ACKNOWLEDGEMENT

We take this occasion to thank God, almighty for blessing us with his grace and taking thanks to our esteemed guide, **Mr. VENKATESH GARU**, for providing us with the right guidance and advise at the crucial junctures ad for showing me the right way..

We extend our sincere thanks to our respected **Head of the division, Mrs. A. Laxmi Bai**, for allowing us to use the facilities available. We would like to thank the other faculty members also, at this occasion. Last but not least, We would like to thank our friends and family for the support and encouragement they have given us during the course of our work

DECLARATION

I declare that the work reported in the thesis entitled "**PERSONAL ASSISTANT FOR SBTET PORTAL(CHATBOT)**" is a record of the work done by us under the guidance of **Mr. VENKATESH GARU, Lecturer, Department of DCME, Government Polytechnic, Nizamabad.**

I further declare that this work has not for the award of any Other degree or diploma of this or any other University.

ABSTRACT

The use of chatbots evolved rapidly in numerous fields in recent years, including Marketing, Supporting Systems, Education, Health Care, Cultural Heritage, and Entertainment. In this paper, we first present a historical overview of the evolution of the international community's interest in chatbots.

Next, we discuss the motivations that drive the use of chatbots, and we clarify chatbots' usefulness in a variety of areas. Moreover, we highlight the impact of social stereotypes on chatbots design. After clarifying necessary technological concepts, we move on to a chatbots classification based on various criteria, such as the area of knowledge they refer to, the need they serve and others.

Furthermore, we present the general architecture of modern chatbots while also mentioning the main platforms for their creation. Our engagement with the subject so far, reassures us of the prospects of chatbots and encourages us to study them in greater extent and depth.

INTRODUCTION

Artificial Intelligence (AI) increasingly integrates our daily lives with the creation and analysis of intelligent software and hardware, called intelligent agents. Intelligent agents can do a variety of tasks ranging from labor work to sophisticated operations. A chatbots is a typical example of an AI system and one of the most elementary and widespread examples of intelligent Human-Computer Interaction (HCI).

It is a computer program, which responds like a smart entity when conversed with through text or voice and understands one or more human languages by Natural Language Processing (NLP).

In the lexicon, a chatbots is defined as “A computer program designed to simulate conversation with human users, especially over the Internet”.
Chatbots are also known as smart bots, interactive agents, digital assistants, or artificial conversation entities.

Chatbots can mimic human conversation and entertain users but they are not built only for this. They are useful in applications such as education, information retrieval, business, and e-commerce.

They became so popular because there are many advantages of chatbots for users and developers too. Most implementations are platform-independent and instantly available to users without needed installations. Contact to the chatbot is spread through a user’s social graph without leaving the messaging app the chatbot lives in, which provides and guarantees the user’s identity.

Moreover, payment services are integrated into the messaging system and can be used safely and reliably and a notification system re-engages inactive users. Chatbots are integrated with group conversations or shared just like any other contact, while multiple conversations can be carried forward in parallel.

Knowledge in the use of one chatbot is easily transferred to the usage of other chatbots, and there are limited data requirements. Communication reliability, fast and uncomplicated development iterations, lack of version fragmentation, and limited design efforts for the interface are some of the advantages for developers too.

HISTORY

Alan Turing in 1950 proposed the Turing Test (“Can machines think?”), and it was at that time that the idea of a chatbot was popularized. The first known chatbot was Eliza, developed in 1966, whose purpose was to act as a psychotherapist returning the user utterances in a question form. It used simple pattern matching and a template-based response mechanism. Its conversational ability was not good, but it was enough to confuse people at a time when they were not used to interacting with computers and give them the impetus to start developing other chatbots.

An improvement over ELIZA was a chatbot with a personality named PARRY developed in 1972. In 1995, the chatbot ALICE was developed which won the Loebner Prize, an annual Turing Test, in years 2000, 2001, and 2004. It was the first computer to gain the rank of the “most human computer”.

ALICE relies on a simple pattern-matching algorithm with the underlying intelligence based on the Artificial Intelligence Markup Language (AIML), which makes it possible for developers to define the building blocks of the chatbot knowledge.

Chatbots, like Smarter Child in 2001, were developed and became available through messenger applications. The next step was the creation of virtual personal assistants like Apple Siri, Microsoft Cortana, Amazon Alexa, Google Assistant and IBM Watson [

.

