Asian Journal of Electrical Sciences
ISSN: 2249-6297 (P) Vol.10 No.1, 2021, pp.5-13

DOI: https://doi.org/10.51983/ajes-2021.10.1.2833

Utilization of Chabot in an Educational System

Beenu[1], Harsh Jindal[2], Rakesh Kumar[3], Meghul Kumar Kushawaha[4] and Santosh Kumar[5]
[1&2]Department of Computer Science Engineering, Chandigarh Group of Colleges, Punjab, India
[3]PhD Research Scholar, Department of Mechanical Engineering, Chandigarh University, Punjab, India
[4&5]Department of Mechanical Engineering, Chandigarh Group of Colleges, Punjab, India
E-mail: santoshdgc@gmail.com

(Received 7 January 2021; Revised 27 January 2021; Accepted 17 February 2021; Available online 23 February 2021)

Abstract **- Chabot are recently being utilized in a variety of online applications such as education, marketing, supporting systems, cultural heritage and industry from e-commerce to travel. It provides several benefits, such as availability, personalization, etc. Chabot is appeared in very large numbers at the start of the present decade. In a present day, the usage of Chabot is increasing day by day in large scale of the application that is providing better intelligence to the user. In fact, to speed up the assistance these systems are equipped with Chatbots which can interpret the user questions and provide the right answers, in a quick and proper manner. Hence, it is not a part of virtual assistants, but it can be utilized for governments as well as organizations on websites, applications and instant messaging platforms to develop the products, ideas or services. This paper presents the realization of a chatbot in the educational system. In addition, the authors present the historical development, types of chatbot, applications and their future in education sector is described.**

Keywords: **Chatbot, History, Mobile Learning, Facebook, Messenger, Applications, Future Scope**

I. INTRODUCTION

The chatbot is smart software that talks with a user. Chatbot was conceived as a new interface, designed to replace complement applications. Recently, several big names are using artificial intelligence (Al) Chatbots at large extent to enhance their customer service and to stay relevant and visible. The educational institutes, business and educators are also developing catboats in the distinct field [1]. This software is based on the Artificial intelligence (AI) & Natural Language Processing (NLP) [2]. This chatbot software is intelligent & learns over time to respond like humans as free-from user inputs. Chatbots or other artificially intelligent conversational tools, built to improve student's interaction and collaboration, which are acting as a game changer in the innovated -tech world. The Educational field is an application of AI area where chatbots are progressively being accepted as a tool which easily gives the right information to students and reduce the load of tension on the teacher side [3]. Developers develop the chatbot by utilizing AI and latest technologies so that it can communicate with students on all subjects including elementary, secondary, high school and up to college levels. Many educational chatbot applications that are available as web or mobile applications have been developed for interacting with students. The Summit Learning project and Jill Watson are the best examples which show how chatbots can bring constructive change to the learning process and make it more efficient [4]. There are also many of other simpler bots and Artificial Intelligence apps with high technology, which are used in various schools and colleges. One such platform is Botsify, which is a dedicated chatbot for education. The chatbot can provide particular topics to students through standard text messaging or multimedia such as images, videos, audios, and document files [5]. Just like any virtual classroom, the chatbot hands them out all learning material required, then take various types of quizzes/tests and submits the results to their teachers automatically. This makes easy to monitor student performance and helps to speed up the processes. Chatbots will facilitate lecturers in their work routine, response to a student's queries or perhaps checking their school assignment. Often, they are used as on-line assessments: if in a class there are several students, providing attention to everyone among them becomes terribly demanding for lecturers, whereas Chatbots will work with multiple students and teams at a similar time. They will conjointly work as a support for lecturers by distinctive writing system and grammatical mistakes, checking school assignment, distribution comes and particularly keeping track of progress and achievements of every student. The Smart & Secure Feedbacks, Better Student Support etc. are the ways in which the AI& chatbots are affecting the education [6]. This paper presents the conviction of a Chatbot model for supporting understudies all through their learning exercises. Chatbot aims to be an e-Tutor for college kids. The aim of this paper is that the introduction of a framework for: the automated identification of the students' desires because of the adoption of language process techniques and the choice of the simplest answer because of the employment.

