dated March 21, 2012 and "On further development of computerization and introduction of information and communication technologies" dated May 30, 2002, became important documents in this direction. At present the Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented. This program was approved by President's Resolution dated June 27, 2013. Making a statement at enlarged meeting of the Cabinet of Ministers dedicated to the socio-economic development in 2015 and the most important priorities of economic program for 2016, President Islam Karimov noted that in today's conditions in the era of Internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation of system "Electronic government" are of priority significance. As the head of our state underlined, development of ICT has a direct impact on the level of competitiveness of the country, allows you to collect and summarize vast amounts of information, offers great opportunities for management at strategic level. In addition, since 2002 a Centre for development and introduction of computer and information technologies UZINFOCOM operates, which assists in the development and implementation of national programs of computerization and introduction of ICT in all sectors of public administration, economic and social spheres. Over the past years, the country carried out systematic work on development of Internet, mobile communications and other areas, on formation of high-tech base of modernization of national economy.

The basis for development of ICT in Uzbekistan is the telecommunications infrastructure. The current stage of development of telecommunications technologies,

networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services. Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT.

In 2014-2015 Program of development of broadband access networks on Wi-Fi technology has been implemented successfully in the Republic of Uzbekistan. As a result of comprehensive measures at airports, railway stations, places of frequent-stay travelers, parks, shopping malls and other public places of the capital and each administrative center of republic Wi-Fi points have been created. The high development rates of national Internet segment should be separately noted. Uzbekistan has 10.2 million web users. According to UZINFOCOM center, in January 2016 the number of websites in the UZ zone exceeded 25 thousand, while growth totaled more than 30% compared to same period of last year. In order to stimulate domestic programmers the National register of software developers has been created, which already included 69 companies. A directory of software manufacturers Software.uz has been developed that provides necessary information to citizens and businesses.

According to the Resolution of the President of the Republic of Uzbekistan "On measures to further strengthen the incentives of domestic software developers" dated September 20, 2013 new benefits and preferences for members of software industry were introduced. Thus, they are exempt from customs duties for imported equipment for their own use, components, parts, technical documentation and software until January 1, 2017. It is known that interactive public services are of particular importance in protection of human rights and freedoms, saving time and expenditures for obtaining necessary information and services. A consistent work on formation of "Electronic government" is carried out in the country. The activity of the Governmental portal of the Republic of Uzbekistan (gov.uz) and the single portal of interactive state services (SPISS), located on the Internet at my.gov.uz, have been established. Functional of SPISS expands dynamically, 235 kinds of interactive services are being rendered through it. Over the past five years, this system received in total more than 200 thousand electronic applications of citizens and executives.

Making an online appointment with the heads of government agencies, receipt of information on their activities, various inquiries and sending requests became popular. In January 2015, the portal has launched a new system for discussion of draft legal acts related to business activities, and evaluation of existing documents. To date, 80 draft laws have been discussed through this system, 9 of them have been improved

taking into account the opinions of citizens. At this time, the discussion of more than 20 legal act continue familiarization of sides with case are completely automated now. Information system E-SUD for electronic proceedings is functioning effectively since 2004. Through its implementation, procedures such as keeping registration books, document management within court. In particular, Week of information and communication technologies ICT Week Uzbekistan is being held since 2004. Traditionally it is opened with national exhibition of information technologies ICT expo, which takes place once in two cities - Tashkent and Samarkand.

The exhibition presents existing and future forms of ICT-based services, oriented to business community and authorities, and general population. Among the important events of the week - The Forum for Information and Communication Technologies ICT forum, where representatives of leading companies, industry experts and foreign experts discuss state and prospects of progress in this sphere. As part of the week conferences Best Soft Uzbekistan are also being held, during which they demonstrate the latest achievements of software developers, and e-Government Uzbekistan dedicated to the strategic objectives in the field of "e-government", results of implemented projects, exchange of experience and ideas in this direction.

Training of personnel in the development of ICT sector is topical. Currently, major domestic centers of integration of education, science and industry - Tashkent State Technical University (TSTU) and Tashkent University of Information Technologies (TUIT) - train specialists in technical direction and for IT sector. In 2013, TUIT opened two new master's direction - management of the system "Electronic Government", and library science. At the same time, these universities carry out scientific research on the basis of active cooperation with leading industrial enterprises of the country. From October 1, 2014 the branch of the prestigious South Korean INHA University began its activity in Tashkent. Professionals in areas such as computer and software engineering, computer network engineering are trained here.

To sum up, a program of transition to widescreen and digital TV is being implemented in Uzbekistan. To date the coverage of population with digital TV programs has already reached the level of 45 percent. And in order to provide the staffing needs of the ICT sector, the Tashkent Electro Technical Institute of Communications was reorganized in Tashkent University of Information Technologies.

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ELECTRONIC TRANSPORT CALCULATIONS FOR CO2 ADSORPTION ON CALCIUM-DECORATED GRAPHEME NANORIBBONS

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Summary. *This text is about calcium-based functionalization is an effective tool of enhancing CO2 uptake capacity of carbonbased materials [C. Cazorla, S. A. Shevlin, and Z. XGuo, J. Phys. Chem. C 115, 10990 (2011)]. Using density functional theory in combination with the nonequilibrium Green's function formalism we conduct electronic transport calculations to study the response of Ca-decorated graphene nanoribbons to CO2 adsorption. Sensitivity of graphene to CO2 molecular adsorption is considerably increased due to the Ca-decoration: the electron transmission near the Fermi level increases due to the formation of extended electronic states. In addition, the variations of the ectrostatic potential across the system reduces due to the molecular adsorption, which also increases the conductance of the system. Enhanced electronic transport due to the CO2 adsorption is also obtained in current-voltage calculations. Since the change in the conductivity is one of the main characteristics of gas sensors, our results will be useful in developing graphene-based solid-state gas sensors.*

Key words: *changes, sensing, capturing, considered, combination, adsorption properties, nanomaterials, enhanced, properties, grapheme, reveal, Current-voltage, adsorption.*

Due to recent global climate changes, sensing, capturing and storing greenhouse gasses (especially carbon dioxide, CO2) became a priority topic in energy and environmental research [1–5]. Together with metal-organic framework based adsorbents (see [6] for review), carbon based nanomaterials, such as graphene and carbon nanotubes are also considered as promising materials for the capture of greenhouse gases (see Refs. [7–9] for reviews). Surface functionalization is considered as an effective tool to enhance the gas adsorption properties of these materials. For example, calcium (Ca) decoration can enhance the CO2 uptake capacity of carbon-based materials by several time due to the stronger interaction between the molecule and Ca dopants [10]. Graphene is also known as a promising material for gas sensing application due to its exceptional mechanical and electronic properties such as unique

surface morphology, high surface-to-volume ratio, high conductivity and low thermal noise [11, 12]. Graphene-based devices have advantages over the other solid-state gas sensors in terms of low cost and power consumption, sensitivity and response/ recovery time (see, Refs. [13–16] for reviews). Moreover, sensing and catalytic properties of graphene can be further enhanced by metal (metal-oxide) nanoparticle decoration (see, Ref. [17–19] for review). Among the other metals, Ca atoms are also considered to be effective dopants to improve the catalytic and gas sensing properties of graphene [10, 20, 21]. Here, we use density functional theory (DFT) in combination with the nonequilibrium Green's function formalism to study the electronic transport properties of a graphene nanoribbon [22, 23] doped with a single Ca atom. The main purpose is to enhance the conductive response of the graphene by Ca-functionalization. In its pristine form, graphene is less sensitive to CO2 molecule due to the weak physisorption. The response of the graphene nanoribbon increases to the gas molecule adsorption after Ca-decoration. For example, the electron transmission near the Fermi level increases after the molecule attachment to the Ca atom due to the formation of extended electronic states in graphene. The electrostatic potential oscillations are also affected by CO2 adsorption, which is also considered as one of the important factors affecting the electronic transport in the system. Current-voltage calculations also reveal enhanced transport in Ca-decorated graphene due to the CO2 adsorption.

COMPUTATIONAL DETAILS

We first study the stability of Ca atoms on top of monolayer graphene. For that purpose we performed nudged elastic band (NEB) [24] calculations to obtain reaction paths and barriers for the migration of Ca atoms on graphene (see Fig. 1). Transport calcula- FIG. 1: (Color online) Energy profile for the migration of a Ca atom on top of monolayer graphene. Insets show the migration pathway. 2 FIG. 2: (Color online) Top (a) and side (b) views of the device geometry: hydrogen passivated graphene nanoribbons with a single CO2 molecule adsorbed through Ca atom. The transmission is calculated along the *z*-direction and a vacuum spacing of 20 ˚A is left along the *x*-direction. tions are conducted in a hydrogen-passivated zig-zag graphene nanoribbon of width 11.37 ˚A. A single CO2 molecule is adsorbed on surface of graphene either directly or through a Ca atom adsorbed on the hollow site of graphene (see Fig. 2). All the samples are first optimized using DFT within the generalized gradient approximation of Perdew-Burke-Ernzerhof (PBE) for the exchange-correlation energy [25]. The Brillouin zone sampling was performed using 1_1_100 Monkhorst *k*- point sampling [26]. The convergence criteria for total energy and Hellman-Feynman forces were 0.001 eV and 0.05 eV/˚A, respectively. The electrostatic potentials were determined on a real-space grid with a mesh cutoff energy of 148 Ry. Double-zeta-polarized basis sets of local

numerical orbitals were applied to all atoms. Grimme's DFT empirical dispersion correction [27] to the PBE was used to account for van der Waals interactions. The

device structures consist of a central (scattering) region and left/right regions (i.e., a two probe configurations). Both electrodes are modeled as an electron gas with a given chemical potential. The transmission is calculated along the *z*-direction. All simulations were conducted using the first-principles computational package Atomistix Toolkit [28].

RESULTS AND DISCUSSIONS

Cazorla et al. have shown that Ca atoms have large binding energies to the surface of graphene and Cadecorated graphene is thermodynamically stable [10]. Here, we conduct NEB calculations to obtain the energy barrier for the migration of Ca atoms on the surface of graphene. The size of the simulations cell is 8.525˚A_7.383˚A and the system consists of 24 carbon atoms. Periodic boundary conditions were used in all three directions and vacuum spacing of more than 10 ˚A is used in perpendicular direction to the graphene layer. The Ca atom is adsorbed on the hollow site of graphene in both initial and final states with Ca-C distance of 2.66˚A (see left and right insets in Fig 1). The initial path in the NEB calculations is constructed using a linear interpolation of the initial and final Cartesian coordinates. All the atoms are relaxed during the simulations. The residual forces in finding the transition states were less than 0.01 eV/˚A. The calculated energy barrier for the diffusion of Ca atom is 0.9 eV. This barrier is large enough to prevent the diffusion of the Ca atom on the surface of graphene at room temperature. Next, we calculate the adsorption energy of CO2 molecule on the Ca atom using *E*ads = *E*graphene+Ca+CO2 *E*graphene+Ca *E*CO2 *;* (1) where *E*graphene+Ca+CO2 is the total energy of graphene+Ca system with adsorbed CO2 molecule, *E*graphene+Ca is the total energy of graphene+Ca system and *E*CO2 is the total energy of isolated gas molecule.WE used the same graphene unit cell as in Fig 1. The simulations show a strong chemisorption of the CO2 molecule on the Ca atom. The adsorption energy of the gas molecule is *E*ads =1:55 eV, which prevents the desorption of the gas molecule at temperatures well above room temperature. Figure 2 shows the device geometries for which we have conducted electronic transport calculations. The size of the active layer in our device geometries is 29.532 ˚A and the size of the electrodes is 7.383 ˚A. This active region is long enough to study the effect of a single impurity [29, 30] without the interference of the electrodes. The edge carbon atoms are terminated by hydrogen atoms to get better structural and electronic stability as compared to bare graphene nanoribbon. As a reference, we present in Fig. 3(a) the zero bias transmission spectra of pristine graphene nanoribbon without (solid-black curve) and with (dashed-red curve) the presence of CO2 molecule. In the former case, the transmission spectrum shows a step-like behavior with an enhanced transmission at the Fermi level. These features, which are typical for graphene nanoribbons, originate from the edgelocalized electronic states. CO2 is weakly physisorbed on the surface of graphene (see inset in Fig. 3(a)) due to the weak interaction between the CO2 gas molecules andgraphene [11]. Therefore, the system shows a negligible transport

response to CO2 adsorption: the spectrum still 3 FIG. 3: (Color online) (a) Zero bias transmission spectra($T(E)$) of pristine graphene without solid-black curve) and with a single CO2 molecule adsorbed (dashed-red curve) as a function of electron energy. Energy origin coincides with the Fermi energy. Inset shows the adsorption of CO2 molecule on graphene nanoribbon. (b) $T(E)$ of graphene with a single Ca atom without (solid-black curve) and with (dashed-red curve) CO2 molecule. Inset shows the adsorption of Ca atom on graphene oribbon. exhibits a sequence of steps of integer transmission andan enhanced transmission at the Fermi level (dashed redcurve in Fig. 3(a)). A small reduction of the electron transmission is obtained only at the Fermi level and at energies -1.5 eV and 1.5 eV, where the $T(E)$ curve exhibits a jump. Those are the electron energies, where the molecule mostly contribute the density of states (DOS) of the system (see Fig. (a)). The location of the peaks in DOS corresponds to the reduction in the transmission.

However, the contribution of the molecule to the DOS of the system small (in the considered range of the spectrumthe maximum DOS is _80 eV igure 3(b) shows the zero-bias transmission spectra of Ca-doped graphene without (solid-black curve) and with the CO2 molecule attached (dashed-red curve). The Ca atom is adsorbed on the hollow site (with a Ca-C distance of 2.59 ˚A) and locally disturbs the planar structure of graphene (see the inset in Fig. 3(b)). The transmission spectrum changes considerably after the Ca atom adsorption. First, T(E) becomes smaller at the Fermi level as compared to the case of pristine graphene nanoribbon.