As shown in Fig. **1** according to Scopus, there was a rapid growth of interest in chatbots especially after the year 2016. Many chatbots were developed for industrial solutions while there is a wide range of less famous chatbots relevant to research and their applications.

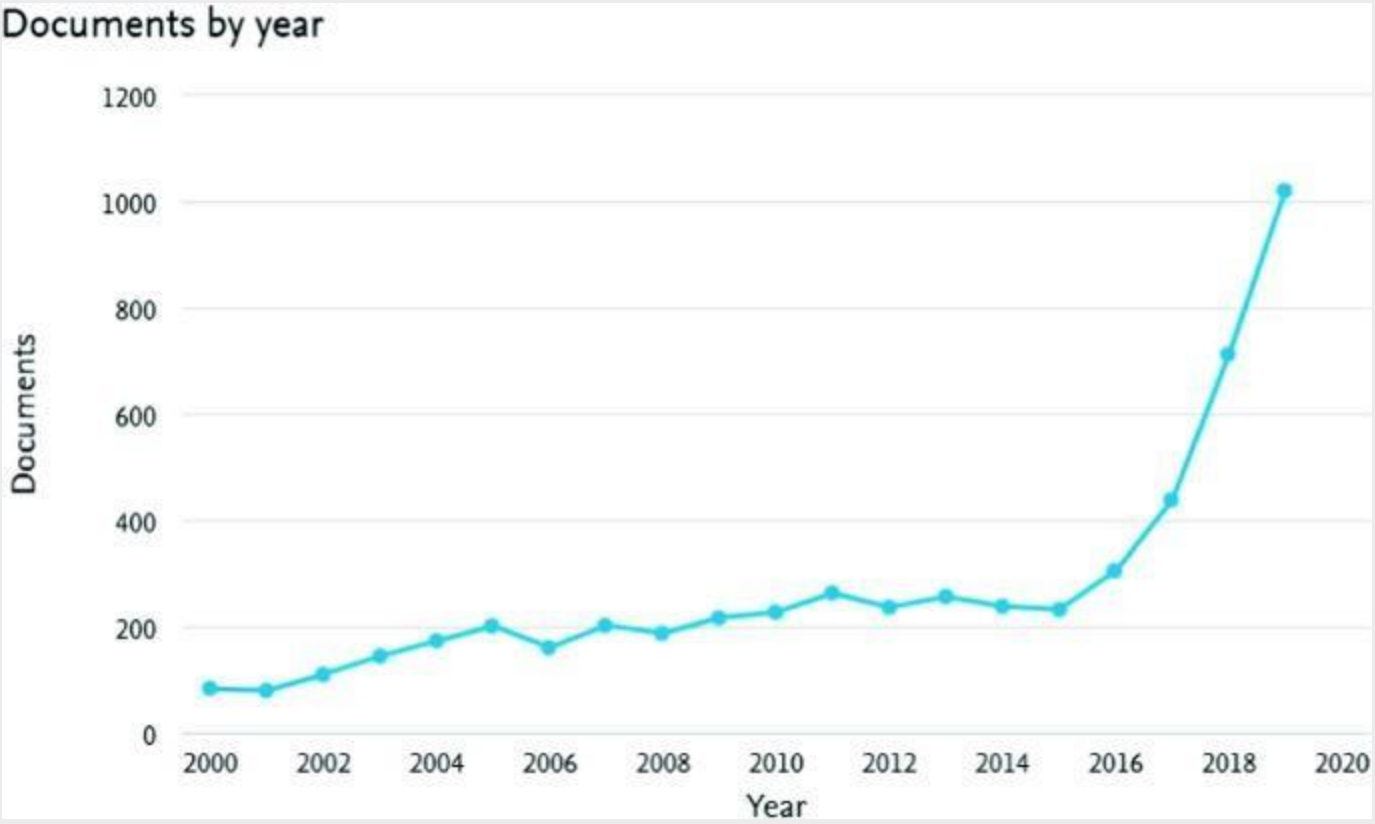


Fig. 1.

Search results in Scopus by year for “chatbot” or “conversation agent” or “conversational interface” as keywords from 2000 to 2019.

TYPES OF CHATBOTS

Chatbots can be classified using different parameters: the knowledge domain, the service provided, the goals, the input processing and response generation method, the human-aid, and the build method.

Classification based on the **knowledge domain** considers the knowledge a chatbot can access or the amount of data it is trained upon. **Open domain** chatbots can talk about general topics and respond appropriately, while **closed domain** chatbots are focused on a particular knowledge domain and might fail to respond to other questions.

