A SURVEY ON CHATBOTS USING ARTIFICIAL INTELLIGENCE

[1]Mr. M. Ganesan, [2]Deepika.C, [3]Harievashini.B, [4]Krithikha.A.S, [5]Lokhratchana.B

Department of Computer Science and Engineering, Sri Manakula Vinayagar Engineering College,

Puducherry, India

[1]ganesan@smvec.ac.in, [2]deepika.chinnasamy1998@gmail.com, [3]vashiniharie@gmail.com, [4]krithikha55@gmail.com,

[5]lokhratchana19@gmail.com

***Abstract*— The major role of today's technology is played by the artificial intelligence along with the NLP processing integrated with the machine learning algorithms. The computer program which uses artificial intelligence to imitate the behavior of the human decision making as well as providing the various kind of services forms the basis for the survey on artificial intelligence on the chatbots. Thus, the paper provides a survey based on the different platforms used to build a chatbot for providing various kind of services to different kind of users. The design techniques for building the chatbot depends on the services meant to provide for the users. The chatbot will get the experience by learning through the past experience using various algorithms. The data can be trained to the chatbot which will enable it to check with the knowledge base for providing accurate results to the query of the user through client side applications.**

Keywords——Natural Language Processing, Chatbot, Machine learning.

I. INTRODUCTION

In Today world, Chatbot plays an important role in people life. It is used in communication or interaction purpose with human Due to the existence of Natural language interaction between humans and computers, chatbot is very useful for humans. It is used for knowledge seeking purpose and also entertainment purposes. It is demonstrated by using machines where machines are feed with human intelligence and mimics their actions. It also helps to learn, think, behave and communicate like humans and able to solve the problems. Chatbot is classified into two types as web Chabot and standalone chatbot. Web chatbot is used to communicate with users automatically and Standalone chatbot is one which interacts only when it is installed in any available device. Apart from these types of chatbots many other chatbots are also available which makes human tasks and solve other decision-making problems. Chatbot is considered as a virtual human being which interacts with the human based on trained texts. This is mainly based on machine learning and artificial intelligence. Chatbots are mainly built using interactive languages like Natural Language Processing and conversion services. Natural language processing plays an important for conversion which is used for closer communication for humans and machines. Besides this we are able to give the information about railway booking and reservation system. This tells about information of railway through the standalone Chatbot. The dialogues which are given as inputs are being trained by natural language processing. Due to the advancement developed in the field of machine learning algorithms and deep learning applications combined with the artificial intelligence, have dominated human works.

Nowadays technology has vital role in all fields. Indian Railway are the cheapest mode of transportation [1] and it stands fourth in railways. Railways [2] faced many problems starting from booking ticket till departure. Booking tickets are happened through standing in a queue in olden days and need to get tickets for each person. But technology makes them easy where tickets are booked through m-ticketing and eticketing [3]. In olden days, users can able to book their tickets through government website and booked tickets were checked by TTE. But nowadays advancement of technology leads to new evaluation where tickets are booked through the M-ticketing which is same as like E-ticketing. In this booking method, Users need to book ticket [4] through online web portal and able to make printout of ticket or they can get the one-time password for reservation.

Artificial Intelligence is done by using machines. It is used in many fields like medicine, math, psychology, cognition etc. It has the ability to solve the simple to complex problems by using the algorithm. In this paper it is done using Chatbot which is a machine [5] used to get the train status information by using the in-built information without using the algorithm. And the train seat availability occurs through the next phase, it tells about the first class, second class, third class and sleeper class for passengers. These are also some kind of information available in database. Chatbots are feed with some kind of information like human intelligence for seeking correct information when user asks for queries. This is done through the intent which is in database for information seeking.

Booking ticket tells about the modules for train status, train seat availability and railway announcements language translator. Here artificial intelligence plays an important role where Chatbot is used for communication [6]. Chatbot act as the machine which is used for getting the request from the user and able to get back the response in form of text to give it to the client user.