This is despite strong contribution of the Ca atom to the DOS of the device (see Fig. 4(b)). Second, two broad minima are obtained in the transmission spectrum above the Fermi level. In fact, total reflection of the electrons can occur at these energy values. Dashed-red curve in Fig. 3(b) shows the transmission spectrum of Ca-doped graphene when the CO2 molecule is attached to the Ca atom (see Fig. 2 for the optimized geometry). Extra features are also observed in the transmission spectrum due to the molecular attachment. For example, the transmission at the Fermi level slightly decreases, where the contribution of the electronic states of the molecule to the DOS of the system is largest (dashed-red and dotted-blue curves in Fig. 4(c)). The first minimum in the transmssion spectrum shifts to higher energies, whereas the second broad minimum disappears from the spectrum. This follows the disappearance of one of the peaks in the contribution of the Ca atom to the DOS of the system (see solid-black curve in Fig. 4(c)). The structural analysis show that the Ca-C bond distance reduces to 2.71 ˚A. In order to understand the origin of the obtained changes in the transmission spectrum due to the Cadoping and CO2 adsorption, we calculated the projected self-consistent Hamiltonian (PSH) eigenstates. These eigenstates are associated with the poles of the Green’s function at the given electron energy. Figure 5 shows the PSH eigenstates of the Ca-doped sample without (a, b) and with the CO2 molecule (c, d) for different electron energies. Near the Fermi level, we obtained an

extended electronic state for the Ca-graphene system (Fig. 5(a)), which explains the enhanced transmission at the Fermi level. Some localization of the electronic states near the Ca+CO2 complex is obtained after the CO2 adsorption (Fig. 5(c)), which explains the small reduction of the FIG. 4: (Color online) (a) Device density of states (DDOS) of graphene+CO2 system projected on C atom (solid-black curve) and O atoms (dashed-red curve) of the molecule. (b) DDOS of graphene+Ca system projected on the Ca atom. (c) DDOS of graphene+Ca+CO2 system projected on Ca atom (solid-black curve), C atom of the molecule (dashed-red curve) and O atoms (dotted-blue curve). 4 FIG. 5: (Color online) Isosurface plots of the projected self-consistent hamiltonian eigenstates for graphene+Ca (a, b) and graphene+Ca+CO2 (c, d) systems. The isovalues are 0.005 ˚A3=2. The energies for the corresponding isoplots are given in each panel. transmission at the Fermi level. At the electron energies, corresponding to the transmission minima in the Ca-graphene system (solid-black curve in Fig. 3(b)), we found strong localization of the electronic states (see Fig. 5(b)). Such nanoscale charge localizations reduce the probability of the charge carriers to transit across the system. CO2 molecule adsorption results in the formation of extended electronic states at these energy values (Fig. 5(d)). Consequently, the system shows electron transmission at for this range of electron energy. Another important factor affecting the charge carrier transport in nanoscale systems is the change in the electrostatic potential profile in the system. In order to see the effect of Ca-doping and CO2 molecule adsorption on the electrostatic potential variation, we present in Fig. 6 the averaged electrostatic potential along the transport direction (*c*-axis) at zero voltage biasing for pristine graphene (a) and Ca-doped graphene. The results are shown without (solid-black curves) and with (dashed-red curves) the CO2 molecule. Pristine graphene nanoribbon shows periodic oscillations with double minima in each period (solid-black curve in Fig. 6(a)). CO2 adsorption results in small increase in the amplitude of the potential oscillations near the molecule. Ca atom adsorption has a major impact on the electrostatic potential profile in the system: a potential difference of more than 0.4 V can be created in the system. Electron scattering from such a large barrier can reduce their transport across the system. CO2 adsorption on the Ca atom reduces this large potential variation: ΔV reduces to 0.1 V. These findings indicate the enhanced sensitivity of Ca-doped grapheme FIG. 6: (Color online) Electrostatic difference potential along the transport direction for zero bias across the samples. The results are shown for pristine graphene (a) and Ca-doped graphene (b) without (solid-black curves) and with CO2 molecule (dashed-red curves). as compared to pristine graphene in terms of the change of the electronic transport. Finally, we study the response of the graphene+Ca sample to CO2 adsorption at finite voltage biasing by calculating the current-voltage (I-V) characteristics us5 FIG. 7: (Color online) Current-voltage characteristics of Cadoped graphene without (solid-black circles) and with CO2 molecule (open-red circles). ing the Landauer-B¨uttiker formula $I(V) = 2e/h \int RL\ T(E; V)\ [f(E\ \ L)\ \ f(E\ \ \_R)]\ dE:$(2)re

f(*E;EF*) is the Fermi-Dirac distribution function and *_L*/*_R* is the chemical potential of the left/right electrode. Figure 7 shows the *I-V* curves of the graphene-Ca system without (filled-black circles) and with (open-red circles) CO2 molecule for the bias voltage below 1 V. For the considered range of the voltage biasing, the CO2 adsorption results in enhanced electronic transport. Depending on the value of the voltage biasing, the current in the system can be more than 20% larger after the gas molecule attachment.

CONCLUSION

Electronic transport calculations are conducted using DFT in combination with the nonequilibrium Green's function formalism to study the response of Ca-doped graphene nanoribbon to CO2 molecule adsorption. Enhanced sensitivity of the system to the gas molecule adsorption is obtained as compared to pristine graphene. Extra features are obtained in the transmission spectrum of the system due to the formation of different electronic states near the Ca-CO2 complex. The gas molecule adsorption also affects the electrostatic potential profile in the system, which plays an important role in the electronic transport. Enhanced electronic transport is also obtained at finite voltage biasing as revealed in our *I-V* calculations. These results will be useful for designing more sensitive graphene based gas sensors.

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THE ROLE OF ICT IN UZBEKISTAN

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Summary. *The following article is devoted to the role of ICT in Uzbekistan, which consist of many lines. They are all connected closely to each other and each of them is individual work field.*

Key words: *ICT, online discussions, linear antenna, social sites, international network*

A look back at 90s, that time a social status of Uzbekistan was not good, especially, ICT had not come yet. Almost all work had done by hand, without using computers, technologies and contact to each other was really complicated. Apart from that many work spaces had difficulties in terms of IT. Even just sending a message took a lot of time and was too expensive. Moreover, most of people could not get world news, even the news in the nearest countries.

Inevitably, nowadays we are living in a century, that people call the information century, where information is the key and engine of the progresses. In other words, recently we are not able to reject the role of ICT in our daily life. For instance, Social networking is widespread today. It is supposed that there are few people who have not got an account on social sites like Imo, Telegram or Facebook. With the help of these

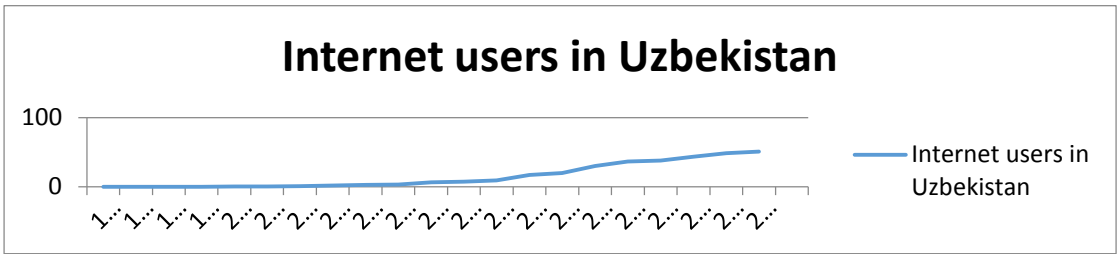
sites we are able to make voice calls, send text, send pictures, even make video calls in face-to-face mode. What is more, all countries tend to develop their IT in different fields such as in manufacture, treatment, business, education, transportation, agriculture etc. Because the international network linking millions of computers, it can regularly keep connecting each other. It means there is no problem with worldwide communication. It is a fact that, organizations of various countries use internet for video conference in terms of online discussions. On the other hand, we have some troubles in usage which we should conduct a research in the future. For example, when there are too many users become online, speed, quality of images, voice are lower than normal. Nevertheless, the future is on our hand, we may improve it as much as possible.

As other countries, Uzbekistan also has already started to pay its attention for ICT sphere so as to make progress in all area. Opening Tashkent University of Information Technologies, INHA University in Tashkent, and adding Computer Science subject in schedule of a schools, lyceums and colleges was first step to guarantee our future trend.

It is believed that, Uzbekistan increases the level of education with the help of ICT. Precisely, computers may make priceless importance on education system. In fact, there are a lot of modern conditions (like smart-room) for students in order to get contemporary knowledge concerning their professions. For example, lecturers use attention getting devices such as interactive whiteboards to give presentations. It increases the chance of effective learning. Besides, students have a chance to get these presentations on website also. Unfortunately, there is a little lack of enthusiasm in some lectures and tutorials. As a result, most of students become bored during the long period lectures. In the near future, in order to eradicate this problem, lecturers may spend approximately twenty minutes for video calls to foreign professors or specialists according to the topic during the lessons. It is predicted that, it may significantly increase the chance of attracting the students to ongoing lectures and seminars.

By looking into immediate future in social life, it might be seen that, there will be a high speed Wi-Fi zone in every bus-stations, train-station, parks, cafes, hotels, markets, bazaars, clinics, schools, colleges, lyceums, universities, libraries. In fact, until 2020 the cheapest thing is going to be a using the internet. Furthermore, today, there are some Internet Service Providers (ISP) like Uzonline, Sarkor Telecom, TURON, TPS. They offer a broadband high-speed connection rather than the traditional dial-up telephone connection. However, it seems to be that after some years it will not satisfy a demand of users. The solution is going to be the acceleration of speed of internet by establishing the great number of linear antenna over the country and simultaneously using up to date technologies.

The value for Internet users (per 100 people) in Uzbekistan from 1990 till 2016



If we look at society, we sometimes meet disabled people like blind or deaf and they cannot completely use the computers and other gadgets. Government always pays attention for them. It is nearly time, they will not worry to use computers since the latest assistive technology is equipped to support them to use computers and do their job in the office, learn at school, or interact with their families at home. What is more, 3-D worlds are also becoming popular due to the fact that people are fond of the virtual reality environments. Obviously, among the kids 3-D games are common type activity owing to the fact that it influences them deeply. 3-D is used not only for the game, but for making cartoons and films also, with it, media is becoming more impressive. As a matter of fact, even 5-D also have already presented for human being. It is not doubt that after some years watching football on TV will be more interesting, popular rather than watching in reality in stadium.

ICT consists of many lines, they are all connected closely to each other and each of them is individual work field. They are software engineer, computer security specialist, blog administrator, webmaster, hardware engineer, network administrator and others. They will make our life easier. It is clear that, nanotechnology will be widely used over the Uzbekistan. For example, nanotransistor will be used in IT, nanobot will treat diseases, and nanotube will be used in wider industries.

New technologies in electronics continue to develop. People will make possible the ideas now we are thinking that is impossible, they will do such things so easily, accurately that now we do them hardly and spend a lot of time. It is very difficult to predict many steps of ICT development. It will change the world significantly and probably will change the community.

PERSPECTIVES OF UZBEKISTAN IN ICT

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Summary: *In 2017, the number of internet users grows seven times more than the year of approximately 2000 with the quantity of 3.2 billion people, the mobile phone users reached to 7 billion people. Nowadays approximately 5% of the production of world GDP*

is related to ICT sphere. In our country less than 2% of GDP is related to ICT sphere. There: 80% Communication and Informatization, 4% Programming Production, 7% Electronic Productions and Computer Making Technologies. Through Common Interactive Government Services Portal more than 270 modern services are serving.

Key words: *e-government, ICT, communication, informatization, development.*

Evolution ways of Communication and Informatization are following:

1. Establishing e-government system;
2. Developing e-commerce system;
3. Heightening internet speed;
4. Spreading Interactive Government Services;
5. Providing information security.

In my opinion, if Uzbekistan develop all the above given evolution ways, it achieves great results in ICT sphere. For example, to heighten the quality of internet, we must have sufficient agreements with potential internet providing companies. Firstly, well qualified specialists must be brought up in ICT sphere. Secondly, government must spend more investment in education sphere. Moreover, specialists system must be reformed.

Generally, I stand for reforming the specialists system, because without well experienced specialists, no goal can be achieved in ICT sphere. Now we look to ICT statistics in the world as well as in Uzbekistan.

In 2016, GDP grew by 8%; GDP in 2014 was $45,353 million. High economic growth rates were supported by macroeconomic stability characterized by low inflation rate, state budget surplus and positive foreign trade balance. The inflation rate calculated on the basis of the consumer basket comprising 308 goods and services was 6.8% in 2016. This indicator did not exceed the estimated figure for 2016.

As of January 1, 2016, the resident population of the Republic of Uzbekistan accounted for 30,490 million people or grew by 1.5 % compared to the 2016 level. As of January 1, 2016 the number of people employed in the economy grew by 299,500 people or by 2.5% and accounted for 12.5 million people. As of January 1, 2016, the real unemployment rate in Uzbekistan was about 4.9%. Due to comprehensive measures implemented with aim to modernize, technically renovate production facilities and update competitiveness of industrial sector, in 2013 Uzbekistan managed to ensure steady high growth of industrial production and efficient structural transformation of the industrial sector. Machine building and metal working (121.1%), industry of construction materials (113.6%), light (113.2%), food (109.1%) and woodworking (114.9%) industries made the most significant input into the growth of industrial output. The share of these industries in total industrial manufacture grew from 50.3% in 2014 to 53.7%.