II. HISTORY

The ELIZA is the 1st chatbot in the computer science history, which is developed by Joseph Weizenbaum in 1966. This chatbot generally operates by recognizing key words, which is given by users to reproduce a response in the form of output utilizing those keywords from pre-programmed responses. After that, in 1995 Richard Wallace was developed ALICE chatbot which was able to use natural language for processing. Jabberwacky chatbot was created by B. Alan Turing. He also published an article named "Computing Machinery & Intelligence" in 1950 [7]. It proposed the term now called as the Turing test which tests the ability of the program to conversant more like a

human. Through the 1980s & 1990s, this technology was used at that extent in which telephone systems (automated type) utilized very simple decision, right through to MSN & AOL [8]. Chatbots have a dominant appearance in modern society, becoming a constitutive component of everything from personal assistants on mobile devices to technical support help over telephone lines & even being utilized for health interventions [9].

III. TYPES OF CHATBOT

Chatbot are mainly classified into two distinct categories as shown in Figure 1.

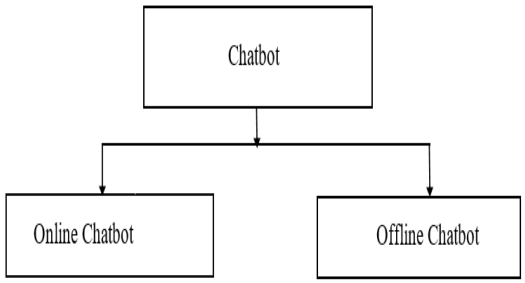

Fig. 1 Classification of chatbot [10]

A. Online Chatbot

A chatbot could be a malicious program that simulates human spoken language through voice commands or text chats or each. Chatbot, short for chatterbot, is a man-made intelligence (AI) feature, which will be fixed and used through any dominant electronic communication application [11]. They answer the queries asked for them by looking out them on the internet. These prove to be an enormous facilitate once it involves the client service of the corporate. Any client United Nations agency approaches the location, does not need to attend to be attended to. On-line bots check that that what does not happen. Once the question is asked, it is replied to instantly seeking data on-line. Online bots conjointly referred to as clever- bots, have virtually constant computer code because the offline bots simply a lot of smarter. On-line bot's area unit a lot of smarter as they learn a lot of from the tasks allotted to them [12].The platform of online chatbot is depicted in Figure 2.

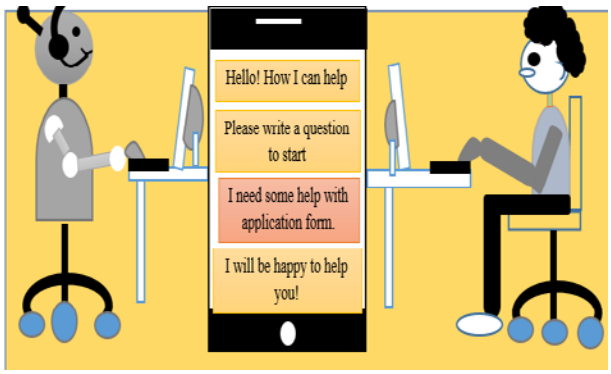

Fig. 2 Platform of online chatbot [10]

B. Offline Chatbot

The offline larva computer code is restricted to the number of data inserted in it. There is a specific amount of data saved within the computer code concerning the information-of product and the details of the merchandise like value, quality, quantity, etc. Once a traveler asks the larva concerning his queries, the larva then provides the knowledge of it, on the requested subject. If the entered question is inside the information of the larva, then it provides the required links and specific data if not, then the main points of the traveler area unit asked for expression that the involved entity can contact them inside fastened schedule [13, 14]. The offline platform of chatbot is illustrated in Figure 3.

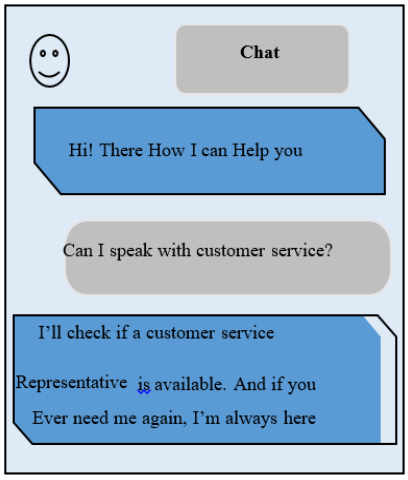

Fig. 3 Offline chatbot [15]

IV. WORKING OF CHATBOT

The Chatbot generally works on following methods that includes Pattern Matches and Natural Language Processing as discussed below.