Classification based on the **service provided** considers the sentimental proximity of the chatbot to the user, the amount of intimate interaction that takes place, and it is also dependent upon the task the chatbot is performing. **Interpersonal** chatbots lie in the domain of communication and provide services such as Restaurant booking, Flight booking, and FAQ bots. They are not companions of the user, but they get information and pass them on to the user. They can have a personality, can be friendly, and will probably remember information about the user, but they are not obliged or expected to do so. **Intrapersonal** chatbots exist within the personal domain of the user, such as chat apps like Messenger, Slack, and WhatsApp. They are companions to the user and understand the user like a human does. **Inter-agent** chatbots become omnipresent while all chatbots will require some inter-chatbot communication possibilities. The need for protocols for inter-chatbot communication has already emerged. Alexa Cortana integration is an example of inter-agent communication.

Classification based on the **goals** considers the primary goal chatbots aim to achieve. **Informative** chatbots are designed to provide the user with information that is stored beforehand or is available from a fixed source, like FAQ chatbots. **Chat-based/Conversational** chatbots talk to the user, like another human being, and their goal is to respond correctly to the sentence they have been given. **Task-based** chatbots perform a specific task such as booking a flight or helping somebody. These chatbots are intelligent in the context of asking for information and understanding the user's input. Restaurant booking bots and FAQ chatbots are examples of Task-based chatbots.

Classification based on the **input processing and response generation method** takes into account the method of processing inputs and generating responses. There are three models used to produce the appropriate responses: **rule-based** model, **retrieval-based** model, and **generative** model.

Rule-based model chatbots are the type of architecture which most of the first chatbots have been built with, like numerous online chatbots. They choose the system response based on a fixed predefined set of rules, based on recognizing the lexical form of the input text without creating any new text answers. The knowledge used in the chatbot is humanly handcoded and is organized and presented with conversational patterns [28]. A more comprehensive rule database allows the chatbot to reply to more types of user input. However, this type of model is not robust to spelling and grammatical mistakes in user input. Most existing research on rule-based chatbots studies response selection for single-turn conversation, which only considers the last input message. In more human-like chatbots, multi-turn

response selection takes into consideration previous parts of the conversation to select a response relevant to the whole conversation context.

A little different from the rule-based model is the **retrieval-based** model, which offers more flexibility as it queries and analyzes available resources using APIs. A retrieval-based chatbot retrieves some response candidates from an index before it applies the matching approach to the response selection.
The **generative** model generates answers in a better way than the other three models, based on current and previous user messages. These chatbots are more human-like and use machine learning algorithms and deep learning techniques. However, there are difficulties in building and training them.

Another classification for chatbots considers the amount of **human-aid** in their components. **Human-aided** chatbots utilize human computation in at least one element from the chatbot. Crowd workers, freelancers, or full-time employees can embody their intelligence in the chatbot logic to fill the gaps caused by limitations of fully automated chatbots. While human computation, compared to rule-based algorithms and machine learning, provides more flexibility and robustness, still, it cannot process a given piece of information as fast as a machine, which makes it hard to scale to more user requests.

Chatbots can also be classified according to the permissions provided by their development platform. Development platforms can be of open-source,

such as RASA, or can be of proprietary code such as development platforms typically offered by large companies such as Google or IBM. **Open-source platforms** provide the chatbot designer with the ability to intervene in most aspects of implementation. **Closed platforms**, typically act as black boxes, which may be a significant disadvantage depending on the project requirements. However, access to state-of-the-art technologies may be considered more immediate for large companies. Moreover, one may assume that chatbots developed based on large companies' platforms may be benefited by a large amount of data that these companies collect.

Of course, chatbots do not exclusively belong to one category or another, but these categories exist in each chatbot in varying proportions.

DESIGN AND DEVELOPMENT

The design and development of a chatbot involve a variety of techniques. Understanding what the chatbot will offer and what category falls into helps developers pick the algorithms or platforms and tools to build it. At the same time, it also helps the end-users understand what to expect.

The requirements for designing a chatbot include accurate knowledge representation, an answer generation strategy, and a set of predefined neutral answers to reply when user utterance is not understood. The first step in designing any system is to divide it into constituent parts according to a standard so that a modular development approach can be followed. In Fig. 3, a general chatbot architecture is introduced.