 ISBN 978-1-7281-6202-7

Language translator for announcements in major important phase in this paper. Because when user was trying to move to another state, they need some kind of information through railway announcements. But it harder for them to get it due to lot state language which is differ in native language. Through this Chatbot it gives the correct language translation for user with correct information in database.

The major work of the TTE is to check the tickets from source to destination for users and able to delete it when user arrives the particular destination. These works are done through the Chatbot itself by using railway API itself.

Whenever the passenger reaches above the destination period, This Chatbot gives the notification through the message about the location penalty

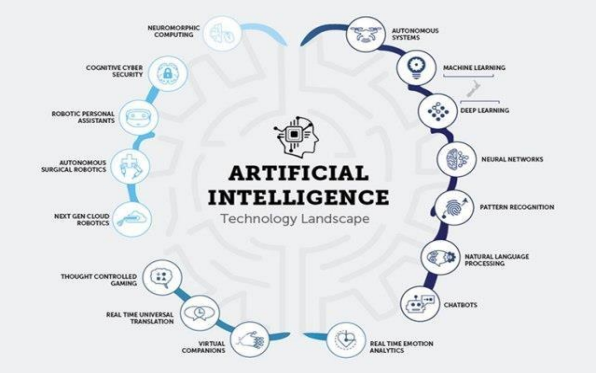

Fig 1.1 FIELDS OF ARTIFICIAL INTELLIGENCE

II. LITERATURE SURVEY

A. ARTIFICIAL INTELLIGENCE APPLICATION

The authors Anirudh Khanna, Bishwajeet Pandey, KushagraVashishta, Kartik Kalia proposed a survey on Artificial Intelligence in machines which seems to be a demanding task [7]. It consists of the process for prompting to create intelligent machines. It provides a discuss on some of the recent practices in AI and it also provides an alternate theory for the improvement in the today's well known and suggestions for distributed acceptance. Thus came the existence of the implementation of the machines with artificial intelligence or intelligent machines is made. It also shows that AI only can't provide an adequate result, it must also incorporate the different concept that the intelligent machines will automatically become the intelligent system's future scope. Such creation of intelligent machines integrated with the algorithms at backend is known as Artificial Intelligence or AI.

Intelligent machines are capable of performing many tasks. Leading trends in the field of artificial intelligence includes the learning about machines, simulation of human brain, NLP processing, facial recognition and works related to neural networks, cyber security, etc. One such example of an AI system includes the design of chatbots. Any such program of the chatbot can understands multiple languages of the human by the concept of NLP processing.

Natural Language Processing (NLP) which belongs to study of artificial intelligence is concerned about the study of interaction between humans and machines using their own natural language. Such AI chatbot can also performs some prominent functionalities like performing calculations, creating alarms or remainders for the users in order to intimate them with their planned works, etc.

B. CHATBOT AND TECHNICAL COMMUNICATION

The author John P. Mclntire, Lindsey K. Mclntire, Paul R. Havig has provided a survey on the chatbot which provides service to users that people use to communicate with the system through a chatbot interface or client side application[8]. User can request the queries using texting or by voice. The chatbot will carry out actions for the user request in response to your conversation. Chatbots are developed generally only for individual purpose. This is explained by combination of two features such as:

1. A Conversational User Interface (CUI) can be used as both voice recognized and text queries.

2. It also provides answers from various sources and it can also be in a variety of different formats.

Most of the chatbots works on a basic model of these three properties namely:

- Entities
- Intents
- Responses

In the current trend, there is a lot of opportunity for professional technicians in the aspects of technology to get involved with the designing, training and implementation part of the intelligent machines or user interface like chatbots. Thus it can help them to learn some new skills. In this paper, it is mainly focused on the AI based chatbots. AI based chatbots will interact with the users and used to process more complex requests queried by the users or customers. AI based chatbots are used widely in almost all fields to reduce the complexity of searching and responding answers to the complex requests asked by the customers.

