A STUDY AND ANALYSIS OF THE LATEST TRENDS IN THE IMPLEMENTATION OF AN AUTOMATED INTELLIGENT CONVERSATION SYSTEM (CHATBOT)

Mohammed Waseem Ashfaque[a], Sumegh Tharewal[b]

[a] *Department of Computer Science & I.T, Dr B.A. M. University*,Aurangabad, India.
[b] *Department of Computer Science & I.T, Dr B.A. M. University*,Aurangabad, India.

* *Corresponding author:waseem2000in@gmail.com*

ABSTRACT
The purpose of developing and deploying technology in its advance form is to provide easiness, to the human beings and help to those who are needful it.

Nowadays, we are living in an intelligent environment surrounded by smart technologies. Where various devices or machines, are working smartly, like a human, due to artificial intelligence and its associated technologies, like deep learning, machine learning and natural language processing. They reduced the gap between man and machine. A chatbot is one of part of this technology; it becomes so popular and essential part of Human-computer interaction, the chatbot is playing, a vital role, in establishing the conversation in between, computer and humans. And that's why this automated conversation system is developed and deployed at many area's or domains. There is another system like various voice controlling systems, different dialogue systems, and personal assistants can be entities of human-computer interaction. But the purpose of developing a chatbot is to follow the humans, by the following of human style, conversation in the most realistic way, using natural language. Chatbots can be work as a counsellor, doctor, manager, teacher and friend. So various corporates and institutions, are ready to adopting and using chatbots, to increase the work efficiency. And to automate their services provided to the stakeholders. Implementing intelligent chatbots, which can interact with a human, is a bit of a challenge. Therefore, it can be evaluated most efficiently with more study, and appropriate analysis, the critical review will be required. This article conducted a survey, of latest chatbots through different papers, articulated in other areas, keeping in mind the, specific knowledge type provided to the systems, the domain area, for what purposes it is developing. The facts and finding of this review article will help in directing future directions for future scope.

1.0 INTRODUCTION

The objectives of this article, through this study, to analyze the latest trends which are applicable in the implementation process of the chatbots system. A computer is the hub of technologies; it has opened the gateway of other latest technologies, with its latest trends. Artificial intelligence is one of them, which is playing a leading role in advance development, with its many applications.NLP ("Natural language processing") is one of application through which digital electronic machine is "computer" which identify and acknowledge the language of human. And this application is utilized, in development of an automated conversational system, which is known as chatbots.In the current scenario of business, and at other places, it increases its demands, and requirements of chatbots. So it is popular now, everywhere due to its versatility and diligence of works and applications. Apart from this chatbots is capable in handling various customers at a time especially in the business area, in this way it increases the customer experience, and in the sense of human resources, it's entirely feasible Megha Desai

(2020).M. Milenkovic (2019). The progressing momentum of chatbots, in market places, its implementation, showing that mostly in the future, it is showing that, it will bring down the labour cost and workload by up to 70% and more PTI, (2020). And these results in, many corporates sectors and business zones, they are investing more cost in the chatbots implementation. According to the customers, chatbots are always offering them its best services, in the form of helping, and supporting, them any time, without time binding Editors at BRN.AI (2019).

Due to its versatile application and uses, in various domains, and areas of business, education, and customer services, the current scenario shows that more than 80% of these zones planning to develop and deploy chatbots around 2020Sandbank et al.(2017). The significant advantages of deploying chatbots, in various corporates, companies are, automated chatbots, their processes of customer services, in the form of answering to the customer, about their queries on all kind of products and services. Anyhow developing intelligent chatbots is quite challengeable, which needs a sense of context;

punctuality of text, the maturity of language and technical skills sets Wu et al. (2018). And so it required the techniques of A.I and NLP, for making a bridge of communication in between man and machine through natural language Radziwill et al. (2017).The natural language of human has some complexities, due to which the necessity, requirement of an "Artificial intelligence" professional, is increased to develop, such algorithm or model, which understands the complexity of the natural language of human, with the help of particular approach, of natural language processing. And NLP is more capable, which makes the human language more understandable to the computer system De Haanet al.(2018). Chatbots are working on providing a particular knowledge of a specific domain, depending upon its working area. And based on chatbots answer to the user's questions. This provided knowledge to the chatbots can be three types.

1) structured dataset, 2) unstructured dataset 3) knowledge bases datasets Tatwadarshiet al.(2020).

In this article, we keep a critical literature review of the chatbots, to study and analyzed the latest trends, in the implementation of an automated intelligent conversation system.