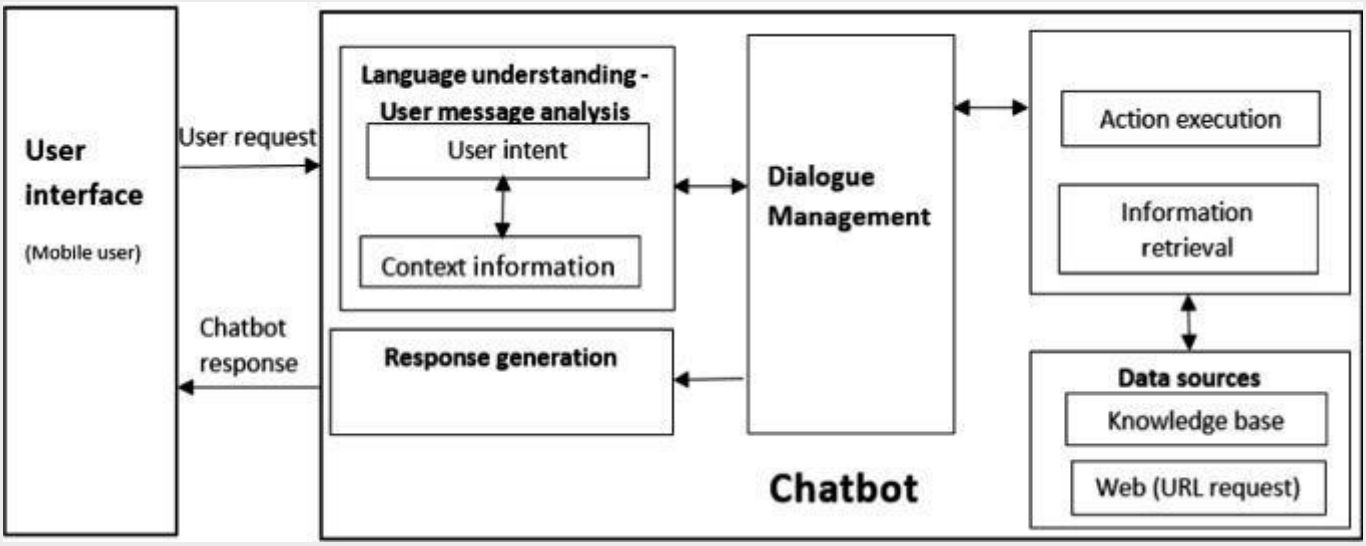


Fig. 3.

General chatbot architecture

The process starts with a user's request, for example, "Open SBTET official site?", to the chatbot using an app using text or speech input like Amazon Echo.

After the chatbot receives the user request, the Language Understanding Component parses it to infer the user's intention and the associated information (intent: "translate," entities: [word: "environment"]).

Once a chatbot reaches the best interpretation it can, it must determine how to proceed. It can act upon the new information directly, remember whatever it has understood and wait to see what happens next, require more context information or ask for clarification.

When the request is understood, action execution and information retrieval take place. The chatbot performs the requested actions or retrieves the data of interest from its data sources, which may be a database, known as the Knowledge Base of the chatbot. But in our project we have not used any data source, instead of using data source we added queries and its actions in a particular function using else-If ladder concept.

Upon retrieval, the Response Generation Component uses Natural Language Generation (NLG) to prepare a natural language human-like response to the user based on the intent and context information returned from the user message analysis component. The appropriate responses are produced by one of the three models rule-based, retrieval based, and generative model.

A Dialogue Management Component keeps and updates the context of a conversation which is the current intent, identified entities, or missing entities required to fulfill user requests.

ALGORITHM

START ---

GUIDED DIALOGUE ---

LISTEN TO USER COMMANDS ---

RECOGNISING THE COMMAND OF USER ---

IF COMMAND == TRUE

PERFORM COMMANDED TASK ---

ELSE

ASK FOR COMMAND AGAIN

[IF COMMAND IS ABOUT DIPLOMA

OPEN SBTET OFFICIAL SITE]

[IF COMMAND IS POLYCET

OPEN POLYCET DETAILS PAGE]

