ACADEMICIA

ISSN: 2249-7137 Vol. 11, Issue 3, March 2021 Impact Factor: SJIF 2021 = 7.492

ACADEMICIA
An International Multidisciplinary Research Journal
(Double Blind Refereed & Peer Reviewed Journal)

DOI: 10.5958/2249-7137.2021.00867.3

# REAL-TIME ANALYZING OF CHATBOT DATA WITH DISTRIBUTED SYSTEMS

**Boltayev B. R*; Xujamov D. J****

[1,2]Master,
Tashkent University of Information Technology,
Named after Muhammad Al-Khorezmi of Urgench Branch,
UZBEKISTAN

**ABSTRACT**

*Chatbots are one of the most widely used technologies to implement virtual assistance. Presently, chatbot based virtual assistants are being used by many web administrators to mediate access to data and to carry out generic conversations with the users. Such virtual assistants are getting a lot of attention from the business organizations, as it can help in improving customer care support; reduce the costs in customer service centers and can handle multiple clients at a time. Big data analytics is the process of collecting, organizing and analysing large data sets to discover patterns and unknown correlations hidden in the data, such as usage statistics and customer preferences, which can serve as valuable business information. This paper describes the implementation of a chatbot framework with an interface to big data. This implementation would provide mass knowledge analysis capability to chatbots from distributed environments, which can further the spectrum of usage of such intelligent agents.*

**KEYWORDS**: *Chatbot, Play Framework, Akka, Cassandra, PostgreSQL, Elasticsearch.*

## I.INTRODUCTION

Many companies have recognized chatbots as “the next big thing” in terms of customer relationships. In today's digital age these relationships are shaped by an empowerment of customers due to increased information availability, digital communication channels and more diverse possibilities for reaching customers. Regarding the usefulness of chatbots from the customers' point of view, a chatbot enables 24-hour customer service, personalized interaction and no waiting time. For companies, chatbots entail time and cost savings as many processes can be automated and employees can be appointed to more complex tasks. [1]

One of the familiar technologies to implement virtual assistance is chatbot. Chatbots, also known as conversional agents, are software frameworks that can respond to natural language inputs and attempts to hold a conversation in a way that imitates a real person. Chatbots communicate with their human partners through various frameworks ranging from a simple text interface to speech recognition features. [2]

## II. THE USE OF CHATBOTS

Definition The word "chatbot" consists of the terms "chat" and "robot". Originally, the term chatbot was used for a computer program, which simulates human language with the aid of a text-based dialogue system. Chatbots contain a text input and output mask, which allows mobile users to communicate with the software behind them, giving them the feeling of chatting with a real person. [3]

Generally, chatbots have quite similar technologies and architectures. Figure 1 shows the technical process of a chatbot, when a user makes a request until the appropriate answer is sent by the chatbot. And responsible users like managers request report or statistics to control behavior of chatbot.