In 2015 foreign trade turnover grew by 9.6% compared to the 2014 level, accounting for USD 28.8 billion. Some measures were undertaken with aim to expand export of competitive products. As a result, export of goods and services grew by 10.9% compared to

the corresponding 2014 level. Positive changes, observed in sector structure of industrial production, resulted in the increased share of goods with higher value added. The share of energy and oil products grew to 34.8% (18.5% in 2015), services – to 16.3% (11.8%). At the same time, the share of non-oil exports exceeded 70% of manufactured goods. Increase in the physical volume of ammonium sulphate, technical oils (motor and lubricating), natural gas, liquefied gas (propane), secondary aluminum, cotton yarn, knitted fabric, fruits and vegetables and other goods contributed to the growth in exports. In 2015, import of goods and services grew by 7.7% compared to the 2014 level. The share of machinery and equipment accounted for 44.1%, food for production needs – 6.6%, which is characterized by increasing level of diversification and modernization in branches and sectors of the economy. Uzbekistan - ICT Environment, Innovation Policies & International Cooperation In 2013 total investment into economy from all sources of funding amounted to UZS 27.5 trillion or increased by 9.8% compared to the corresponding 2015 level. The share of capital investment in GDP represented 23.2%. Foreign investment and loans represented 20.3% in total utilized investment compared to 21.6% in 2015. The volume of direct foreign investment and loans accounted for USD 2090 million, growing by 8.1% compared to the previous year. The volume of foreign investment under the guarantee of the government grew by 11.4% and accounted for USD 580.6 million. The sector structure of foreign investment changed. The share of foreign investment into fuel and energy sector grew from 30.2% to 35.0%. The share of foreign investment attracted by machine building dropped from 2.6% in 2015 to 1.4% in 2014. Domestic investments is summarized from investments of own funds of enterprise (UZS 8.7billion), loans extended by commercial banks (UZS 3.0 billion), investment from off-budget funds(UZS 1.7 billion), investment from funds of the public (UZS 6.9 billion).Total is UZS 1.3 billion, that approximately equal to $ 64.6 million (Source: State Committee of Statistics, Uzbekistan)

GDP per capita in PPS (EU25=100) 2.796 3.820 100 100 Real GDP growth rate (% change previous year) 8.0 8.1 -4.5 0.1 Labor productivity per person employed (EU25=100) 100 100 Inflation rate (average annual) 10.6 11.0 1.0 1.5 Unit labor costs (growth rate) 27 29 3.3 0.6 Unemployment rate (as % of active population) 0.2 0.2 8.8 10.8 Foreign direct investment intensity 21.6 20.3 Business investment as a percentage of GDP 31 30.802 Broadband Penetration Rate (% population with broadband access) 6.6 38.2 Percent of organizations with web sites 54 N/A

In the ICT Development Index 2015 by the ITU1, Uzbekistan has taken 104th place (comparing with previous edition of the index, country's trend is 0) with the index of 3.12, which is by far the lowest value in the CIS region. In the Global Innovation Index 2016 2, the country takes 128th place improved its position by 5 points in comparison with 2016.In E-Government Development Index 20163, Uzbekistan takes 100th place and is included in the group of countries with middle level of.

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FUTURE OF UZBEKISTAN IN ICT

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Summary. *This article is devoted to the development of information and communication technologies, achievements and further plans for the bright future of ICT in Uzbekistan.*

Key words: *Information technologies, ICT, e-government, digital revolution, communication.*

Information and communication technologies have existed for centuries and have been important components of virtually all economic systems. What has changed in the last 10-50 years has been the development of techniques for managing, processing and communicating digital information. With digital ICTs, information can be duplicated exactly at very low marginal cost and transmitted quickly over long distances at speeds unimaginably rapid when compared to previous methods.

Thus, Uzbekistan: e-government deepens participatory democracy and state transparency dedicated to accelerating the development and implementation of information and communication technologies in all spheres of life of the state and society. It describes the implementation of the Program for the development of a modern and based on best practices of e-government system for the period until 2020 which was adopted on the initiative of the first President Islam Karimov. It is reported that at this stage there have already been achieved positive results, including the functioning of the Single portal of interactive state services rendering over 290 modern services. Thus, the effect of ICTs and the digital revolution on economic growth, social capital, and political development in a country goes far beyond the contribution of the ICT sector. ICTs affect the efficiency and productivity of other economic processes, the distribution of economic gains and basic services and the transparency and accountability of the government.

Uzbekistan has had several factors working in its favor as a major ICT power: a sizeable population, high urbanization, income levels and distribution, extremely high literacy rates, and pre-existing engagement in export promotion strategies. These have all set the stage for successful ICT industrial policy and support from both economic and social factors. As important as these factors are, they would all amount to little without pro-active involvement from Republic of Uzbekistan's political leadership to ensure that appropriate planning; infrastructure and human capacity building capitalize on these strengths. Could Uzbekistan serve as a model for other developing countries seeking to grow through ICT industries? India, Korea and Brazil also show the value of a literate and educated population to developing industries in software and multimedia development, but the large income disparities of these countries have made it difficult to spread the advantages of ICT development beyond a small elite sector of their societies.

Today, in the country with a population of 32 million people, 60% of which are youth, cellular communication is used by 21 million, and the internet used by more than 13 million people. As a result of large-scale measures, which were adopted in the country, Uzbekistan has significantly improved position in 2016 UN ranking of on the level of e-government development, entering the 40% of the most advanced countries of the world and took 80 place among countries that use e-government, as well as the 47th place for e-participation index which assesses the effectiveness of the government dialogue with their citizens and businesses. In Uzbekistan this indicator is on the 3rd place among the CIS countries and the first among the Central Asian countries. As highlighted that the introduction and development of e-government in Uzbekistan built in the rank of national priority, signed more than 40 governmental decisions on the electronic government, developed regulatory framework outlined in the Law 'On electronic government' and subsequently adopted by the Parliament of Uzbekistan.

With technologies and production processes evolving rapidly, knowledge of available and emerging technologies, the new opportunities and product improvements they enable, as well as the costs of introducing them have become a key means for keeping businesses dominant, innovative, productive and relevant in their specific industries. Business knowledge of its own workforce, its capabilities, training needs and grievances with management are all vital to maintaining the productivity of what is often the most expensive factor of production.

In addition, information system E-Sud for electronic proceedings is functioning effectively since 2004. Through its implementation, procedures such as keeping registration books, document management within court, direction of judicial notifications and procedural acts, familiarization of sides with case are completely automated now. We can notice that, all educational institutions of the republic are connected to ZiyoNET network, which is functioning since 2005. In the library of

portal, which was updated in 2014, has more than 75 thousand units of informative-educational resources, including textbooks, dissertations, research papers and others.

Moreover, as part of implementation of resolution of Head of our state "On measures on further improvement of foreign language learning system" dated December 10, 2012, "Foreign Languages" section has been created on ZiyoNET, which includes over four thousand materials such as textbooks, interactive lessons, games, relevant video and audio.

In particular, Week of information and communication technologies ICTWeek Uzbekistan is being held since 2004. Traditionally it is opened with national exhibition of information technologies ICTExpo, which takes place once in two cities - Tashkent and Samarkand. The exhibition presents existing and future forms of ICT-based services, oriented to business community and authorities, and general population. Among the important events of the week - The Forum for Information and Communication Technologies ICTForum, wh ere representatives of leading companies, industry experts and foreign experts discuss state and prospects of progress in this sphere.

Thus, the domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space. The country regularly hosts major events dedicated to the development of hi-tech industry.

In conclusion, we can emphasize that e-government contributes to strengthening representative democracy and government transparency, and is an ongoing and dynamic driver of the bright future of Uzbekistan.

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THE ICT IN UZBEKISTAN AT PRESENT AND IN FUTURE

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Summary: *This article is devoted to the issues of present condition and future of ICT in Uzbekistan is being considered.*

Key words: *development, mobile broadband access, video telephony, national Internet, multimedia services, software products*

From the early days of independence, Uzbekistan has paid great attention to the development of information and communication technologies and their wide application in all spheres of life of state and society.

The current stage of development of telecommunications technologies, networks and communication infrastructure of the country is characterized by expansion of fixed and mobile broadband access, increase of switching centers for data transfer and voice traffic, modernization of trunk lines, as well as creation of infrastructure for development of multimedia services.

Over the past 20 years in many regions of the country more than 2,000 kilometers of fiber-optic cables have been laid. They are designed for broadband access to modern technology and provision of converged services such as video telephony, high-speed Internet, watching HDTV-channels and others. Due to the measures taken in 2015, the overall rate of use of international information networks increased by 42.3% compared to 2014 and amounted to 15.5 Gb/s.

Today, all mobile operators operating in our country, consistently introduce the fourth generation network 4G LTE, which allows to handle a large volume of information on Internet quickly and efficiently, download and view video streaming and high-quality photos, use online applications in education purposes and for business. All of these technologies enable Internet users in Uzbekistan to expand their usual ability to work with ICT.[1]

In 2014-2015 Program of development of broadband access networks on Wi-Fi technology has been implemented successfully in the Republic of Uzbekistan. As a result of comprehensive measures at airports, railway stations, places of frequent-stay travelers, parks, shopping malls and other public places of the capital and each administrative center of republic Wi-Fi points have been created.

The high development rates of national Internet segment should be separately noted. Uzbekistan has 10.2 million web users. According to UZINFOCOM center, in January 2016 the number of websites in the UZ zone exceeded 25 thousand, while growth totaled more than 30% compared to same period of last year.

The use of ICT and software products in the management and production processes plays a major role in the development of sectors of the economy and the domestic industry. For instance, in 2014-2015 in the framework of a special state program 86 projects have been realized in order to introduce information systems in large joint-stock companies, associations and organizations totaling more than 330 billion sums.

Significant measures on developing information and communication technologies are taken for the last few years in our Republic.[2]

Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented.

According to the Resolution, the Tashkent University of Information Technologies has been named after Muhammad al-Khorazmiy, and from the academic year 2017/2018 it is planned to carry out activities related to the study of the priceless legacy of our great ancestor. It is quite symbolic that modern achievements in mathematics, geometry, trigonometry, geography, information and communication technologies confirm the inviolability of the solid scientific basis founded by Muhammad al-Khorazmiy. To provide reliable links between science, production and education in the field of information and communication technologies, the leading sectors of the economy, the special significance is placed on the organization and conduct of traditional scientific and practical conferences of the republican and international levels, the establishment of a scholarship named after Muhammad al-Khorazmiy for gifted university students. Well-known scientific figures will be actively involved in holding these events. Electronic resources of the university will also advance. In them there will be installed the tasks of competitions and Olympiads conducted among students, in particular, on the creation of software products, the development of modern educational literature in such areas as mathematical modeling, algorithmization, cryptology, computer and software engineering, telecommunications, television technologies and information security, the creation of multimedia versions of educational literature for free use by students, scientists and teachers. The Center for the Development of Software Products and Hardware and Software Complexes at the University will be transformed into the Scientific and Innovation Center of Information and Communication Technologies at TUIT. The main task of the Scientific and Innovation Center of Information and Communication Technologies was the elaboration of high-quality domestic software products that are competitive on the domestic and foreign markets, taking into account the real needs of the leading fields and sectors of the economy of the country with the involvement of students of the Al-Khorazmiy Tashkent University of Information Technologies. In accordance with the Resolution, the Center provides for a systematic and scientific analysis for the automation of business processes and other areas, management, production based on the requests of the leading networks of the economy sectors of the republic, as well as the creation of mechanisms for the implementation and development of their models and algorithms. One of the essential aspects of the adopted resolution is the organization of the Foundation for Scientific and Innovation Development at the University. It will provide covering the cost of creating and publishing textbooks and scientific literature for TUIT, including the acquisition of foreign literature, as well as scholarships for Muhammad al-Khorazmiy for talented students and financial support for the publication of the scientific journal «Muhammad al-Khorazmiy Avlodlari». On the expenses of the fund there will be financed the research and development works of the

university and the Center in the field of information and communication technologies development, provision of their scientific and training laboratories with modern equipment, necessary consumables and accessories on a competitive basis. The Foundation will also prepare, retrain and upgrade the skills of gifted students, faculty and young researchers in leading foreign higher educational institutions and research centers. The attraction of highly qualified specialists and scientists for teaching at the university and conducting scientific researches at the Center will level up to the priority.

A consistent work on formation of "Electronic government" is carried out in the country. The activity of the Governmental portal of the Republic of Uzbekistan (gov.uz) and the The single portal of interactive state services (SPISS), located on the Internet at my.gov.uz, has been established. [3]

Functional of SPISS expands dynamically, 235 kinds of interactive services are being rendered through it. Over the past five years, this system received in total more than 200 thousand electronic applications of citizens and businesspersons. Making an online appointment with the heads of government agencies, receipt of information on their activities, various inquiries and sending requests became popular. In January 2015, the portal has launched a new system for discussion of draft legal acts related to business activities, and evaluation of existing documents. To date, 80 draft laws have been discussed through this system, 9 of them have been improved taking into account the opinions of citizens. At this time, the discussion of more than 20 legal acts continues.

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FUTURE OF UZBEKISTAN IN INFORMATION AND COMMUNACATION TECHNOLOGY

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Summary. *Nowadays keeping up with the relentless pace of change in the ICT industry is a daily challenge for modern tech companies. The key to long-term success*

lies in the ability to understand change almost before it occurs and seize the opportunity to shape evolving technologies.

Key words: *smart machines, smart and mobile capabilities, robots self-managing devices, qubits.*

In this article I would like to describe our future innovation in ICT. Nowadays keeping up with the relentless pace of change in the ICT industry is a daily challenge for modern tech companies. The key to long-term success lies in the ability to understand change almost before it occurs and seize the opportunity to shape evolving technologies.

Tech companies often gain competitive advantage by causing market disruption through their ability to understand and act on technology trends. Like waves in the ocean, it`s much easier to ride these trends if you can see them coming and read them right. And we will stimulate innovation within the ICT industry in the coming year, creating new value streams for our society.