[IF COMMAND IS COLLEGES

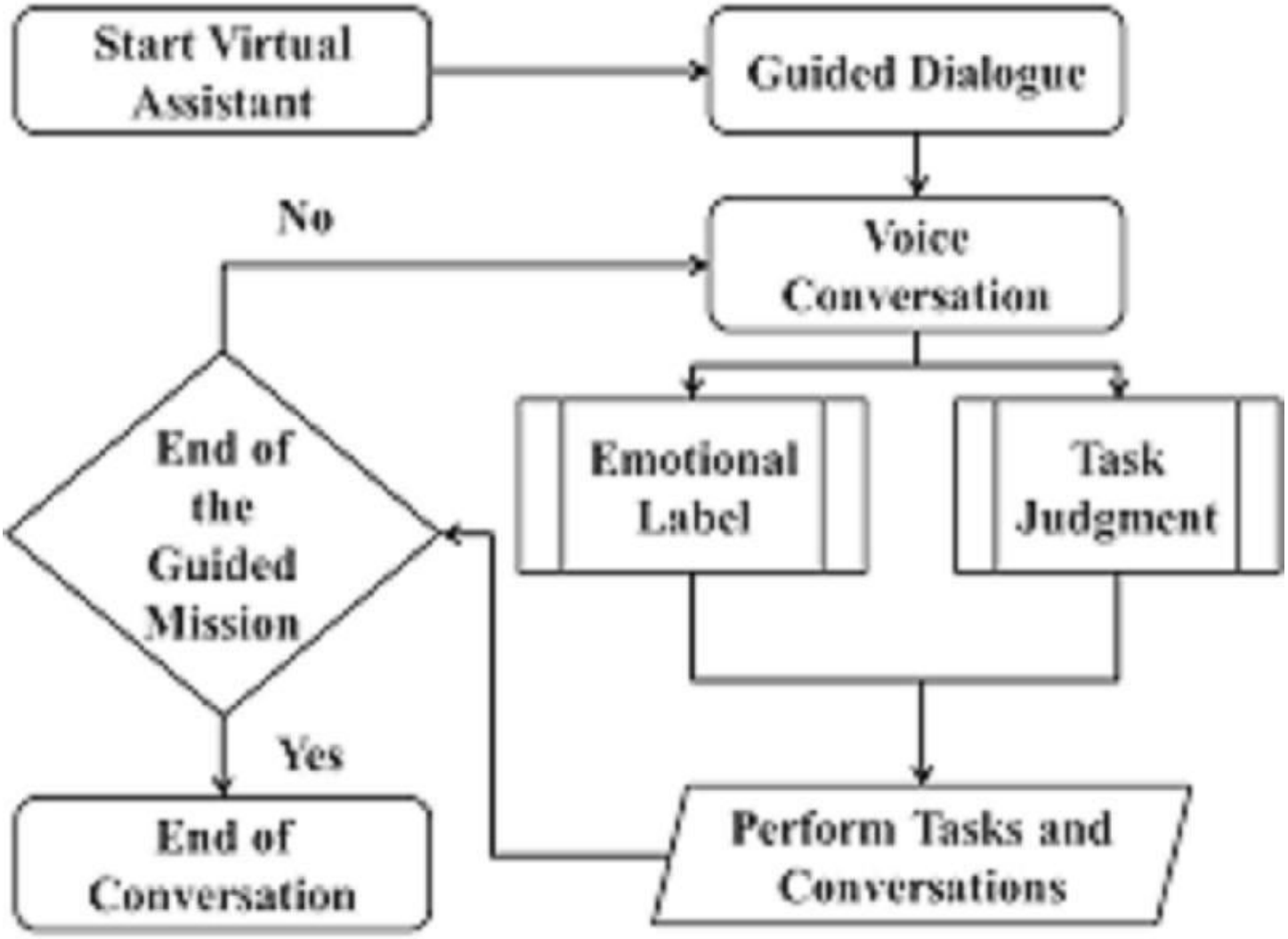
SHOW DIPLOMA COLLEGES IN TELANGANA]

IF COMMAND == SLEEP

SLEEP AND WAIT FOR WAKE_UP COMMAND

```
IF COMMAND ==  WAKE_UP

PERFORM TASKS

ELIF COMMAND == QUIT

COME OUT OF PROJECT AND EXIT

END
```

WORKING PROCESS OF OUR PERSONAL ASSISTANT NAMED "PolyMa" FLOWCHART



WHAT IS PolyMa?

- PolyMa is a Voice Assistant through which we can Access SBTET Portal directly using Voice Commands.
- We can easily access every page and every tab of SBTET portal with voice commands.
- We have developed this voice assistant to access Diploma Official portal Easily and quickly with Voice commands.
- When a user gives exact command, it redirects to the certain web page of SBTET Website.
- If the User command is not identifiable or not Recognized, Assistant asks user to re-tell the Command
- There is no Voice Assistant or Chat bot for diploma website. So this may act as a chatbot
- PolyMa is a windows based Application. It needs to be run manually first
- PolyMa makes work easy to access the Diploma official site.