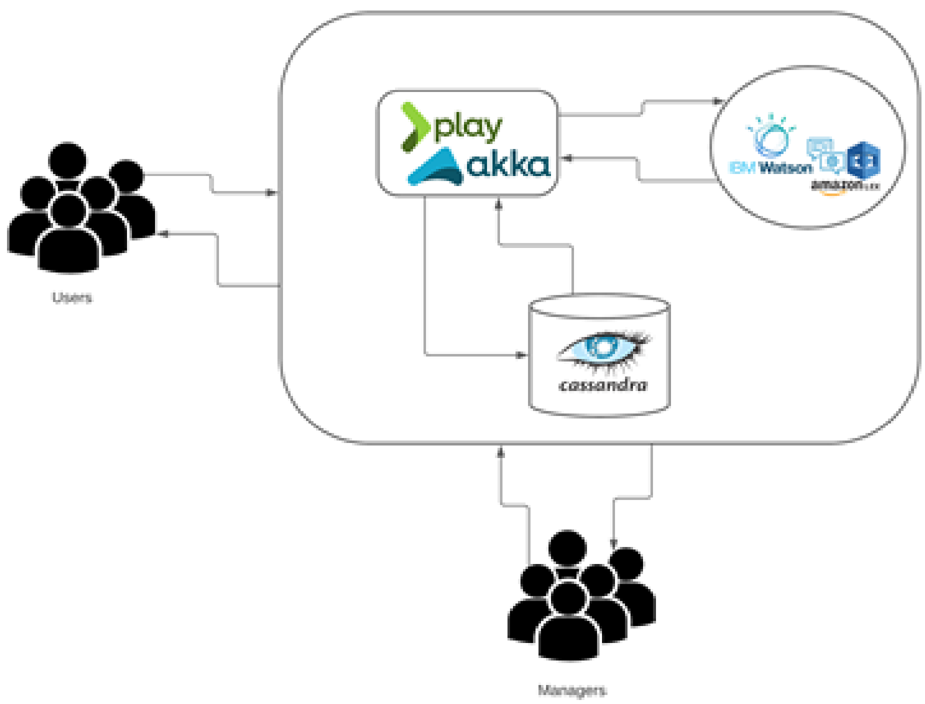


**Fig.1 General Model of building chatbots**

The process starts with a users' request using messengers or widgets in the web pages or via SMS. The users' request is processed by mini-program, which can handle concurrently many requests. In this section is used technologies Play framework [4] and Akka[5], which is the construction of concurrent and distributed applications. Next one is described API of IBM Watson [6] or Amazon Lex [7], which is recorded by NLP and is translated into the programming language of the conversation engine, then it analyses the question and redirects to back-end Play/Akka construction. Each process will be saved to NoSQL Database Cassandra [8] to support chats in real-time after amount of time and it will store data for reporting and statistics.

Benefits of Structure:

- Quick response.
- Continue conversation after any amount of time.

Challenges of structure:

- High consumption of RAM.
- By increasing conversations recovery becomes slow (after restart server while deployment).
- Elastic requests of report and statistics become not effective.

To solve the problem of reporting need to add another database which has good adaptation for query requests.

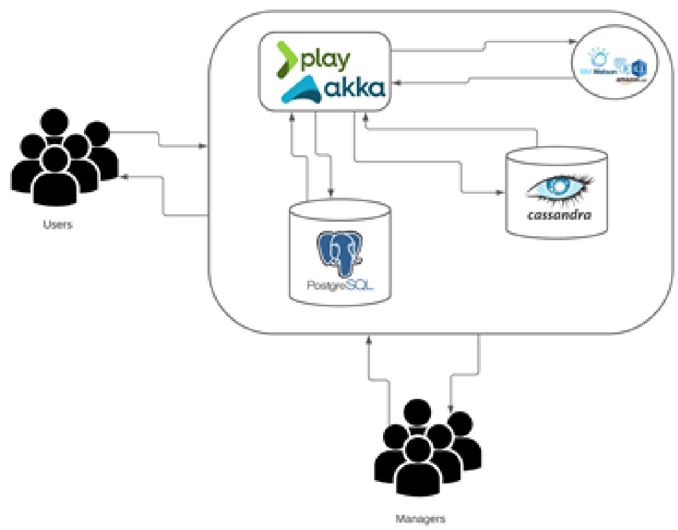


**Fig.2 Chatbot model with NoSQL and SQL databases.**

PostgreSQL – it's database, which has good adaptation with query request. Now not all data will be stored in Cassandra, all data will be transferred to PostgreSQL. Data of last several days will be stored on Cassandra to provide continue conversation in real-time without delays. For reports and statistics will start working PostgreSQL.

Benefits of structure:

- Quick response.
- Continue conversation after several days.
- Elastic requests of report and statistics become not effective.
- Old data will be stored in ROM last, new data will be stored in the RAM.

ISSN: 2249-7137 Vol. 11, Issue 3, March 2021 Impact Factor: SJIF 2021 = 7.492

Challenges of Structure:

- Search texts or phrases inside of bot or user inputs becomes difficult

To improve search from input text need to integrate with search tool by effective indexes.

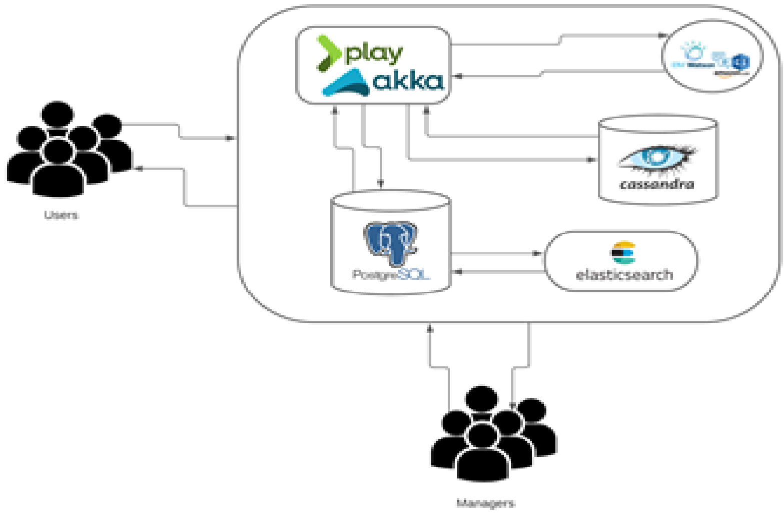


**Fig.3 Structure with search engine as Elastic search**

With help of Elastic search [9] searching texts or phrases inside of bot or user inputs becomes easy and fast. It works with synchronization with Postgre SQL. For main reports Postgre SQL will be used, but for detailed searching Elastic search will be used