In that way we can evolving spreading intelligence throughout the cloud. Connected smart machines, such as robots and autonomous vehicles, are fundamental to the evolving networked society. Enhanced cloud architecture that can distribute and share machine intelligence will enable smart connected machines to work on an increasingly higher level.

Supported by advancements in artificial intelligence (AI) – particularly in the areas of big data analytics, machine learning and knowledge management – rapid progress has been made in terms of what smart machines can do. Developments in connectivity and cloud technologies are making it possible to distribute and share machine intelligence more easily, at a lower cost, and on a much wider scale than before.

When connected to the cloud, smart machines will be able to use the powerful computational, storage and communication resources of state-of-the-art data centers. Today`s intelligent software robotics systems are capable of supporting repetitive administrative tasks with current development pushing toward advisory tasks. Cloudification shifts the capabilities of these systems into a new sphere that include complex problem-solving and decision-making on a mass-market scale.

Connect, store, compute and share. Shifting systems into the cloud enables communities of collaborating robots, machines, sensors and humans to process and share information. Each new insight collected within a community can be shared instantly, which increase the effectiveness of collaborative tasks, and improves performance throughout the system, with a common awareness of system state shared by all participants, as well as a shared knowledge base.

A distributed machine intelligence architecture offers lower implementation costs. Sharing a backbone of almost unlimited computational power

makes it possible to build lightweight, low-cost robots and smart machines that require a low level of control and a minimum amount of sensors and actuators. Application-specific requirements related to responsiveness and speed will determine whether a local or global clouds is most suitable, and how much intelligence can be distributed.

Smart and mobile capabilities virtually everywhere. Intelligent clouds will create new value chains in many industry segments, but some of the forerunners include mining, agriculture, forestry and health care. New opportunities will open up for all organizations and people involved in the supply chain from the manufacturer to the customer. Consider an automated agriculture application remotely controls farm machines to carry out various farming tasks. To harvest mature crops, for example, the system will control the necessary machines to cut, gather and transport them. Each individual machine will take local decisions to ensure secure completion of its set tasks, working in conjunction with all the machines involved int the harvesting. Weather reports gathered from another distributed cloud application are used by the system to carry out harvesting in an optimal way. Contact with the farmer occurs only when participating machines cannot resolve issues themselves.

The harvesting example highlights just one of the many coming applications that will rely on multiple information sources, cloud, and distributed machine intelligence. To ensure scalability and widespread uptake of such applications, the challenge lies in the rapid development and proliferation of universally accessible mobile capabilities. 5G will provide a resilient, high-availability, low-latency network that offers applications with integrated computing and storage resources that ideally placed to meet latency requirements. 5G is well matched to industrial robotics applications because, like other radio technologies, it removes the need for cabling and minimizes infrastructure adaptions, but it also offers identity management, optimum placement of resources, and encryption for security and privacy.

Self-managing devices

Combining sensory data with AI techniques enables the data from massive numbers of sensors to be merged and processed to create a higher-level view of a system.

Connected smart devices will change our lives in many ways. These range from simple services that open your garage door as your car approaches, for example, to radically new business opportunities involving services yet to be invented and markets to be discovered. Combined with intelligent handling of data, smart devices can boost the productivity and profitability of any business. But to enable the deployment of billions of smart devices, the cost of managing and monitoring them needs to be low. Evolving software and communications technology are shifting toward the creation of autonomous and self-managing devices.

The Internet of Things (iot) means automation and intelligence in everything that is connected. This implies that a collective intuitive behavior among a wide range of

devices for a wide range of applications is possible in the future. The connectivity allows objects to be sensed and actuated remotely, creating a bridge between the physical and digital world.

It's the combination that triggers the effect Beyond the physical devices embedded with processors, software, sensors, actuators, and connectivity, it is the combination of sensory data and ai that enables more effective and accurate interactions. It is by merging data from a multitude of sensors that a superior baseline for intelligent processing is created. These are the common denominators that push IoT development further.

From a connectivity perspective, two distinct and different use cases emerge. One extreme is the massive machinetype communication (massive mtc) that can support millions of connected devices such as energy meters and logistics tracking. Here, we are looking at device battery lifetimes beyond 10 years and cost reduction in the order of 80 percent as well as 20dbbetter coverage compared with present state-of-the-art solutions.

The other extreme is the critical machine-type communication (critical mtc), which entails real-time control and automation of dynamic processes in various fields such as vehicle-to-vehicle, vehicle-to-infrastructure, high-speed motion, and process control. Critical parameters to enable the performance required are network latency below milliseconds, ultra-high "five nines"(99.999 percent) reliability. The future network architecture needs to cater for both mtc scenarios.

Key technology advancements. The 2016 Ericsson Mobility Report (https://www.ericsson.com/res/docs/2016/ericsson-mobility-report-2016.pdf)predicts that there will be 28 billion connected devices by 2021. On the device side, the key technology driver is the evolution of sensors, actuators, processors, memories, and batteries. Beyond conventional electronics, we will see implementations of nanoscale technologies based on thin-film, grapheme, and quantum sensors. We can expect any size and shape of device in the future.

Another emerging key technology is that of an advanced software toolbox leveraging advanced analytics, machine learning, and knowledge management with processing capabilities of real time streaming data. Intelligent control logic is another interesting area. There is an increasing need for standardized platforms and software protocols. These will inevitably drive market consolidation, with massive cost savings and productivity gains as a result.

Effective connectivity and identity management are fundamental to the future network. These imply automated deployments, aggregated subscription management as well as embedded provisioning and control through the whole life span of the device.

What does this mean for the future role of networks?

Iot devices enable us to monitor sensors and automate a lot of processes. The added intelligence needed is a feature that will mainly be embedded in the network itself.

For iot technology to live up to its promise and be applied on a massive scale throughout society, it must be built on a secure, global, telecom-grade network that is based on common standards. This will also ensure a healthy competitive and innovative ecosystem.

In terms of 5g, such an underlying network infrastructure is already in place – ready to show how well it is scaling and how its cost-efficiency properties support iot applications. 5goffers both superlight bandwidth with ultra-low latency and extreme battery life for devices. By combining cloud intelligence with a powerful but energy-efficient wireless connection, even very simple and inexpensive devices can be made smart and generate great business value

Communication beyond sight and sound communication will evolve in a highly remarkable way over the coming years, as interaction between human beings and machines evolves to include additional experiences and senses. The internet you can feel is on the horizon.

Today, 2dvideo is the most advanced form of communication people use to connect with each other. In the future, people will be able to participate in distant business meetings or attend a family gathering by sending an augmented 3dselfie. I am sure many people are looking forward to the day it will be possible to attend events such as Mobile World Congress, the fifa World Cup, or the Super Bowl virtually.

Emerging technologies in the fields of the tactile internet, virtual reality and augmented reality – supported by 5gnetwork evolution – are showing signs that the ability to experience an event virtually is no longer science fiction, but a feasible reality, and indicate a giant step forward in innovation.

The tactile internet is founded on the visionary principle that all of our human senses can be embedded in human machine interaction. Using haptics (interaction involving touch), remote experiences can be a near real-time representation of reality. To accomplish such realistic remote experiences, however, the loop connecting the disciplines of robotics, ai, and communications needs to be closed and near-zero latency requirements will need to be met.

Virtual and augmented reality are expected to become integral technologies of the Networked Society, potentially disrupting the consumer electronics market.

Pushing the boundaries of traditional physics To close the robotics, ai, and communications loop quickly, Ericsson has started a collaboration on the tactile internet with King's College London. As the research team puts it, "We need to beat the limits of the traditional laws of physics, as even the speed of light is not fast enough to enable these kinds of applications."

In this context, tactile communication enables haptic interaction between control and machine with visual feedback. Technical systems will need to support audiovisual interaction, and enable remote robotic systems to be controlled with an unnoticeable time lag. End-to end, components other than the physical distance separating control from machine add to the total system delay. For instance, video coding and rendering require a substantial amount of computational power, and so these components increase overall system delay.

This type of next-generation communication will contribute to the resolution of complex challenges that arise in many sectors such as education, health care, personal safety, smart city, traffic management and energy consumption. Some business-related examples include virtual stores, interactive 3d design labs, training, interactive entertainment, and enterprise communication. Presently, the gaming industry is the primary incubator for ar and vr.

Not just raw speed –some intelligence too.

Human-to-human and human-to machine communications will put high demands on future networks. Solutions supporting high capacity and extremely low latency in combination with high availability, reliability, and security will define the characteristics of the network. In massive video distribution, for example, the need for capacity is created by certain application needs for high resolution, high dynamic range, and high frame rate, which in turn necessitate link speeds in gigabits per second. But it's not just about raw speed. Our research in this area has, for instance, investigated the idea of dividing the amount of transmitted data into priority hierarchies with different time requirements, transmitting only data that has been modified and anticipating changes.

Fundamental technologies reshaping what networks can do

The laws of physics are the only real restriction on the development of communication networks. Ericsson is firmly committed to pursuing innovations that challenge present system limitations to help us reach beyond what is possible today.

While becoming increasingly versatile, the network's fundamental building blocks are also becoming much smaller, mimicking the way living things have evolved. The network of the future will be akin to the digital embodiment of an intuitive organism that is able to handle vast amounts of consciously intelligent automated resources. New materials in combination with innovative manufacturing technologies promise to radically enhance network capabilities.

Which technologies have the greatest potential to spur network evolution in the near future? In the semiconductor area, a wide range of new materials and manufacturing technologies will soon become mainstream. New packaging and integration technologies offer substantially increased bandwidth in addition to power reductions. The semiconductor industry is also at the cusp of leveraging new memory technologies that will be able to take on different roles in the system memory hierarchy,

as well as offering substantial improvements in system input and output performance. The semiconductor industry advances through continuous scaling of traditional cmos. Major players are working on the 10nm node, and industry roadmaps include 7nm and 5nm manufacturing technologies. Advanced 2.5d/3dintegration techniques for non-monolithic integration have the capability to offer a whole system function integrated on a single chip. These solutions are both cost and energy efficient. The introduction of multicore central processing unit solutions at power consumption equal to or lower than their predecessors is a predominant trend. Other trends include the development of various types of architectures aimed at significantly accelerating processing speed, such as massive parallel computing. Electrons and light blending in new ways Advances in silicon photonics allow for optical integration directly into the processing unit and other vital components in a communication network. Photonics will add properties such as low propagation loss, high data-transfer density, and excellent signal integrity. Bridging the gap between optical and electronic components, silicon photonics will shrink everything including the footprint, power consumption, and cost of high-speed network applications. Furthermore, silicon photonics will allow for greater disaggregation of functions, which opens up for more efficient hardware architectures, while enabling more aggregated data traffic.

Qubits – small but powerful .

Slightly further into the future, quantum computing promises to bring about an exponential increase in computational power. Quantum computing is a technology that builds on the quantum properties of elementary particles (qubits).

Qubits can be entangled with each other and can take on intermediate values compared with ordinary bits, which can only be either 1 or 0. This way, a quantum computer can increase parallelism and radically reduce the computing efforts needed to address certain types of problems. Researchers have already succeeded in creating qubits within a semiconductor, and the first fully operational quantum computer was displayed at the end of 2015. One of the main challenges is to keep the quantum state unperturbed, which requires extremely low temperatures and very good insulation from the surrounding environment.

By matching the exponential expansion of the digital universe with computational power that also grows exponentially, we are confident that we will be able to continue to stay on top of future demands for communication.

Weaving security and privacy into the IOT fabric

In a world where everyone's personal and financial information is available online, cyber security and privacy are very serious issues for consumers, corporations and governments alike. And the rapidrise of wearables, smart meters,and connected homes and vehicles makes security and privacy more vital than ever.

The complexity and heterogeneous nature of future networks and connected devices will require security and privacy controls to be made an intrinsic part of every

device, network, cloud and application. However, controls are only valuable if they can be managed in a fast and coordinated manner across all layers – preferably in an automated fashion, steered by policies and analytical insights rather than by the choices of an individual. Automated security and privacy management that is pervasive yet observable and auditable are the core characteristics that can enable the future Networked Society.

Weaving intelligence on three levels Three layers of technology make it possible to weave security and privacy protection into every layer of ict: actual security controls, security analytics, and an adaptive security posture.

Over the next decade, key security controls will include data sovereignty and novel identity management controls that are tailored to people and devices, as well as encryption technologies. Some encryption technologies are in the early phases of development but will begin to appear on the market in the next three to five years, as the underlying technologies mature. New root of-trust technologies that are applicable to both physical and virtual environments also show great promise, and significant effort will be put into making them a reality. Novel security analytics technologies can now provide insights that make it possible to create predictive security systems as opposed to reactive ones. These technologies could be used to create disruptive data management solutions in the near future, but for this to happen, we need to have context-aware security feeds and security analytics algorithms that correlate these feeds, often across multiple domains.

The third technology layer, the adaptive security posture, is achieved through automation, based on security analytics insights and policy-based automated orchestration of security controls.

It will all be built on trusted networks No single industry player will be able to address all of these challenges on its own. Industry-wide collaboration, joint development, and standardization – including vendors, service providers, and users – will be essential in order to realize the vision of a secure Networked Society that protects business assets and everyone's privacy.

Traditionally, network service providers rank among the most trusted industry players. With this in mind, I believe that network service providers and their networks will be the foundation upon which the trust for everything else – devices, clouds, communications and applications – is built. At Ericsson, our focus is on enabling networks to play this key role across multiple industries.