REFERENCE:

1. Bansal H, Khan R. A review paper on human computer interaction. Int. J. Adv. Res. Comput. Sci. Softw. Eng. 2018;8:53.

2. Khanna Anirudh, Pandey Bishwajeet, Vashishta Kushagra, Kalia Kartik, Pradeepkumar Bhale, Das Teerath. A Study of Today's A.I. through Chatbots and Rediscovery of Machine Intelligence. International Journal of u- and e-Service, Science and Technology. 2015;8(7):277–284.

3. chatbot | Definition of chatbot in English by Lexico Dictionaries. https://www.lexico.com/en/definition/chatbot

4. Abu Shawar BA, Atwell ES. Chatbots: are they really useful? J. Lang. Technol. Comput. Linguist. 2007;22:29–49. [Google Scholar]

5. Klopfenstein, L., Delpriori, S., Malatini, S., Bogliolo, A.: The rise of bots: a survey of conversational interfaces, patterns, and paradigms. In: Proceedings of the 2017 Conference on Designing Interactive Systems, pp. 555–565. Association for Computing Machinery (2017)

6. Turing AM. Computing machinery and intelligence. Mind. 1950;59:433–460. [Google Scholar]

7. Weizenbaum J. ELIZA—a computer program for the study of natural language communication between man and machine. Commun. ACM. 1966;9:36–45. [Google Scholar]

8. Brandtzaeg PB, Følstad A, et al. Why people use chatbots. In: Kompatsiaris I, et al., editors. Internet Science. Cham: Springer; 2017. pp. 377–392. [Google Scholar]

9. Colby KM, Weber S, Hilf FD. Artificial paranoia. Artif. Intell. 1971;2:1–25. [Google Scholar]

10. Wallace RS. The anatomy of A.L.I.C.E. In: Epstein R, Roberts G, Beber G, editors. Parsing the Turing Test: Philosophical and Methodological Issues in the Quest for the Thinking Computer. Cham: Springer; 2009. pp. 181–210. [Google Scholar]

11. Bruno Marietto Maria das Gracas, Aguiar Rafael Varagode, Barbosa Gislene de Oliveira, Botelho Wagner Tanaka, Pimentel Edson, Franca Robson dos Santos, da Silva Vera Lucia. Artificial Intelligence Markup Language: A Brief Tutorial. International Journal of Computer Science & Engineering Survey. 2013;4(3):1–20. [Google Scholar]

12. Molnár, G., Zoltán, S.: The role of chatbots in formal education. Presented at the 15 September 2018

13. Siri. https://www.apple.com/siri/

14. Personal Digital Assistant - Cortana Home Assistant – Microsoft. https://www.microsoft.com/en-us/cortana

15. What exactly is Alexa? Where does she come from? And how does she work? https://www.digitaltrends.com/home/what-is-amazons-alexa-andwhat-can-it-do/

16. Google Assistant, your own personal Google. https://assistant.google.com/

17. IBM Watson. https://www.ibm.com/watson

18. Scopus - Document search. https://www.scopus.com/search/form.uri?display=basic

19. Colace F, De Santo M, Lombardi M, Pascale F, Pietrosanto A, Lemma S. Chatbot for e-learning: a case of study. Int. J. Mech. Eng. Robot. Res. 2018;7:528–533. [Google Scholar]

20. Ranoliya, B.R., Raghuwanshi, N., Singh, S.: Chatbot for university related FAQs. In: 2017 International Conference on Advances in Computing, Communications and Informatics (ICACCI), Udupi, pp. 1525–1530 (2017)

CONCLUSION:

Minimal human interference in the use of devices is the goal of our world of technology. Chatbots can reach out to a broad audience on messaging apps and be more effective than humans are. At the same time, they may develop into a capable information-gathering tool. They provide significant savings in the operation of customer service departments. With further development of AI and machine learning, somebody may not be capable of understanding whether he talks to a chatbot or a real-life agent.

We consider that this research provides useful information about the basic principles of chatbots. Users and developers can have a more precise understanding of chatbots and get the ability to use and create them appropriately for the purpose they aim to operate.

Further work of this research would be exploring in detail existing chatbot platforms and compare them. It would also be interesting to examine the degree of ingenuity and functionality of current chatbots. Some ethical issues relative to chatbots would be worth studying like abuse and deception, as people, on some occasions, believe they talk to real humans while they are talking to chatbots.