A. Pattern Matches: The chatbot uses pattern matches to generate a relevant response from the clients and group the text. AIML (Artificial intelligence markup language) is a standard structured model of these patterns. The example of pattern stored in chatbot is illustrated in Figure 4.

```
<aiml version = "1.0.1" encoding = "UTF-8"?>
<category>
<pattern>WHO IS NELSON MANDELA </pattern>
<template>Nelson Mandela was the first black president of South
Africa. </template>
</category>
<category>
<pattern>DO YOU KNOW WHO *IS</pattern>
<template>
<srai>WHO IS <star/></sari>
</template>
</category>
</aiml>
```

Fig. 4 Pattern stored in chatbot [16, 17]

The distinct API providers in the chatbot landscape, the majority of them are typically focussed on NLP and NLU are discussed in the section below.

B. Natural Language Processing (NLP): It is an arm of AI that concern with the computers and human interaction using the natural language. The objective of natural language processing is to read, understand, decipher and make sense of the human languages in a aspect that is valuable. This type of chatbot method comprises of many sub-disciplines including natural language understanding, relationship extraction, discourse analysis and a few others language analysis areas. The full NLU System would be able to draw inferences from the text, translate the text into another language, answer questions about the contents of the text etc. The Natural Language Processing (NLP) includes the following steps;

1. Entities: Entity generally represents a concept of chatbots. It might be a question about any subject.
2. Intents: It is the action of chatbot which will perform when the user say something or type something.
For instance, intent types "I want to order a R.D Sharma Book of mathematics "Do you have this book? I want to order tit" or "Show me cover page of the book", all of this user's text shows single command giving users options for R.D Sharma book [18].
3. Context: When an NLU (Natural Language Understanding) algorithm examines a sentence, it does not have the old day conversation. It means that if it receives the answer to a quiz. From anywhere it has just asked, it will not remember the question asked by the user. The distinct application programming and NLP services provide an interface to build the chatbot software and to make it possible for many categories of businesses even it is large, medium and small scale [19]. The platform of NLP is shown in Figure 5.

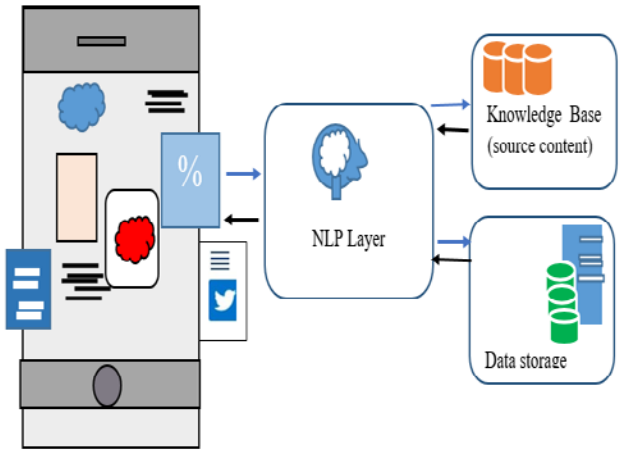

Fig. 5 NLP platform [19]

V. CHATBOT IN EDUCATION

The increasing application of chatbot technology in everyday life is changing the idea of students to learn and analysis the information. It is just because of AI that the educators recently are able to provide a suitable learning atmosphere to the students. They develop the system in chatbot which can automatically detect weather learner understand or not? [20]. The chatbots tool, built to enhance student interaction with educators in online mode. It has been seen for decades that in the similar classroom, the every student has distinct learning doubts, needs and interests. So, everyone can utilize the help of a particular special online tutor instead of virtual educating. Unfortunately, this service is not available in the expensive universities in any part of the world. What is the most practical and cost-effective alternative solution to this problem? The Solution is Chatbots for education. In most cases, chatbots can be used to give basic lectures even in large institutes [21].

VI. APPLICATIONS OF CHATBOT IN EDUCATION

The general applications of chatbot in education are illustrated in Figure 6.

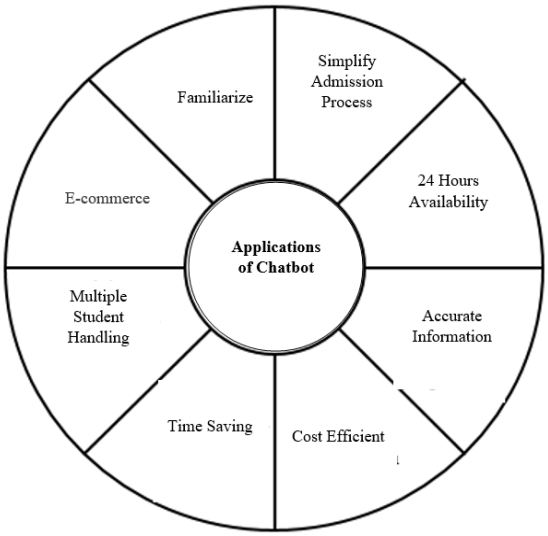

Fig. 6 Chatbot applications in education [22]