C. CHATBOT DESIGN TECHNIQUES AND ITS CLASSIFICATION

The authors Sameera A. Abdul-Kader, Dr. John Woods proposed a survey paper including the various design framework of the chatbot with the speciality of conversation done through the speech also[9]. The chatbot designer must be highly technical in his profession along with good programming knowledge and also developers with practical experience for bring the chatbot more realistic. The chatbot is said to be highly realistic only when it provides high response

to the query with appropriate knowledge base in it. On designing the chatbot, software packages are required for certain constituent parts. Also, the framework design of the chatbot can be classified into three major regions as responder, classifier and the Graphmaster.

The responder plays an interfacing role between the chatbot and the user. The classifier is the part between the responder and the Graphmaster for normalizing, parsing the input query given by the user or customer into the logical parts. The Graphmaster plays a part of holding the pattern matching algorithms and organizing the storage of the chatbot. The techniques involved in the design of the chatbot are parsing, pattern matching, language tricks, chat script, ontologies, SQL and relational database etc.

Also, the input query given as speech can be analyzed and categorized into three major regions as voice recognition and converting the voice into the text, processing of the text and the query is responded by taking corresponding actions. The text processing can be further classified into many steps as splitting the text and processing it into individual words, classifying the words as parts of speech, chunking into phrases, eliminating the redundant words, checking for keywords and correcting the existing errors.

D. ANALYSIS ON ARTIFICIAL INTELLIGENT HUMAN-ROBOT INTERACTION

The authors L.Mary Gladence, Vakula C.K, Mercy Paul Selvan, T.Y.S.Samhita proposed the survey on the robot educated by the methods of discourse acknowledgment will provide another way for instructing and delivering the concepts by interaction. The work assigned for the developers is to train the robot for composing the intelligence by giving three unique sources of information like Voice order, Camera based video infomation or by utilizing MEMS equipment interface which will be utilize Zigbee for its functionalities. Voice direction can be perceived by utilizing the Android application.

By making use of the signal and discourse method, administrators can be able to control the robot without undergoing any of the complex work[10]. The outcomes will be able to explain the concepts of how the online robot instructing framework can effectively show the controllers of robot. A web-based strategy involving the combination of discourse and motion is used to characterize the application by a person who controls the robot. This new framework is made up of a training phase of pen and a movement catch framework for processing. Human Robot Interaction (HRI) is a extensive and large research. It categorizes the states of problems based on the interactions

E. THE STATE OF CHATBOTS IN 2018

The survey conducted by the SurveyMonkey audience have reported that more number of chatbots rely on the basic field of artificial intelligence (AI) in order to simulate the conversations replicating how humans will communicate. More specifically, intelligent chatbots often requires the integration of machine learning, which involves a computer program that can automatically improve with the help of previous experience and that is why often machine learning is applied to produce the results for the user query.

From the above survey it has been assumed that 15% of the users have been using the chatbots providing conversation with the customers over the period of past 12 months.

The problems related to the traditional experiences have resulted in not capable of getting answers to the complex questions, takes too long period of time to get the services done, poor quality of the online forms, search operations provided in the application are not much useful, etc.

In the current on-demand real-time world we live, everything seems to be just getting done on one click away, customers or users expect to find the information they are looking for quickly and easily.

Thus by surveying the authors have concluded that the chatbot can provide the services like providing quick reply to the users or customers at emergency, resolving the problem efficiently than the human power, finding the human customer service assistant, communicating with all sort of peoples at anytime and anywhere in one place itself, it can also provide payment facilities within the bot or booking a ticket or hotel reservation etc.

Thus, from the below table, we have proposed a survey based on the existing applications over the chatbots. The chatbots provide the user or customer experience more efficiently than the existing applications. It provides the extra and user friendly features like time saving, cost saving, high performance, efficient response with more accuracy, available at all place and anytime, extensive customer assistance, easier approach for the users or customers to find the solution for the big problem, flexible platform for the user enhancement, responding to the user or customer more efficiently and quickly, etc. Thus, by giving a customer satisfaction application. Also, the existing system was developed on the basis of understanding of only text enabled user request or query but the chatbots are enabled with both voice and text recognition for providing the response to the user query. Thus the chatbot has more enhanced features than the existing systems with lots of facility for the user or customer satisfaction.