2.0 LITERATURE REVIEW

2.1 History and background of chatbots

The history of chatbots is started in 1950, in the form of "Turing test, by "Alan Turing". Weather computer can follow the human and his day to day actions and practices Shawar et al. (2007). With this idea, though he started the project in 1950. In 1966 he could develop the first chatbots, which is known as "ELIZA" Weizenbaumet al.(1966). "ELIZA", has least featured chatbots, with some matching keywords and text identification features. Because it was the primary and so simple chatbot with least parts, but it can communicate, with humans, and this way, the experiment of chatbot and the human conversation was successful. In the 1980s, the little advanced chatbot was developing using Artificial intelligence markup language "AIML", and the name of that chatbot was, Artificial Linguistic Internet Computer Entity "ALICE" Wallace, R. (2003).The intention of using "AIML", that it operates in "pattern matching rules", which is smoothly able to connect with the keywords which are submitted by the user to the chatbot. The next chatbot named "Jabberwock", which was built-up to follow the human language, and to learn more from previous experience of chatting, and patterns of context used for a related reply from chatbot Carpenter et al.(2006).

2.2 Year-wise development of chatbotsat a glance

"Turing Test" developed in 1950," ELIZA" created in 1966," PARRY" produced in 1972."Racter" was formed in 1984, "Jabber wacky" created in 1988, "Loebner Prize" built-in 1990. "Dr Sbaitso" created in 1991, and "ALICE" developed in 1995.

"Elliot" developed in 2000, "Smarter child" developed in 2001, "Mitsuku" developed in 2005, "I.B.M. Watson" developed in 2006. "Siri" developed in 2010, "Google Now" developed in 2012, "Alexa", &"Crotona" developed in 2015. "Bots for Messenger (Facebook Chatbots)", &" Tay" in 2016, "Woebot" developed in 2017. Due to the high demanding of chatbots in the year 2019, communities are more eagerly, knowing about the chatbots, chatbots are in their discussion. Like a true friend, now chatbots can understand the real feelings. Due to the advancements of A.I. techniques, chatbots become smarter, intelligent that was never before. 80% of business zones and market places started to planned about chatbots as a business assistant for their business development for providing all-time customer services and satisfaction by 2020Tatwadarshi et al.(2020).

2.3 What will be future of chatbots

The year 2020 and future will be with more expectations, planning, and designing of an automated intelligent conversation system (chatbot), Using A.I. and its associative techniques.

In 2020, A.I. will be in a leading position in technology development like chatbots. More predictions are swing in the society thatis, the chatbot will act like a humanbeingin the coming time, and it will be the peak progression of the technology that it made, man to the machine. And corporates and market yards will have a wide range of data, to deal with such data they will require such assistant, so they will need more Chatbot apps implementation, designing and developments Tatwadarshiet al.(2020).

2.4 Applications of chatbots

Day by day, the requirements and demands of chatbots, at various places is increasing. And nowadays, chatbots become a vital stakeholder in all areas, depending upon the necessity, and services offering by it, sometimes it can be internal and occasionally external Suarez-Serrato et al. (2016). And the same way, public opinion about chatbots also increasing. Another way chatbots becomes a digital bridge of conversation or dialogues between government and citizens Androutsopoulou et al. (2018). In education, zones chatbotsare using as a critical thinking agent, which supports teaching new languages to the students Goda et al. (2014). And now, many educational institutes, they are implementing chatbots, in their campuses as a smart and

intelligent tutoring system for the learners Kerly et al. (2007).

for medical students, for their educational purposes, another chatbot was proposed Kerfoot et al. (2006). "Your-MD" chatbot was designed and deploy, for patients, to assist and provide timely updated health-related information in the health care sector De Haanet al.(2018). "Shawar and Atwell", designed an algorithm, to train a chatbot in a particular domain, on any topic of any language. This algorithm applies, on "Arabic" and "Africans", using the specific corpus. The Qurans to compute and FAQ.Shawaret al.(2007).

Bankings, tours and travel agencies, share markets, media houses, insurance companies and social media, these are all the different sectors where chatbots are developed and implemented and still implementing because every time the requirements of uses are in demands Androutsopoulou et al.,(2018).Forelle et al. (2015).

Since last few years, chatbots becomes the point of attraction, and it has been used by various corporates, institutes, organizations, companies, to in paving customer relationship, by giving the answering of their questions, related to their queries. In this way, they have decreased operational costs (abdullatif et al.,2020). In public and private sectors, it is widely using, voice-based chatbots in the form of virtual assistants like "Cortana"," Siri"," Google now" and "Alexa".

3.0 ANALYSIS OF CHATBOTS

This section carries a review and analysis of some papers on the chatbots development system.Libraries of words, and collection of keywords, is the vital source, and it is the brain of the chatbot. Based on this brain, the chatbot performs all the communication with the user.

It is indeed to develop a smart chatbot, which uses the web infrastructure, for finding the appropriate answer, of users question, when a user asked to the chatbots, it is suggested by, Sameera. et al.(2017). The article proposes to develop such chatbot& toolkit for natural language processing, for its essential operations. This article suggested performing text matching to find out the appropriate answer to the question, and structured databases should store it.