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DEVELOPMENT OF UZBEKISTAN IN ICT

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Summary. *Information Technology is a developing technology that aims at obtaining the maximum information with minimum of resources, labour our time. According to the dictionary, Information Technology is "the study or use of electronic equipment especially computers, for storing, analyzing and distribution of information of all kinds, including words, numbers and pictures." Ever since the appearance of Man on the earth, information has been the major cause of his progress and development.*

Key words: *innovative, modern technological base, communication technologies, implementation, the electronic evaluation system, data portal, electronic government, Virtual receptionist, portal.*

The Government of Uzbekistan (GoU) has acknowledged the need for invigorating the innovative activity as the main engine for sustainable growth. Some of the most notable government measures include reorganization of the State Committee for Science and Technology, institutional strengthening of the technology transfer centers and organization of annual innovation fairs. In the real sector of the economy, mass scale modernization is envisaged by the latest government medium-term investment program totaling more than USD 20 billion for that purpose.

For Uzbekistan, achieving innovative and technological development is of critical significance, as only through this way is it possible to create modern technological base, to produce competitive goods, to rationalize the use of natural resources, to increase the efficiency of the agricultural sector, and to improve international competitiveness. However, over the past 10-15 years Uzbekistan's National Innovation System has been suffering from consistent underinvestment in science and technology sector. Most developed economies of Western Europe, USA, Japan, and South Korea spend as much as 3% or more of their GDP on R&D annually, while in Uzbekistan this figure has been less than 0.1% according to most generous estimations.

Kim Nam Seok, the Korean ICT expert who are working as the Deputy Minister of Information technologies and communications of the Republic of Uzbekistan

published an article 'Uzbekistan: e-government deepens participatory democracy and state transparency' dedicated to accelerating the development and implementation of information and communication technologies in all spheres of life of the state and society.

It describes the implementation of the Program for the development of a modern and based on best practices of e-government system for the period until 2020 which was adopted on the initiative of the first President Islam Karimov. It is reported that at this stage there have already been achieved positive results, including the functioning of the Single portal of interactive state services rendering over 290 modern services. It is noted that since the beginning of 2016 the number of applications increased by 2 times and amounted to 800 thousand. Previously, the state had to spend more resources to provide these services manually.

The publication reports that the electronic evaluation system of intervention of legislative acts has become another effective tool for citizens and business participation in public decision-making. So, through this system more than 1,400 publicly available comments and proposals have been received and more than 800 normative-legal acts half of which was taken into account when approving the regulations.

'Commissioning of the new national open data portal, which was used more than 630 thousand times, has become an important tool for the development of business start-ups. The portal includes 1750 sets of public data provided by 109 organizations', - continues The Financial Times. The article notes that submission of tax and statistical reporting, processing of customs declarations, registration of businesses and trade names, running the system 'Electronic visa' became the most popular online services. At the same time, it is effectively functioning single mechanism of electronic trading on public procurement, electronic filing of claims and applications from entrepreneurs in economic courts, by the country's 'one-stop' centers for the collection of documents when applying for government services. Thus, citizens and business entities have access to the most relevant and popular public services through monitors or smart phones.

'Today, in the country with a population of 32 million people, 60% of which are youth, cellular communication is used by 21 million, and the internet - by more than 13 million people, says the publication. As a result of large-scale measures, which were adopted in the country, Uzbekistan has significantly improved position in 2016 UN ranking of on the level of e-government development, entering the 40% of the most advanced countries of the world and took 80 place among countries that use e-government, as well as the 47th place for e-participation index which assesses the effectiveness of the government dialogue with their citizens and businesses. In Uzbekistan this indicator is on the 3rd place among the CIS countries and the first among the Central Asian countries.'

As highlighted in the article, the introduction and development of e-government in Uzbekistan built in the rank of national priority, signed more than 40 governmental decisions on the 'electronic government', developed regulatory framework outlined in the Law 'On electronic government' and subsequently adopted by the Parliament of Uzbekistan.

'September 25, 2016 to create a virtual desk of the Prime Minister (pm.gov.uz), which dramatically improved the interaction of the population with the state authorities and has been part of the progressive democratization of society in Uzbekistan, says the source. Now, the population and business entities may apply directly to the Prime Minister with the unresolved problems, statements, complaints or suggestions instantly without any costs and a digital signature. The call center does not require personal information such as passport number, only the phone number is enough.'

It is noted that the virtual desk allows you to promote gender equality among applicants, and enables people with disabilities to use the portal via the phone number and contact the call center orally. It is emphasized that the benefits of Virtual receptionist obvious. This increase in public trust and reliability, ensuring the national approach to solving problems, the implementation of reforms on the basis of 'bottom-up', transparency and prevention of corruption. These factors, in turn, contribute to the gradual openness and transparency at all levels of power.

The Financial Times also informs about the future plans for the development of virtual reception of the Prime Minister, which include the connection of regional and subordinate units of government agencies, as well as the regional prosecutor's offices. 'This portal is intended to contribute to the improvement of institutional reform and should be a common platform for the public, as well as a friendly system for the population and businesses. With a commitment to the further development and innovation, Virtual Receptionist expects to be included in a UN report in 2018 as an exemplary model in terms of providing public services among the countries of the world,' the article says.

In conclusion the British edition emphasizes that e-government contributes to strengthening representative democracy and government transparency, and is an ongoing and dynamic driver of the bright future of Uzbekistan.

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FUTURE OF UZBEKISTAN IN ICT

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Summary. *Information communication technologies are opening new doors for government to develop spheres such as education, social life, medicine, science, agriculture and others. ICT is, and will continue to be, a catalyst in advancing and development. New information and communication technologies overcome the barriers of distance and time, and significantly improve the accessibility of information and knowledge. As a result, the sharing of information and knowledge quickly and effectively becomes feasible and acts as a key element in achieving development goals and mitigating the impact of unforeseen events such as natural disasters or outbreaks of disease.*

Key words: *ICT, technology, mitigate, communication, sphere*

At the present age, world in which we live has seen a number of great shifts and has another view currently than it was a couple of decades ago. Contributing reasons for that are undoubtedly revolution in sphere of technology more precisely in field of information communication technologies. Together with people information, communication technologies are opening new doors for government to develop spheres such as education, social life, medicine, science, agriculture and others. ICT is, and will continue to be, a catalyst in advancing and development. New information and communication technologies overcome the barriers of distance and time, and significantly improve the accessibility of information and knowledge. As a result, the sharing of information and knowledge quickly and effectively becomes feasible and acts as a key element in achieving development goals and mitigating the impact of unforeseen events such as natural disasters or outbreaks of disease.

From the first days of independence, Uzbekistan has paid great attention to the comprehensive development of information and communication technologies and their wide application in all spheres of life of state and society. Over a short period, the authorities created the legal framework conducive to further formation and progress of market of IT-technologies. In particular, in 1992 the Law "On telecommunications" was adopted, which established general principles of progressive promotion of the industry. Issues of ICT legal regulation received further development in the Law "On information" dated December 11, 2003. At present the Complex program of development of National information and communication system of the Republic of Uzbekistan for 2013-2020 is being implemented. This program was approved by the first President's Resolution dated June 27, 2013. Making a statement at enlarged meeting of the Cabinet of Ministers dedicated to the socio-economic development in 2015 and the most important priorities of economic program for 2016, where 1st

President Islam Karimov noted that in today's conditions in the era of Internet and electronics, the widespread introduction of information and communication technologies in the fields of economy, radical acceleration of creation of system "Electronic government" are of priority significance. As the head of our state underlined, development of ICT has a direct impact on the level of competitiveness of the country, allows you to collect and summarize vast amounts of information, offers great opportunities for management at strategic level.

The use of ICT and software products in the management and production processes plays a major role in the development of sectors of the economy and the domestic industry. For instance, in 2014-2015 in the framework of a special state program 86 projects have been realized in order to introduce information systems in large joint-stock companies, associations and organizations totaling more than 330 billion soums.

Our country regularly hosts major events dedicated to the development of hi-tech industry. In particular, Week of information and communication technologies ICT Week Uzbekistan is being held since 2004. Traditionally it is opened with national exhibition of information technologies ICT Expo, which takes place simultaneously in two cities - Tashkent and Samarkand. The exhibition presents existing and future forms of ICT-based services, oriented to business community and authorities, and general population. Among the important events of the week - The Forum for Information and Communication Technologies ICTForum, where representatives of leading companies, industry experts and foreign experts discuss state and prospects of progress in this sphere.

As part of the week conferences competition named BestSoft of Uzbekistan are also being held, during which they demonstrate the latest achievements of software developers, and e-Government Uzbekistan dedicated to the strategic objectives in the field of "e-government", results of implemented projects, exchange of experience and ideas in this direction.

Particular attention is paid to development of national market of software products. In order to stimulate domestic programmers the National register of software developers has been created, which already included 69 companies. A directory of software manufacturers Software.uz has been developed that provides necessary information to citizens and businesses. According to the Resolution of the first President of the Republic of Uzbekistan "On measures to further strengthen the incentives of domestic software developers" dated September 20, 2013 new benefits and preferences for members of software industry were introduced. Thus, they are exempt from customs duties for imported equipment for their own use, components, parts, technical documentation and software until January 1, 2017.

Currently, major domestic centers of integration of education, science and industry - Tashkent State Technical University (TSTU) and Tashkent University of

Information Technologies (TUIT) - train specialists in technical direction and for IT sector. In 2013, At the same time, these universities carry out scientific research on the basis of active cooperation with leading industrial enterprises of the country. From October 1, 2014 the branch of the prestigious South Korean Inha University began its activity in Tashkent. Professionals in areas such as computer and software engineering, computer network engineering are trained here. Thus, the domestic IT-industry is developing successfully, joint ventures are being created, new software projects are being developed and implemented, Internet is gaining more space. Ongoing consistent measures in this direction contribute to further development of information society in Uzbekistan and its integration into the global information space.

Considering opportunities of Uzbekistan in ICT, achieved results as well as planned projects with foreign countries for the future indicate that in the future such a growth rate is not predicted to decrease whereas show a gradual rise.

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PROTECTION OF INFORMATION AND WIRELESS NETWORKS

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The very principle of wireless data transmission includes the possibility of unauthorized connections to access points. Take up the "non-protracted" threats that form the basis of the problem. When developing a corporate network, administrators primarily take care of the quality of coverage of offices, forgetting that hackers can connect to the network directly from a car parked on the street. There are situations where it is simply impossible to block the very possibility of "hearing" traffic transmitted.

No less dangerous threat - the probability of theft of equipment. If the security policy of the wireless network is built on MAC addresses, then the network card or access point stolen by the attacker can open access to your network.

Often unauthorized connection of access points to LAN is performed by the employees of the enterprise. Protection of information when connecting to a network of such devices employees also provide on their own, not always thinking about the consequences.

The solution to such problems must be dealt with in a comprehensive manner. Organizational activities within the framework of this article are not considered - they are often chosen based on the operating conditions of each particular network. As for technical events, a very good result is achieved by using mandatory mutual authentication of devices and the implementation of active (Obrserver 8.3, Airopeek NX 2.01, Wireless Sniffer 4.75) and passive (APTools 0.1.0, xprobe 0.0.2) monitoring tools.

Vulnerability of old methods of protection

IEEE 802.11 has always dealt with data security in wireless networks. Unfortunately, the methods of securing the networks of the 803.11x at the stage of their initial development (1997-98) were used, to put it mildly, unsuccessful.

The classic WEP encryption protocol developed by RSA Data Security uses a 40-bit key that is added to the generated initialization vector (IV, 24 bits). Using the obtained key, the user data and the checksum are encrypted using the RC4 algorithm. Vector IV is transmitted in clear form.

The first disadvantage is of course the 40-bit key, since even DES with its 56-bit key has long been considered unreliable. The second disadvantage is the immutability of the key - the use of a static key simplifies the problem of hacking. And finally, the very approach to encryption seems very doubtful, the size is IV-24 bits, which means it will be repeated no later than 5 hours (the packet length is 1500 bytes, the speed is 11 Mbps), and this is in the extreme case.

Authentication methods also do not inspire much confidence. For example, it is not worthwhile to overhear the entire MAC authentication procedure, because the MAC addresses in the frame are transmitted unencrypted. The most successful of these methods is PreShared Key. But it is good only with reliable encryption and regular replacement of quality passwords.

There is a common misconception that the use of a unique Service Set ID (SSID) avoids unauthorized connections. Alas, SSID is only suitable for logical partitioning of network devices into groups. The only thing you can do with SSID is to embarrass crackers using "unprintable" characters.

WEP attacks.

Insufficient key length, absence of its rotations and the very principle of RC4 encryption all allow the attacker to organize a very effective passive attack. And for

this he will not have to do any actions that would help him to find out - he will just listen to the channel. It is not required at the same time with special equipment-it grabs a conventional WLAN card, bought dollars for 20-25, and also a program that will accumulate packages on the hard disk until the values of the vector IV match. When the number of packets becomes sufficient (most often from 1 to 4 million packets), the WEP key is easily computed.

Good results can reach a hacker, resorting to active methods of attack. For example, by sending to the local network known data (say, from the Internet) and simultaneously analyzing how the access point encrypted them. This method allows you to calculate the key and manipulate the data.

Another method of active attack - Bit-Flip attack. The algorithm of the action is as follows. In the intercepted frame encrypted by WEP, several bits in the "Data" field arbitrarily change, the CRC-32 checksum is recalculated and sent back to the access point. The access point receives the frame at the link level, because the checksum is correct, tries to decrypt this and responds in advance to the known text, for example: "Your encryption key is incorrect". Subsequent comparison of the text in an encrypted and unencrypted form can allow the calculation of the key.

DOS attacks using the DSSS broadband modulation method can affect 802.11b and 802.11g devices operating at low speeds.