TABLE 1: ANALYSIS OF EXISTING APPLICATIONS VS CHATBOT

SL. No	Metrics	Existing System	Using Chatbot
1)	User Queries	Text Enabled	Both Text and Voice Enabled
2)	Time Saving	Efficient	More Efficient
3)	Cost Saving	Less cheap and faster	Much cheaper and faster
4)	Performance	No accuracy	Consistent and Accurate
5)	Flexible attribute	Lot of development and testing needed to change platforms	Easily be used in any platform in any industry
6)	Resolution speed	Slow response	Quick response
7)	Keeping Up with the Trends	User wants to download the App	Being Present on Messaging Platform
8)	Extensive Customer Assistance	Lack of information about a product	Provide assistance real-time
9)	Always-Available Customer Support	Not available all the time	Available at any time
10)	Proactive Customer Interaction	Not initiate the communication	Initiate the communication
11)	Easier Approach	Unilingual	Multilingual
12)	Customer Satisfaction	Not that much user friendly	User friendly and smooth interaction
13)	Increased Customer Engagement	Less interactive	More interactive
14)	Operational cost	Not reduced	Reduced
15)	Handling capacity	Communicate with one human at a time	Have conversations with thousands of people
16)	Faster Onboarding	Not easy for human employees	Easy to understand conversation flow and structure
17)	Better Lead Generation	Lower conversion rates	Higher conversion rates

III. CONCLUSION

Thus, by concluding this survey provides a clear picture of various papers proposed on the chatbots with its different types of the classification and design techniques. Though there are different application based chatbots it can be integrated with all kinds of services for the users. Thus from the above survey, we can easily conclude that the chatbot has been playing a major part of role in recent years almost all fields like education, transportation, medicine, etc. Also, it is developed with various design techniques based on the services to be provided by it for users and it is using different algorithms at the backend or depends up on the different design platforms provided for it.

IV. REFERENCES .

[1] Dia Baoqian, Wang Tong, "Risk Assessment Based On Accident Theory In Urban Railway Transportation", 2010 International Conference On Intelligent System Design And Engineering Application

[2] Sadaf Sheikh, Gayatri Shinde, Mayuri Potghan, Tazeen Shaikh.," Urban Railway Ticketing Application." International Journal Of Advance Research In Computer Science And Software Engineering Vol. 4, Issue 1,130132, Jan 2014.

[3]. M. Arnone, T. Delmastro, G. Giacosa, M. Paoletti, and P. Villata, "The Potential of E-ticketing for Public Transport Planning: The Piedmont Region Case Study," Transp. Res. Procedia, vol. 18, no. June, pp. 3– 10, 2016

[4]. N. Jadhav, P. Dolas, M. Kurrey, K. Dhawale, and P. C. V Rane, "Railway Ticket Scanner System," International Journal of Advanced Research of Computer and Communication Engineering vol. 5, no. 3, pp. 36–37, 2016

[5] Luis Fernando Molina, Esther Resendiz, J. Riley Edwards, John M. Hart, Christopher P. L. Barkan and Narendra Ahuja, "Condition monitoring of railway turnouts and other track components using machine vision", Proceedings of the Transportation Research Board 90th Annual Meeting, 2011.

[6]. K. Fan et al., "NFC Secure Payment and Verification Scheme with CS E-Ticket,"Hindawi Security and Communication Networks vol. 2017.

[7]. Anirudh Khanna, Bishwajeet Pandey, KushagraVashishta, Kartik Kalia, "A study of Today's A.I through chatbots and Rediscovery of Machine Intelligence", International Journal of u- and e- Service, Science and Technology, vol.8, No.7,2015.