## III. RESULTS AND DISCUSSION

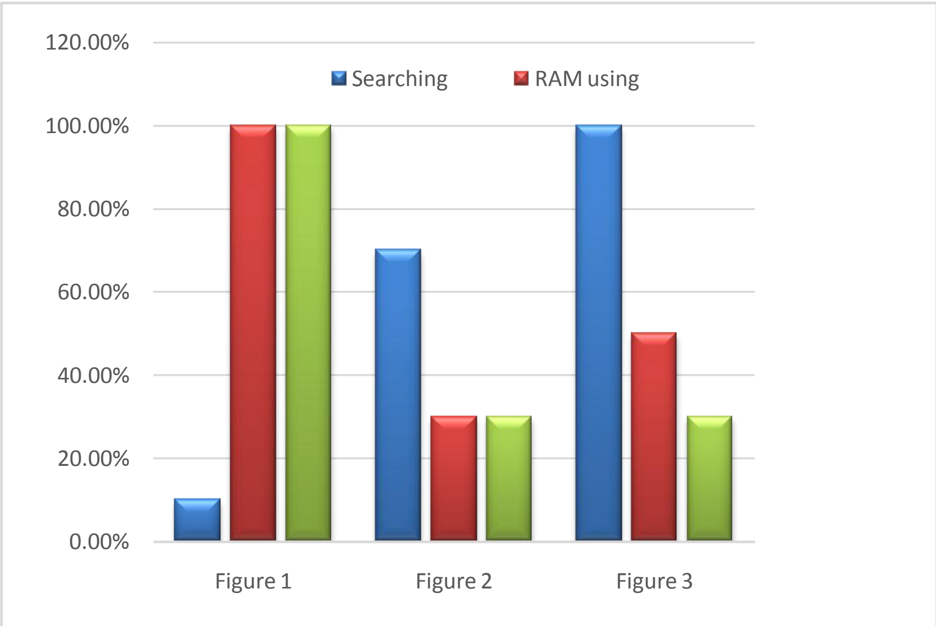


**Fig.4 Comparing of Figure 1,2,3**

In the Fig.4 can be seen first model (Fig.1) fully works with RAM, but not effective for reporting and input search. The second model (Fig.2) good for reporting, but still not for input search. The third model (Fig.3) shows, that any search, reporting problems are solved.

## IV. CONCLUSION AND FUTURE WORK

The use of new technologies provides many opportunities for improvement and optimization of the existing system. Since with the accumulation of data, their processing will require the use of other technologies these structures can be further optimized using big data technologies like Spark, Hadoop, Storm, and Kafka.

## REFERENCES


1. [1] *Customer service 4.0 - Wie gut sind Chatbots*, 2019, [online] Available:https://www.heise.de/downloads/18/2/5/4/1/3/4/2/Studie_chatbots.pdf.
2. Reshmi, S., and Kannan Balakrishnan. "EMPOWERING CHATBOTS WITH BUSINESS INTELLIGENCE BY BIG DATA INTEGRATION." International Journal of Advanced Research in Computer Science 9.1 (2018).
3. Zumstein, Darius, and Sophie Hundertmark. "CHATBOTS--AN INTERACTIVE TECHNOLOGY FOR PERSONALIZED COMMUNICATION, TRANSACTIONS AND SERVICES." IADIS International Journal on WWW/Internet 15.1 (2017).
4. “The High Velocity Web Framework for Java and Scala,” Play Framework - Build Modern & Scalable Web Apps with Java and Scala. [Online]. Available: https://www.playframework.com/. [Accessed: 28-Mar-2021]
5. “Build concurrent, distributed, and resilient message-driven applications for Java and Scala,” Akka. [Online]. Available: https://akka.io/. [Accessed: 28-Mar-2021]
6. “Watson Assistant - Overview,” IBM. [Online]. Available: https://www.ibm.com/cloud/watson-assistant. [Accessed: 28-Mar-2021]
7. J. Mylet, “Lex,” Amazon, 2012. [Online]. Available: https://aws.amazon.com/lex/?nc1=h_ls. [Accessed: 28-Mar-2021]
8. “Manage massive amounts of data, fast, without losing sleep,” Apache Cassandra. [Online]. Available: https://cassandra.apache.org/. [Accessed: 28-Mar-2021]
9. “Free and Open Search: The Creators of Elastic search, ELK & Kibana,” Elastic. [Online]. Available: https://www.elastic.co/. [Accessed: 28-Mar-2021]