All of the above allows us to talk about the unreliability of the old methods of providing security in wireless networks, therefore, in cases where existing equipment does not allow the implementation of modern security solutions

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IMPLEMENTATION OF INFORMATION SYSTEMS IN ENTERPRISES

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Summary. *The article describes the requirements for modern information systems and highlights the key stages of their implementation.*

Key words: *information system, ICC, EIS, development of methodologies*

Realities of today's business is such that the development of information technology has a direct impact on the growth of the business performance of enterprises. For example, the introduction of the e-mail dozens of times to accelerate the process of interaction, both between different companies, and their component parts. The appearance of the Internet and all gave rise to such a thing as a "transnational corporation" in its modern sense. Thus, we can conclude that the timely development of information technologies and integrate them into their business processes (and possibly new organization) offers a wide range of competitive opportunities. But the introduction of new technologies is often not possible alone and requires the adoption of a package of measures aimed at modernizing the (creation) of business processes. In such cases, said the introduction of new enterprise information system. Let us consider what constitutes such a system and what factors may influence the need for its occurrence in the enterprise.

To date, the term "information system" is rarely used in this form, and is often replaced with the acronym EIS (enterprise information system), especially when it comes to plants. What is such a system? On this score, there are many opinions, but they all agree on the fact that the ICC - an open integrated and automated real-time system, whose main objective - the implementation of the automation of business processes at all levels, including business processes and management decision-making. The scale of the system can vary from a few local computers to the local operating system to hundreds of users and thousands of pieces of equipment with specialized software. But whatever the scale, the ICC must meet several requirements:

1) Ease of use.

Implies a possibility to control all information in the enterprise.

2) Reliability.

Implies a high degree of fault tolerance and safety information.

3) Protection of information.

Implies a high level of protection for information in its transmission and storage.

In addition to the above requirements of the implemented EIS should address a range of tasks, otherwise it will not be effective. We formulate these problems.

1) Storage and processing of information.

2) Storage of different structure.

3) Analyze and forecast information flows.

4) Study of methods of storage and reporting person.

5) Implementation of information retrieval.

6) Create storage infrastructure and data.

Of course, a system satisfying all the conditions will be quite extensive, complex and require a lot of resources, both technical and financial, and human. Therefore, the decision to integrate the ICC in the enterprise will only be accepted if the integration is justified. In turn, the study is based on an assessment of existing systems and new

accounting requirements or on the forecast, if the construction of the system starts with zero. A closer look at aspects mandatory consideration when deciding on the implementation of the ICC in the enterprise and the subsequent problems in implementation.

1) Justification for the introduction.

ICC as a tool in business to penetrate the enterprise at once, but gradually. The organizations themselves come in different ways to the idea of the introduction of the ICC. The prerequisites for such a solution may be as the reorganization of production and intense competition, and a variety of other reasons.

2) The restraining forces.

As a living organism, the company responds to any changes, both external and internal. Very rarely changes are accepted without any resistance. But not always, this resistance is due to a personal aversion employees and managers or organizational difficulties, which may account for the bulk of all the problems in the implementation phase. It happens that there is no technical possibility of upgrading. It can include both backward and technical base (IT-infrastructure), financial problems, and difficulty or inability to adapt existing enterprise business processes.

3) How to overcome the constraints

Any disputes must be solved without delay, because they directly affect the speed and quality of implementation of CIS. The more unwise to stay after the decision to implement and carry out all preparatory procedures. But if the technical and financial problems are the trivial solution in the form of increased funding, the work to overcome the difficulties with the staff is specific, since different people need different manifestation of the (individual) approaches. Therefore, in addition to providing new information and the implicit or explicit coercion, often resorting to the involvement of employees in resisting the implementation process, teaching them new skills necessary or compensate them for the costs incurred by the changes carried out (for example, payments to employees abbreviation).

4) Implementation of the ICC

Conditionally self-introduction is divided into four stages. First, being prepared, which involves the formulation of the upcoming changes and notification of all participants, which will touch this change, as well as an analysis of all the constraints. The next stage is the so-called "defrosting". It involves the training of personnel for future changes and the development of measures to help them safely take any changes. Then, the implementation team spends all planned changes according to existing schedules. After that stage of "freezing" is designed to consolidate all committed changes in the company, thereby returning the company to a new EIS stable state. It should also be noted that the above steps may be repeated several times.

5) Evaluation of the results

An important aspect of the implementation project is to assess the results of these works, a detailed analysis of which can provide an answer to the nature of the difficulties encountered and lessons learned can be applied both at the same company in the case of new developments, and in similar enterprises.

Advances in technology lead to an increase in the complexity of information systems, which incorporate both technical innovations and new trends and solutions in the field of business. It is safe to say that today the availability of the ICC in the enterprise is necessary, otherwise the organization risks losing its competitive edge and disappear. So, the development of methodologies for the implementation of information systems will be developed in the near future at a rapid pace.

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THE RASPBERRY PI HARDWARE OVERVIEW

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Summary. *This article describes how to use new RASPBERRY PI micro scheme. Here we can see analysis of Pi micro scheme.*

Key words: *raspberry PI, I/O ports, HDMI, GFLOPS, performance.*

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside of its target market for uses such as robotics.

Peripherals (including keyboards, mice and cases) are not included with the Raspberry Pi. Some accessories however have been included in several official and unofficial bundles.

According to the Raspberry Pi Foundation, over 5 million Raspberry Pishave been sold before February 2015, making it the best-selling British computer. By 9 September 2016 they had sold 10 million

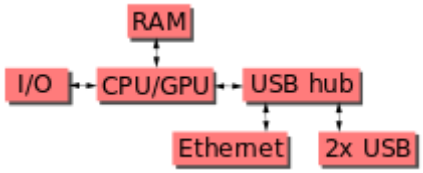
Several generations of Raspberry Pishave been released. The first generation (Raspberry Pi 1 Model B) was released in February 2012. It was followed by a simpler and inexpensive model Model A. In 2014, the foundation released a board with an improved design in Raspberry Pi 1 Model B+. These boards are approximately credit-card sized and represent the standard mainline form-factor. Improved A+ and B+ models were released a year later. A "compute module" was released in April 2014 for embedded applications, and a Raspberry Pi Zero with smaller size and reduced input/output (I/O) and general-purpose input/output (GPIO) capabilities was released in November 2015 for US$5. The Raspberry Pi 2 which added more RAM was released in February 2015. Raspberry Pi 3 Model B released in February 2016 is bundled with on-board WiFi, Bluetooth and USB Boot capabilities. As of January 2017, Raspberry Pi 3 Model B is the newest mainline Raspberry Pi. Raspberry Pi boards are priced between US$5–35. As of 28 February 2017, the Raspberry PI Zero W was launched, which is identical to the Raspberry PI Zero, but has the Wi-Fi and Bluetooth functionality of the Raspberry PI 3 for US$10.

All models feature a Broadcom system on a chip (SoC), which includes an ARM compatible central processing unit (CPU) and an on-chip graphics processing unit (GPU, a VideoCore IV). CPU speed ranges from 700 MHz to 1.2 GHz for the Pi 3 and on board memory range from 256 MB to 1 GB RAM. Secure Digital (SD) cards are used to store the operating system and program memory in either the SDHC or MicroSDHC sizes. Most boards have between one and four USB slots, HDMI and composite video output, and a 3.5 mm phone jack for audio. Lower level output is provided by a number of GPIO pins which support common protocols like I^2C. The B-models have an 8P8C Ethernet port and the Pi 3 and Pi Zero W have on board Wi-Fi 802.11n and Bluetooth.

The Foundation provides Raspbian, a Debian-based Linux distribution for download, as well as third party Ubuntu, Windows 10 IOT Core, RISC OS, and specialised media center distributions. It promotes Python and Scratch as the main programming language, with support for many other languages. The default firmware is closed source, while an unofficial open source is available

Hardware

The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity and peripheral-device support.



Pic 1. Scheme of raspberry PI

This block diagram depicts Models A, B, A+, and B+. Model A, A+, and the Pi Zero lack the Ethernet and USB hub components. The Ethernet adapter is internally connected to an additional USB port. In Model A, A+, and the PI Zero, the USB port is connected directly to the system on a chip (SoC). On the Pi 1 Model B+ and later models the USB/Ethernet chip contains a five-point USB hub, of which four ports are available, while the Pi 1 Model B only provides two. On the Pi Zero, the USB port is also connected directly to the SoC, but it uses a micro USB (OTG) port.

Processor

Pic 2. Image of Raspberry PI board

The Raspberry Pi 2 uses a 32-bit 900 MHz quad-core ARM Cortex-A7 processor.

The Broadcom BCM2835 SoC used in the first generation Raspberry Pi is somewhat equivalent to the chip used in first generation smartphones (its CPU is an older ARMv6 architecture), which includes a 700 MHz ARM1176JZF-S processor, VideoCore IV graphics processing unit (GPU), and RAM. It has a level 1 (L1) cache of 16 KB and a level 2 (L2) cache of 128 KB. The level 2 cache is used primarily by the GPU. The SoC is stacked underneath the RAM chip, so only its edge is visible.

The Raspberry Pi 2 uses a Broadcom BCM2836 SoC with a 900 MHz 32-bit quad-core ARM Cortex-A7 processor (as do many current smartphones), with 256 KB shared L2 cache.

The Raspberry Pi 3 uses a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-core ARM Cortex-A53 processor, with 512 KB shared L2 cache.

Performance

The Raspberry Pi 3, with a quad-core Cortex-A53 processor, is described as 10 times the performance of a Raspberry Pi 1. This was suggested to be highly

dependent upon task threading and instruction set use. Benchmarks showed the Raspberry Pi 3 to be approximately 80% faster than the Raspberry Pi 2 in parallelized tasks.

Raspberry Pi 2 includes a quad-core Cortex-A7 CPU running at 900 MHz and 1 GB RAM. It is described as 4–6 times more powerful than its predecessor. The GPU is identical to the original. In parallelized benchmarks, the Raspberry Pi 2 could be up to 14 times faster than a Raspberry Pi 1 Model B+.

While operating at 700 MHz by default, the first generation Raspberry Pi provided a real-world performance roughly equivalent to 0.041 GFLOPS. On the CPU level the performance is similar to a 300 MHz Pentium II of 1997–99. The GPU provides 1 Gpixel/s or 1.5 Gtexel/s of graphics processing or 24 GFLOPS of general purpose computing performance. The graphical capabilities of the Raspberry Pi are roughly equivalent to the performance of the Xbox of 2001.

The LINPACK single node compute benchmark results in a mean single precision performance of 0.065 GFLOPS and a mean double precision performance of 0.041 GFLOPS for one Raspberry Pi Model-B board. A cluster of 64 Raspberry Pi Model B computers, labeled "Iridis-pi", achieved a LINPACK HPL suite result of 1.14 GFLOPS (n=10240) at 216 watts for c.

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FOREIGN LANGUAGE TEACHERS' PERCEPTIONS AND EXPECTATIONS OF COMPUTER TECHNOLOGY USE IN FOREIGN LANGUAGE LEARNING AND TEACHING

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Summary. *This article sets out to give a general overview of the availability of technology for foreign language (FL) teaching and learning today, to outline the various uses of ICTs (Information and Communication Technologies) in the higher education sector and to point towards future developments and possible implementation in the teaching of ESP (English for Specific Purposes) in higher education in Uzbekistan.The article aimed to examine teachers' perception, motivations and engagement with learning technology in their ESP classes.*

Key words *: ICT, technology, online interaction, whiteboard, ICT application , tools, language, classrooms, education, multimedia services, pupils, communicate, research, learning environments, teaching methods, enhanced, interaction.*

ICT use in general terms is any use of "computing devices such as desktop computers, laptops, software, or Internet for instructional purposes". The use of ICT in foreign language (FL) education, has developed from the earliest stages in audio tapes, word processing, and CD-ROM to Internet browsing, online interaction with peers and such as chat, video teleconferencing, whiteboard, discussion forum, social networking sites, email and other forms of technology including blogs, wikis, IPod, and MP3s. The extensive use of Web 2.0 components, Internet, blogs, e-groups, emails, socializing portals, e-dictionaries, e-encyclopedias, PowerPoint presentations, webcasting, and audio-video, as teaching tools has emerged in the classroom. Combining several of the previous tools and integrating multimedia services one can create a virtual learning environment (VLE) that offers not only content management and exams servicing but also an innovative teaching method that can increase the active role of student in the classroom. These tools brought about a more learner-centered approach and an increased focus on interaction among students and teachers. . Thus, ICT contributes in creating authentic learning environments.ICT application for teaching/learning purposes in ESP has become an issue of debate in contemporary education.

Studies in English as a Foreign Language education have shown that the main benefits of ICT use in the classroom are pupils' motivation for both language learning and linguistic proficiency as well as increased learning competencies. The students display an enhanced sense of achievement and increase in self-directed learning, with the ability to communicate, conduct research and present ideas effectively beyond the confines of the class use of ICT tools in teaching and learning has positive effects on learning as it gives pupils greater enjoyment and interest, enhanced self-esteem and an increased commitment to the learning task. In this area previous studies have also shown that teachers have positive attitudes toward online learning and web-enhanced language learning resources.

However, the need for teacher involvement is necessary to avoid leaving the technology to control the lessons. ICT can be effective only with the teacher's role as a

"facilitator" who plans and guides the lesson. A number of different ICT tools and applications may be integrated in teaching and learning.

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FUTURE DEVELOPMENT OF ICT IN UZBEKISTAN

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Summary. *In this article, the question of the problem of Uzbekistan is being considered. And it is precisely what position Uzbekistan had in the sphere of ICT before independence, what state at the moment and what is being done to develop this sphere in our state.*

Key words: *IKT, internet, telecommunication, digital television, the Unified Portal for State Interactive Services, DWDM communication, Islam Karimov*

In Uzbekistan, the government supports the development of Informational Technologies, promising new, advanced programs to introduce IT ideas and original methods. In such short period after gaining Independence, the young country achieved a big growth in the field of ICT. Currently our country is confidently open new spheres, inventing new type of communication technologies.