[8]. John P. Mclntire, Lindsey K. Mclntire, Paul R. Havig, "Methods for chatbot detection in distributed text based communications", 2010 International Symposium on Collaborative Technologies and Systems.

[9]. A. Abdul-Kader, Dr. John Woods, "survey on Chatbot Design Techniques in Speech conversation Systems", International Journal of Advanced Computer Science Applications, ISSN 2156-5570, 2018.

[10]. Tatsuya Nomura, Takayuki Kanda, Tomohiro Suzuki, Kensuke Kato, " Prediction of Human Behavior in Human-Robot Interaction Using Psychological Scales for Anxiety and Negative Attitudes Toward Robots", IEEE Transactions on Robotics, Vol.no.24,2008.

[11]. Levesque, H.J.: Common sense, the turing test, and the quest for real AI: Reflections on Natural and Artificial Intelligence. MIT Press, Cambridge (2017)

[12]. Suganthi N, Arun R, Saranya D and Vignesh N published a paper titled "Smart Security Surveillance Rover" in International Journal of Pure and Applied Mathematics, Vol. 116, No.12, 2017, 67-75.

[13]. Mohamed Ghazel And El-Miloudi El-Koursi, "Two-Half-Barrier Level Crossings Versus FourHalf-Barrier Level Crossings: A Comparative Risk Analysis Study", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 15, N O . 3, JUNE 2014.

[14]. Ramesh, K., et al.: A Survey of Design Techniques for Conversational Agents. In: International Conference on Information, Communication and Computing Technology. Springer, Singapore (2017)

[15]. Masche, J., Le, N.-T.: A Review of Technologies for Conversational Systems. In: International Conference on Computer Science, Applied Mathematics and Applications. Springer, Cham (2017)

[16] Donald E .Brown , Fellow, IEEE,"Text Mining The Contributors To Rail Accidents", IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, VOL. 17, NO. 2, FEBRUARY 2016

[17] Sehchan Oh, Yongki Yoon, Yongkyu Kim, " Automatic Train Protection Simulation For Radiobased Train Control System", 978-1-46731401-5/12 ©2012 IEEE

[18]. V.Vanitha, V.P.Sumathi, J.Cynthia and B.Illakia, "NEXT GENERATION VEHICLE DIAGNOSTIC SYSTEMS", International Journal of Pure and Applied Mathematics, Volume 116 No. 11, 2017, 251259

[19]. Cahn, J.: CHATBOT: Architecture, design, and development. In: University of Pennsylvania School of Engineering and Applied Science Department of Computer and Information Science (2017)

[20]. Vtyurina, A., Savenkov, D., Agichtein, E., Clarke, C.L.A.: Exploring conversational search with humans, assistants, and wizards. In: Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems – CHI EA 2017 (2017)

[21]. G. M. D, A. K. Scariah, L. R. Pannapara, M. Jessica, and J. Joseph, "Smart Ticketing System for Railways in Smart Cities using Software as a Service Architecture,"International conference on I-SMAC (IoT in Social,Mobile,Analytics and cloud) pp. 828– 833, 2017.

[22] Snehal Kalbhor, Ashwini Mangulkar, Mrs. Snehal Kulkarni , "Android Application For Local Railway Ticketing Using GPS Validation "International Journal Of Emerging Trends In Science And Technology Vol.1,Issue 1,Pp.71-74,March 2014.

[23] Fatih Kaleli and Yusuf Sinan Akgul, "Visionbased railroad track extraction using dynamic programming", 12th International IEEE Conference on Intelligent Transportation Systems, pp. 1–6, 2009.

[24]. Weizenbaum, J.: ELIZA–a computer program for the study of natural language communication between man and machine. Commun. ACM 26(1), 23–28 (1983)

[25] T. Chen, Z. Zhou, and J. Zhang, "Railway Passenger Service Mode on „ Internet + ,"" Springer International Publishing AG 2018 Advances in smart vehicular technology vol. 3, no. 2016.