A. Simplify Admission Process

Training organizations begin utilizing the innovation of Chatbots it will be helpful for them to compare with their forthcoming understudies or guardians without conversing with them through chatbot. This will empower them to examine the specific requirements of the site guest and moreover furnish with the applicable data. Online chatbot can assist organizations with settling questions of the understudies and guardians emerging during on the web affirmation structure filling given by establishments. Understudies can start live visit for an enquiry, live talk bot show moment reaction dependent on question of the understudy [22]. Subsequently, online chatbot robotize assist the understudies with settling their inquiries climate; it is identified with any foundation, course, charges structure, and so forth. The online confirmation measure exercise is shown in Figure 7.

(a) Course enrollment chatbot (b) Montessori school lead generation (c) Employee training bot

(d) University search for studying abroad (e) Education course registration chatbot (f) API explainer bot

Fig. 7 Online Admission process [23].

Admission process of any student in any institute, in any training campus, etc. weather student wants to take admission in any country. In the Covid-19 situation which arises in 2020 in India, most of the students complete their admission process online with the help of chatbot by solving their queries. Chatbots for affirmations can assist understudies with understanding the confirmation cycle in a straightforward. The Chatbot are mainly powered by AI which helps the answer of complicated user queries/questions with personalized responses. The availability of chatbot is given in Figure 8.

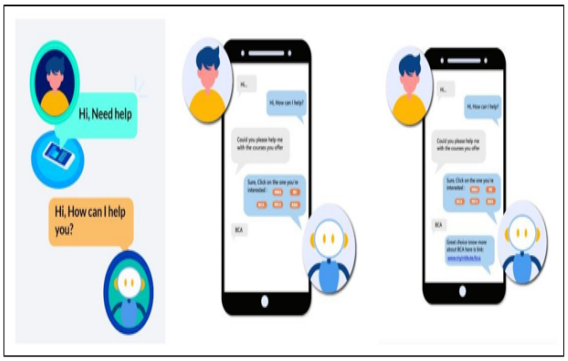

Fig. 8 Availability of the chatbot [24]

B. Available 24/7 Hours

Unlike alternative human resource, chatbot could be a resource of exchanging information. Chatbots build it simple for patrons to create a sale or book an arrangement while not watching for human help [25]. Every student has a different time of their study, according to their schedule. Therefore, every student requires chatbot according to his or her schedule. As we all know chatbot is available 24/7 hours means when the students not get the solution of their problem. They take the help of chatbot and get an immediate solution to their problem.

C. Accurate Information

The information exchanged by humans could be wrong owing to several reasons, perhaps relying upon the case. However, the data provided by chatbot are often correct [26]. Rather than asking anyone regarding any specific info, it's a lot of convenient to raise it to chatbot; it'll answer accurately. Sometimes we recommended asking the question from our friends, elder brother and sister. But, sometimes we get a wrong answer in an indirect way. That is for accurate solution to a problem every student prefers to take a help of chatbot.

D. Cost Efficient

Chatbots saves a numerous expenses of the businesses. Firstly, the implementation of chatbots saves client service prices by replacement nearly all human assistants. The software package for chat wants low maintenance and is cheap [27]. In case of education, the earlier students preferred tutor for every specialized subject and students pay a large amount of fees which is more difficult to pay by parents. But, after the chatbot invention the money is saved in greater extent.

E. Multiple Students Handling

Humans have a limit to handle the student. They have any limit to handle too many students at a time. But the chatbot software being associate degree, artificial intelligence does not have any limit to handle the students [28]. It offers personalized response to each student. Thus, creating it comfort the student. As sometimes many students do work at the same time the chatbot has an ability to handle each and every student query properly without creating any problem to any student. So, the chatbot is the attractive educational tutor software, which solves every problem of the students in a different way, of different subject at the same instant.

F. Time Saving

People sometimes hate the time they need to spend in the waiting room. Chatbots have resolved this drawback by providing them instant responses. Thus, it saves plenty of your time of client in addition, as of huge corporations [29]. In education system student requires to travel for tuition centre's as far off distances which consumes their time a lot. Now with the aid of chatbot students utilize their whole time in study instead of travelling.

G. Better Communication

Chatbots will anticipate the person's question. Therefore, it will show precisely the info he/she is trying to find. This proactive interaction of chatbots minimizes the user's effort. Individuals ought not to trigger the speech. Moreover, if an organization uses multilingual chatbots they will have an additional benefit of interaction with clients in any language as per the convenience of the customer. As if student does not understand anything properly than he/she can ask again and again, but like some tutors chatbot does not become rude. Chatbot provides all information in a very polite manner such like a kind teacher.