After independence, the first president of the country paid special attention to the development IT among all other sectors. An issue of strengthening legal, organizational, personnel and technological base of the industry has considered one of the most important. A nationwide expansion plan of ICT was created, which brings a high level of growth. Thanks of young peers confidently learning of leading technologies linked with technology and communication, which also easily manage and create innovations and implement of ICT projects.

Using actively developed potential, Uzbekistan is able to give a worthy response to all kind of challenges of the present world whether they are technical or technological, having subordinated them to the processes of economic or social growth, building the democratic society, increase of its well-being. In the optimal terms, the national information space was formed in the republic.

At present, the last generation of ICT sphere is being actively formed in Uzbekistan. Expansion the coverage area of fiber-optic communications lets to expand the list of IT services offered on the market now, improving the conditions of benefits of fast Web Television, speedy Internet, Airing high quality TV and radio channels. Modernization of the backbone data transmission network ensured the speed of date transfer to the cities 40 Gbit / s, to the rural areas - 10 Gbit/s.

Digitalization of long-distance, international, and also local telephone exchanges is provided, telecommunication networks are reconstructed, the obtained indexes of advancement which meets all requirements of modern world. In foreseen future, it's planned to dramatically increase the number of channels of Internet access, the speed has been increased several times. This in turn has allowed over the last five years reducing the prices by more than 6 times for operators and providers.

Construction more than 1,800 kilometers of fiber optic lines over the territory of the country contributed to strengthening the potential of high-speed Internet of the country. A DWDM communication network has been launched, capable of transmitting up to 100 Gbps of data per second. It should be noted that this network, which ensures the growth of the conductivity of backbone networks and the introduction of high-speed Internet services, is the first telecommunications system in Central Asia that has such a high speed. [1]

Innovations are widely introduced in the sphere of television. The main property of digital television is image quality. Digital signal processing in the transmission and reception processes allows achieving even higher quality.

At the initiative of the first President- Islam Karimov, the country has developed a concept and program for the transition to digital television. Their practical implementation began on August 22, 2008, with the creation of experimental zones for the transition to digital television in Tashkent and Bukhara, where digital television transmitters were installed. In the experimental zones, the features of digital television were thoroughly studied, which allows to form a technical and methodological base for further activities in this direction. [2]

The active use of ICT is based on a widely branched, equipped with the newest types of equipment and technologies, infrastructure, high staff potential. This work is based on the desire to improve the quality of life of people, to facilitate their daily life, to ensure the effective use of information and communication technologies in public administration.

As a result of the large-scale transformations taking place in the country, it is worth noting the enormous changes that have occurred in the minds and thinking of compatriots, their attitude to the events taking place around them, their increased sense of belonging to them, increasing political activity and strengthening their civic position.

In 2013, the Unified Portal for State Interactive Services was created, which allowed citizens and legal entities to obtain information about public services, as well

as to use them in electronic form. If at that time the state and economic regulation authorities provided only 40 types of state interactive services through the portal, today their number is 280. By the end the year 2027 it is planned to increase the current figure to 300 or more. Now, citizens can freely apply to any kind of issues by informing Unified Portal of digital Public Services, without need to leave their homes. Over the half of decade the quantity of the virtual appeals of the citizens, business entities to state bodies through the Single Portal has been increased by 130 times. [3]

Services are becoming more demanded, as evidenced by numerous user reviews. The openness and efficiency of the activities of state bodies are now not only provided, but are also increasing. Based on the needs and interests of citizens, the opportunities for providing state-run interactive services at a distance are expanding. Provision of tax and statistical reporting, registration of the customs declaration, registration of newly created economic entities are carried out in electronic form. And this is an important criterion for ensuring the well-being of the people.

As a result, it can be said that the most important and main aims for the improvements and quality of communications are: the widespread establishment of new ICT projects over the all territory of their country, obtaining additional date on HD television, and further increasing the provision of virtual support services. This kind of improvements will bring us for the socio-political, social and fiscal growth of our country.

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FUTURE OF UZBEKISTAN IN ICT

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Summary. *This article is devoted to the development of information and communication technologies, achievements and further plans for the bright future of ICT in Uzbekistan.*

Key words: *information technologies, ICT, e-government, digital revolution, communication.*

Generally speaking, information and communication technologies have existed for centuries and have been important components of virtually all economic systems. What has changed in the last 10-50 years has been the development of techniques for managing, processing and communicating digital information. With digital ICTs, information can be duplicated exactly at very low marginal cost and transmitted quickly over long distances at speeds unimaginably rapid when compared to previous methods.

Thus, Uzbekistan: e-government deepens participatory democracy and state transparency dedicated to accelerating the development and implementation of information and communication technologies in all spheres of life of the state and society. It describes the implementation of the Program for the development of a modern and based on best practices of e-government system for the period until 2020 which was adopted on the initiative of the first President Islam Karimov. It is reported that at this stage there have already been achieved positive results, including the functioning of the Single portal of interactive state services rendering over 290 modern services. Thus, the effect of ICTs and the digital revolution on economic growth, social capital, and political development in a country goes far beyond the contribution of the ICT sector. ICTs affect the efficiency and productivity of other economic processes, the distribution of economic gains and basic services and the transparency and accountability of the government.

Uzbekistan has had several factors working in its favor as a major ICT power: a sizeable population, high urbanization, income levels and distribution, extremely high literacy rates, and pre-existing engagement in export promotion strategies. These have all set the stage for successful ICT industrial policy and support from both economic and social factors. As important as these factors are, they would all amount to little without pro-active involvement from Republic of Uzbekistan's political leadership to ensure that appropriate planning; infrastructure and human capacity building capitalize on these strengths. Could Uzbekistan serve as a model for other developing countries seeking to grow through ICT industries? India, Korea and Brazil also show the value of a literate and educated population to developing industries in software and multimedia development, but the large income disparities of these countries have made

it difficult to spread the advantages of ICT development beyond a small elite sector of their societies.

Today, in the country with a population of 32 million people, 60% of which are youth, cellular communication is used by 21 million, and the internet "by more than 13 million people", says the publication. As a result of large-scale measures, which were adopted in the country, Uzbekistan has significantly improved position in 2016 UN ranking of on the level of e-government development, entering the 40% of the most advanced countries of the world and took 80 place among countries that use e-government, as well as the 47th place for e-participation index which assesses the effectiveness of the government dialogue with their citizens and businesses. In Uzbekistan this indicator is on the 3rd place among the CIS countries and the first among the Central Asian countries. As highlighted that the introduction and development of e-government in Uzbekistan built in the rank of national priority, signed more than 40 governmental decisions on the electronic government, developed regulatory framework outlined in the Law 'On electronic government' and subsequently adopted by the Parliament of Uzbekistan.

With technologies and production processes evolving rapidly, knowledge of available and emerging technologies, the new opportunities and product improvements they enable, as well as the costs of introducing them have become a key means for keeping businesses dominant, innovative, productive and relevant in their specific industries. A business knowledge of its own workforce, its capabilities, training needs and grievances with management are all vital to maintaining the productivity of what is often the most expensive factor of production. Finally, knowledge of overall productivity is essential to business viability in a constantly changing and increasingly global business environment. Without knowledge of their own productivity information, companies cannot make effective decisions on what products to introduce, discontinue, outsource and innovate or how to keep their management and workforce trained for necessary tasks and performing profitably. Industrial knowledge management does not intrinsically demand ICT-based information and communication networks but the large quantities of data and analysis to meet modern global business needs generally require decentralized data gathering that can be readily compiled and rolled up to management. Of the options available for such tasks, most businesses and managers find ICTs, the Internet, intranets and similar technologies to be the most cost effective, particularly when businesses expect to operate on an international playing field.

In conclusion, we can emphasize that e-government contributes to strengthening representative democracy and government transparency, and is an ongoing and dynamic driver of the bright future of Uzbekistan.

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FIBER OPTICS

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Summary. *Fiber optics have become the industry standard for the terrestrial transmission of telecommunication information. Fiber optics will continue to be a major player in delivery of broadband services. This article is about developing of fiber optic in industry, its usage, demand for it and its pros and cons.*

Keywords: *fiber, optic, communications, type, cable, transmitting, modulate,*

Nowadays information technologies are developing rapidly in globalization process. Exchanging information process is rapidly increasing. Nowadays exchanging information process not only chatting also one of the power of acting became society progress. The size of information’s transmission, its speed and rising its quality giving the possibilities of enlarging the types of communication sources. At present optical instruments and devices are developing in many spheres and communication.

Fiber-optic communication is a method of transmitting information from one place to another by sending pulses of light through an optical fiber. The light forms an electromagnetic carrier wave that is modulated to carry information. Fiber is preferred over electrical cabling when high bandwidth, long distance, or immunity to electromagnetic interference are required.

Optical fiber is used by many telecommunication companies to transmit telephone signals, Internet communication, and cable television signals. Due to much lower attention and interference, optical fiber has large advantages over existing copper wire in long-distance and high-demand applications. However, infrastructure development within cities was relatively difficult and time-consuming, and fiber-optic systems were complex and expensive to install and operate. Due to these difficulties, fiber-optic communication systems have primarily been installed in long-distance applications, where they can be used to their full transmission capacity, offsetting the increased cost.

The phone system is mostly fiber optics beyond the short subscriber link. Fiber links offer over 1,000 times as much bandwidth over distances over 100 times further. Specifically, you can have:

	Distance	Bandwidth	Voice Channels
Copper	2.5 km	1.5 Mb/s	24
Fiber	200 KM	2.5+ Gb/s	32,000 +

Fiber does not have infinite bandwidth either! At least not the multimode fiber used in most premises networks. It's a lot higher than copper, but as you approach gigabit speeds, you are limiting the distances available for links to 500 meters or so.

Optical fibers come in two main types:

A **single-mode** fiber has a small core that forces the light waves to stay in the same path, or mode. This keeps the light signals going further before they need to be beefed up, or amplified. Most longdistance, or long-haul, fiber optic telephone lines use single-mode fiber.

A **multimode fiber** has a much larger core than single-mode fiber. This gives light waves more room to bounce around inside as they travel down the path. The extra movement eventually causes the pulses to smear, and lose information. That means multimode fiber signals can't travel as far before they need to be cleaned up and reamplified. Multimode fibers can carry only a third or less the information-carrying capacity—or bandwidth—than single-mode fiber. The technology for multimode fiber is less expensive and can only be used for short distances (such as in LANs)

These types of fibers have sharp boundaries between the core and cladding, with clearly defined indices of refraction. The entire core uses single index of refraction. Single mode fiber has a core diameter of 8 to 9 microns, which only allows one light path or *mode.*

There are advantages and disadvantages of Fiber optic.

Advantages & Disadvantages With Optical Fibers

Advantages

- **Bandwidth** - Fibre optic cables have a much greater bandwidth than metal cables. The amount of information that can be transmitted per unit time of fibre over other transmission media is its most significant advantage. With the high performance single mode cable used by telephone industries for long distance telecommunication, the bandwidth surpasses the needs of today's applications and gives room for growth tomorrow.
- **Low Power Loss** - An optical fibre offers low power loss. This allows for longer transmission distances. In comparison to copper; in a network, the longest recommended copper distance is 100m while with fibre, it is 2000m.
- **Interference** - Fibre optic cables are immune to electromagnetic interference. It can also be run in electrically noisy environments without concern as electrical noise will not affect fibre.

- **Size** - In comparison to copper, a fibre optic cable has nearly 4.5 times as much capacity as the wire cable has and a cross sectional area that is 30 times less.
- **Weight** - Fibre optic cables are much thinner and lighter than metal wires. They also occupy less space with cables of the same information capacity. Lighter weight makes fibre easier to install.
- **Safety** - Since the fibre is a dielectric, it does not present a spark hazard.
- **Security** - Optical fibres are difficult to tap. As they do not radiate electromagnetic energy, emissions cannot be intercepted. As physically tapping the fibre takes great skill to do undetected, fibre is the most secure medium available for carrying sensitive data.
- **Flexibility** - An optical fibre has greater tensile strength than copper or steel fibres of the same diameter. It is flexible, bends easily and resists most corrosive elements that attack copper cable.
- **Cost - The raw materials for glass are plentiful, unlike copper. This means glass can be made more cheaply than copper.**

Disadvantages

- **Cost** - Cables are expensive to install but last longer than copper cables.
- **Transmission** - transmission on optical fibre requires repeating at distance intervals.
- **Fragile** - Fibres can be broken or have transmission loses when wrapped around curves of only a few centimetres radius. However by encasing fibres in a plastic sheath, it is difficult to bend the cable into a small enough radius to break the fibre.
- **Protection - Optical fibres require more protection around the cable compared to copper.**

The rapid expansion of wireless telecommunications networks, including cellular phone and data services, measured either by data volume or bandwidth, means fiber optic transmission technology will be a significant part of the future systems. Engineers are becoming more familiar and comfortable with fiber solutions.

Beginning with XXI century Ethernet technologies has been changing to fiber in Uzbekistan. Because fiber is more optimal than Ethernet. More than 10 telecommunication operators in Uzbekistan have been actively introducing broadband access technologies via fiber – optic connections based on FTTx architecture for multi-storey residential houses and buildings. According to experts, fiber optic network is most widespread in Tashkent region -32600 subscribers, in Samarkand -23800 subscribers. In my opinion after 10 years fiber optic network will take the whole Uzbekistan.

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CLOUD COMPUTING

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Summary. *This paper explores some of the basics of cloud computing with the aim of introducing aspects such as:*

- *Realities and risks of the model*
- *Components in the model*
- *Characteristics and Usage of the model*

The paper aims to provide means of understanding the model and exploring options available for complementing the technology and infrastructure needs.

Key words: *cloud, computing, model, software, platform, service, private, public, hybrid, Internet.*

What is the cloud? Where is the cloud? Are we in the cloud now? These are all questions you've probably heard or even asked yourself. The term "cloud computing" is everywhere.