On another side, the Che-Hao Lee et al.(2018).identified that for kids what bot is developing, it should have ideal sets of questions-answers. The article suggests expanding on 100 and more good stories. It can do through making ranks of pairs of questions-answers, but how and the elaboration of natural language and type of knowledge is not mentioning in this article.

This theory pickup and carried out by Ly Pichponreayet al.(2016). Suggested for optical character recognition, utilizes the "Apache-PDFBOX", to identifying and acknowledging the text presents on PDF file. Once the words of the are specified, generate a questionnaire with various techniques and use "string-match" to determine

the answers of being asked questions. It is so most uncomplicated article, which uses the NLP for given task completion. It can be batter techniques which can improve the conversation quality.

The main issue is addressing by these authors, Ming-Hsiang Suet al.(2017). That is, we always keep our eyes close or shut down towards our "elders". There are certain restrictions, due to which it is not still possible, to sit with them and talk within the right way. It is suggested by authors to develop chatbots, which attend to the elders and talk to them in a pleasant mood, with lively conversation as a part of the engagement. It suggested developing, such a database system, which should consist, up to the massive collection of questions and answers. Using "long short-term memory" (LSTM) to maintain the actual state of information, the paper did not discuss anything about how to deal with unstructured databases.

The authors Shih-Hung Wu et al. (2018)., addressed one problem, that is telling a long story, to the chatbot. But for a chatbot, it isn't straightforward to make conversation, based on the story narrated to it. Keeping this in mind, using" CKIP toolkit" design a particular template, for making a partition of words and tagging of parts of speech. The article suggested to utilizes "Term Frequency – Inverse Document Frequency (TF-IDF)", to identify the nouns. Using "artificial intelligence markup language" (AIML) develops chatbots (izyanfatin et al.,2020). The primary defect of the proposed system is that it uses"Legacy techniques", to carry the best, stories based conservations, ideal chatbots system can be developing using other techniques.

Natural language processing has varieties of applications, due to this versatility, it is using in many chatbots from many areas. Cyril Joe Baby et al.(2017). Suggests improving and efficiency in home automation works, to utilize, IoT and chatbot. This article is focusing on using "natural language toolkit" which is base on NLP related tasks. The key idea behind identifying the keywords which give to the chatbot and same time these keywords should be pass through microcontroller system. And with IoT, this microcontroller system will control all the home appliances. The article is technical and has a unique application of chatbot. But the essential operation on processing based on natural language, and keywords identification, and the degree of performance of chatbot, this paper does not give more detail.

Wei Liu et al.(2015). Suggested to design and develop an absolute new chatbot, like "Google Assistant", "Sir" and "Alexa". This article describes, that "IBM Watson" shows and use, how to breakdown the knowledge, which is taken out through the question, and find its answer. The article suggests developing "Deep-question-Answer" system. This paper also proposes to find the solution of inquiry through the internet, in this way system will be open domain. This article defines the efficiency of the system, but in what way, the chatbot will be developed, using what tool and technology should adopt, for

development, what features system will be adopted, what will the degree of accuracy of the system, these issues is not briefing.

Takuma Okuda et al. (2018). Suggest to designing a framework for chatbots, to dealing with the various services in the financial industry. This article elaborates the needs and requirements, multiple functions of the chatbots in the economic field. But the internal architecture of chatbots, concerning the NLP, and how to use and apply the algorithm of the machine learning, and other technical detail is not mentioned.

4.0   CONCLUSION

Chatbots becomes easy, smooth, with full of attractions conversation system, for attending to the customers, most effectively. Due to which chatbots are now widely using in almost every domain. From the analysis, it can say chatbots are in demand, and it becomes a point of attraction, for many researchers also, for that purpose many articles published, many of publishing, and more will be published, on the chatbots. Chatbots developers are more curious; towards users' needs and their expectations. In what way they wanted to adopt chatbots; ultimately, this feedback will be the motivation point for future usage of chatbots, and they will realize how peoples are experiencing, that chatbots. Still, it has time to become like a man to this machine. Many of methods of artificial intelligence and its associative techniques like, machine learning, and deep learning can be uses through which fully an automated intelligent conversation system in the form of chatbots are designed and developed. We believe that, in the present situation, in what way peoples are adapting, to this conversational agent, and changing their communication mode, the incoming time it will vary based on their behaviour and requirements, aligning with social norms. The objective of this review article is to study and analyze what the latest trends for the implementation process of chatbots are is required, for the particular domain, and knowledge type provided to the chatbots to make it entirely and automated intelligent conversation system.

5.0 FUTURE SCOPE

In future, we will design, and develop general-purpose text generation chatbot in regional language of Maharashtra state that is "Marathi", for text and voice system. We are using the generative-based approach, and long short-term memory network (LSTM) technique, of Artificial intelligence.

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