In the simplest terms, cloud computing means storing and accessing data and programs over the Internet instead of your computer's hard drive. The cloud is just a metaphor for the Internet. It goes back to the days of flowcharts and presentations that would represent the gigantic server-farm infrastructure of the Internet as nothing but a puffy, white cumulus cloud, accepting connections and doling out information as it floats.

What cloud computing is not about is your hard drive. When you store data on or run programs from the hard drive, that's called local storage and computing. Everything you need is physically close to you, which means accessing your data is fast and easy, for that one computer, or others on the local network. Working off your hard drive is how the computer industry functioned for decades; some would argue it's still superior to cloud computing, for reasons I'll explain shortly.

The cloud is also not about having a dedicated network attached storage (NAS) hardware or server in residence. Storing data on a home or office network does not

count as utilizing the cloud. (However, some NAS will let you remotely access things over the Internet, and there's at least one brand from Western Digital named "My Cloud," just to keep things confusing.)

For it to be considered "cloud computing," you need to access your data or your programs over the Internet, or at the very least, have that data synced with other information over the Web. In a big business, you may know all there is to know about what's on the other side of the connection; as an individual user, you may never have any idea what kind of massive data processing is happening on the other end. The end result is the same: with an online connection, cloud computing can be done anywhere, anytime.

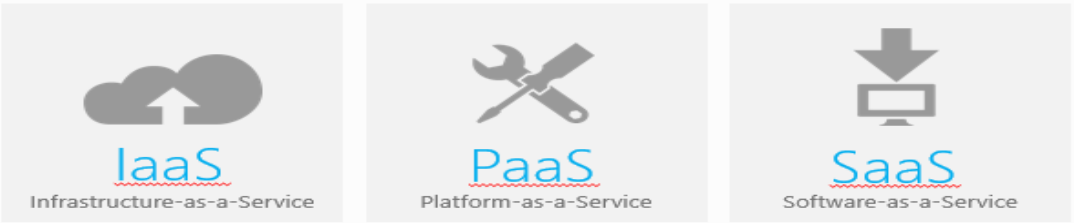
Cloud computing is a computing paradigm, where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage. With the advent of this technology, the cost of computation, application hosting, content storage and delivery is reduced significantly.

Cloud computing is a practical approach to experience direct cost benefits and it has the potential to transform a data center from a capital-intensive set up to a variable priced environment.

The idea of cloud computing is based on a very fundamental principal of „reusability of IT capabilities'. The difference that cloud computing brings compared to traditional concepts of "grid computing", "distributed computing", "utility computing", or "autonomic computing" is to broaden horizons across organizational boundaries.

Cloud Computing Models

Cloud Providers offer services that can be grouped into three categories.



1. **Software as a Service (SaaS):** In this model, a complete application is offered to the customer, as a service on demand. A single instance of the service runs on the cloud & multiple end users are serviced. On the customer's side, there is no need for upfront investment in servers or software licenses, while for the provider, the costs are lowered, since only a single application needs to be hosted & maintained. Today SaaS is offered by companies such as Google, Salesforce, Microsoft, Zoho, etc.

2. **Platform as a Service (Paas):** Here, a layer of software, or development environment is encapsulated & offered as a service, upon which other higher levels of service can be built. The customer has the freedom to build his own applications, which

run on the provider's infrastructure. To meet manageability and scalability requirements of the applications, PaaS providers offer a predefined combination of OS and application servers, such as LAMP platform (Linux, Apache, MySql and PHP), restricted J2EE, Ruby etc. Google's App Engine, Force.com, etc are some of the popular PaaS examples.

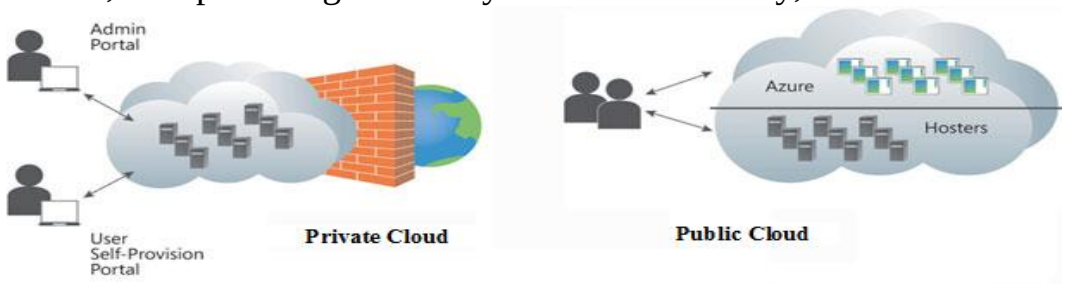
3. **Infrastructure as a Service (Iaas):** IaaS provides basic storage and computing capabilities as standardized services over the network. Servers, storage systems, networking equipment, data centre space etc. are pooled and made available to handle workloads. The customer would typically deploy his own software on the infrastructure. Some common examples are Amazon, GoGrid, 3 Tera, etc.

Understanding Public and Private Clouds

Enterprises can choose to deploy applications on Public, Private or Hybrid clouds. Cloud Integrators can play a vital part in determining the right cloud path for each organization.

Public Cloud

Public clouds are owned and operated by third parties; they deliver superior economies of scale to customers, as the infrastructure costs are spread among a mix of users, giving each individual client an attractive low-cost, "Pay-as-you-go" model. All customers share the same infrastructure pool with limited configuration, security protections, and availability variances. These are managed and supported by the cloud provider. One of the advantages of a Public cloud is that they may be larger than an enterprises cloud, thus providing the ability to scale seamlessly, on demand.



Private Cloud

Private clouds are built exclusively for a single enterprise. They aim to address concerns on data security and offer greater control, which is typically lacking in a public cloud. There are two variations to a private cloud:

- **On-premise Private Cloud:** On-premise private clouds, also known as internal clouds are hosted within one's own data center. This model provides a more standardized process and protection, but is limited in aspects of size and scalability. IT departments would also need to incur the capital and operational costs for the physical resources. This is best suited for applications which require complete control and configurability of the infrastructure and security.

- **Externally hosted Private Cloud:** This type of private cloud is hosted externally with a cloud provider, where the provider facilitates an exclusive cloud environment

with full guarantee of privacy. This is best suited for enterprises that don't prefer a public cloud due to sharing of physical resources.

Hybrid Cloud

Hybrid Clouds combine both public and private cloud models. With a Hybrid Cloud, service providers can utilize 3rd party Cloud Providers in a full or partial manner thus increasing the flexibility of computing. The Hybrid cloud environment is capable of providing on-demand, externally provisioned scale. The ability to augment a private cloud with the resources of a public cloud can be used to manage any unexpected surges in workload.

Conclusion

Nowadays, Cloud Computing is developing in Uzbekistan too. National Telecommunication Operator "Uztelecom" has presented a new project "UzCloud", which operates data processing and is considered the National Data Processing Centre. To be more accurate, it gives more possibilities to Government organizations and big corporative clients, enlarging their business sphere to present us modern ICT services. We should develop such kind of technology because it would be very helpful in various spheres. By the help of Cloud computing all users of mobile phones and internet could save their time and recourses, do their interests effectively. This technology takes into consideration everyone's wishes and demands.

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OPEN BOOKS – OPEN MINDS

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Summary. *This article is about books, their history of creation, developing steps and the attention of our government towards the reading books.*

Key words: *Book, eBook, digital, library, software, publisher, hardcover, texture, substantial, textbook*

BOOKS wash away from the
SOUL the DUST of EVERYDAY life

Books play a significant role in our life. When we open a book, we open a new world. For the majority of people, books are part of their everyday life. A book is like

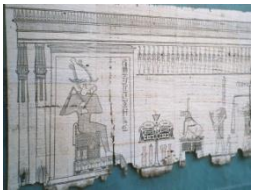
a best friend who will never walk away from you. Books are packed with knowledge, insights into a happy life, life lessons, love, fear, prayer and helpful advice. On the 23-of April the world celebrates the World Book Day. Reading is the perfect hobby.

The history of books starts with the development of writing, and various other inventions such as paper and printing, and continues through to the modern day business of book printing. The earliest history of books actually predates what would conventionally be called "books" today and begins with tablets, scrolls and sheets of Papyrus. Then hand-bound, expensive and elaborate books, called codices, appeared. These gave way to press-printed volumes and eventually lead to the mass printed tomes prevalent today. Contemporary books may even have no physical presence with the advent of the **e-book.**

There were times when people had neither letters nor paper. The history of books is considered to begin with a written language when literary works appeared on leaves, clay tablets, bark. Only in the 14th century Johan Gutenberg from Germany invented printing with a movable type. Now millions of books are published every year.

But we know that in the VI century the Muslims sacred book Quran was written by companions of Muhammad (s.a.v), after his death. Quran was compiled by his companions who wrote down and memorized parts of it. This codices had differences that motivated the caliph Uthman to establish a standard version now known as Uthman's codex, which is generally considered the archetype of the Quran known today.

Sumerian language cuneiform script meets clay tablet, 2400-2200 BC



Egyptian papyrus showing the God Osiris and the weighing of the heart

A Chines bamboo book the modern definition of Codex

An eBook is an electronic version of a traditional print book that can be read by using a personal computer or by using an eBook reader. An electronic book (or e-book) is a book publication made available in digital form, consisting of text, images, or both, readable on the flat-panel display of computers or other electronic devices. E-Books are also referred to as "ebooks", "e-Books", "e-journals", "e-editions" or as "digital books".

Although sometimes defined as “an electronic version of a printed book”, some e-books exist without a printed equivalent. Commercially produced and sold e-books are usually intended to be read on dedicated e-reader devices. However, almost any sophisticated computer device that features a controllable viewing screen can also be used to read e-books, including desktop computers, laptops, tablets and smartphones. It is very simple and easy to purchase and download ebooks through the Internet. When you need certain information, you can get it immediately, by downloading an ebook. Ebooks are portable. You can carry a whole library of hundreds of books with you, on CD, in a laptop, notebook or any ebook reader, without worrying about their weight .With today’s technology you can read ebooks everywhere, on the bus, train, airplane and while standing in line. People are already spending a lot of time in front of their computers, so why not read and ebook, instead of doing something else?

A digital library is a special library with a focused collection of digital objects that can include text, visual material, audio material, video material, stored as electronic media formats (as opposed to print, microform, or other media), along with means for organizing, storing and retrieving the files and media contained in the library collection. Digital libraries can very immensely in size and scope and can be maintained by individuals, organizations or affiliated with established physical library buildings or institutions, or with academic institutions. The digital content may be stored locally, or accessed remotely via computer networks. An electronic library is a type of information retrieval system. Digital libraries may be more willing to adopt innovations in technology providing users with improvements in electronic and audio book technology as well as presenting new forms of communication such as wikis and blogs, conventional libraries may consider that providing online access to their OP AC catalog is sufficient. An important advantage to digital conversion is increased accessibility to users.

Alisher Navoi State Public Library is the largest library of our country, which serves as the national library and holds over 10 million items. The Central State Archive of Uzbekistan considers as the Republican Library for Science and Technology (two million volumes), the Foundation Library of the Uzbek Academy of Sciences (1.5 million), the Pedagogical Institute (808,000), Tashkent State University (2.46 million), and Samarqand (Samarkand) State University's library holds 1.6 million volumes, and the Pedagogical Institute named after Ulugbek in Fergana holds 295,000 volumes.

Nowadays the great attention is given to reading books by our government. Uzbekistan could become one of the most bibliophile countries: the program which has been launched mainly orientated for the development of comprehensive measures on

the elaboration of the system for publication and distribution of books and improving and promoting the reading culture.

A commission established by the Decree of the President develops a set of measures that systematically sets up the work on the publication and distribution of artistic, spiritual, non-fiction, educational literature aimed at increasing the intellectual potential of young people. The program touches a delivery system of published books at affordable prices in the regions, online ordering of publications and electronic versions of books. Particular attention is paid to improving the reading culture of the population.

The working group is engaged in-depth study of the situation in this sphere. By now, it is clear that there is a need to establish the study of demand on the books, raising the intellectual level among the population in the country, especially the youth. Social polls are conducted in the formation of a common list of applications for published literature.

The results showed the need to improve the management system for the publication and delivery of books to the population. It is necessary to organize the work of translating the best works of world literature into Uzbek language and selected works of Uzbek literature into foreign languages on a regular basis. Particular significance is attached to children's literature. It is essential to improve the system of encouragement for publishers and writers, creation of the conditions of granting financial privileges and material support to publishers, improving the orders for the purchase of quality paper and printing materials from abroad to publish books by printing enterprises and publishing houses.

Experts say about the need to review issues of allocation or lease of places for specialized bookstores in regional and district centers and cities. It is proposed to introduce preferences to businesses, in which the share of the book trade in commodity turnover is more than 70%.

One of the priority tasks of the program will be a review of the formation of the funds of information and library institutions, especially information and resource centers in the field of education, along with educational literature and a list of artistic, educational, scientific and popular literature, as well as estimates for the costs of its purchase.

The propaganda of published books among the public gains momentum through the media, in particular, the TV channel Madaniyat va Marifat. Moreover the systemic organization of creative meetings with authors of books in educational institutions, libraries and mahallas, the formation of culture and skills of reading in them also gains traction. Due to improving the organizing system of festivals and fairs of the book in the regions

with the participation of writers, poets are enhanced the propaganda of highly artistic works of national and world classical literature among the population, conducted the competitions in the such nominations, as "The best book of the year", "The best bibliophile family", "The best children's book", "The best audiobook", "Best e-book" among readers, producers of printed and electronic books, booksellers and librarians and educators.

To sum up, it may be said that Books give a soul to the universe, wings to the mind, flight to the imagination, and life to everything.

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CONTENT:

III-SECTION
FUTURE OF UZBEKISTAN IN ICT