H. E-Commerce

The chatbot for online business furnishes that the ability to draw in with existing, new and expected clients with an ongoing, informing (text style), without really giving a live individual. However, the chatbot is considered as two-way street & there are advantages for both brands and users. The customers can find the quick information, without having to wait for a human [30].

I. Familiarize

An additional good thing about the employment of chatbots is that the organization will get to grasp the consumer (e.g. students or parents) far better. The necessities and queries of the traveller will be trotted out, with ease. Every person could have completely different reasonably necessities with the company. Before talking with the consumer, once the representative of the corporation takes a glance at the conversations of the chatbots, it becomes simple to know what the person truly needs; and likewise providing him with the more information [31, 32].

VII. COMPARISON OF DIFFERENT CHATBOT ACTIVITIES AND THEIR WORKING

There are various types of special activities in chatbots are introduced to take tests in schools/colleges during a Covid-19 Pandemic: With the aid of AI, Catboats are developed at that extent, so that students can directly come to know how much they acquire knowledge on which level they stand up. Also in present all schools and colleges using this facility of chatbot to take a test, quizzes, etc. It reduces the stress on teachers of checking test and so on. The different chatbots activates (learning outcomes, learning contents and technical design) and their comparisons are given in Table I.

TABLE I ACTIVITIES OF CHATBOT [33]

Chatbot Activity	Learning Outcomes	Learning Contents	Technical Design
MCQ Bot	LO1: Students will be able to learn the definition and classify the four stages of transformative learning theory.	Definitions; four phases (bewildering, basic, problem, basic reasoning ,normal talk, new activity),cores	A three-layer chat log designed consisting three multiple-choice questions with scaffolding questions.
Contextual analysis Bot	L02: Understudies will actually want to dissect, assess, and apply groundbreaking learning hypothesis in real life.	In learning contents it provides guidelines in applying transformative learning.	A five-layer chat log was designed, starting with a close-ended questions, as well as scaffoldings.
Dictionary Bot	LO3: Understudies will actually want to become familiar with the definition and characterize the four phases of extraordinary learning hypothesis.	Terms and concepts related to transformative learning.	A two-layer chat log was designed with directed question and response.

A. Working of Chatbot Activities

The working of chatbot activities include MCQ bot design, Case Study Bot Design and Dictionary Bot Design are explained in the section below.

1. MCQ Bot Design

MCQ Bot designs so that students can test themselves on which level they are lying after studying any topic. This bot has a special feature it moves forward after two wrong tries and show the answer. In achieving Learning Outcome 1, we built three layers which are question, options, and feedback. Each layer has three distinct inquiries. For instance, question 1 asked the understudies “What do you call a computer on a network that requests a file from another computer?” and gave four options which are “client,” “host,” “router,” and “a web server.” Understudies should pick one alternative, and if the understudies pick the correct choice, the chatbot will give the input “Congratulation you got it or any other compliment of praise!” also, push ahead to the following inquiry. Notwithstanding, on the off chance that they select some unacceptable alternative, a platform question will be appearing as "Decent attempt, yet if it's not too much trouble, consider the systems administration of the PC? Again possibility" [34]. At that point, the inquiry 1 will return once more. Further, if the understudy doesn't find the correct solution after two attempts, detail clarifications will be given to understudies, and they can keep on addressing the following inquiry. The MCQ bot will be trailed by an evaluated test undertaking to check understudies' fundamental understandings of extraordinary learning. It is a valid statement for students, despite the fact that chatbot and test exercises were both intended for students so that student's become ready to retain idea, the MCQ bot can be a decent self-evaluation for students to check their comprehension before they move to the reviewed test task which is support point for students. The stream charts the language structure that how the MCQ bot functions is delineated in Figure 9.

2. Case Study Bot Design

This chatbot action, tending to LO2, was planned after the video talk of an extraordinary learning application. Learners need to solve a practical case named Irene Case with one close-finished inquiry raised by the chatbot. For example, is Abraham Lincoln was the president of America? Type “yes or No”. The team decided not to make handwritten response from a listener in their language because by this the chatbot little bit confused [36, 37]. Another step offered by chatbot

is also what could be the next step depending upon the case study. Learners have to put their fingers from two options either on one, like in MCQ Chatbot. Chatbot provides a correct explanation on answering the wrong answer, but in case study bot design it seems not look same.

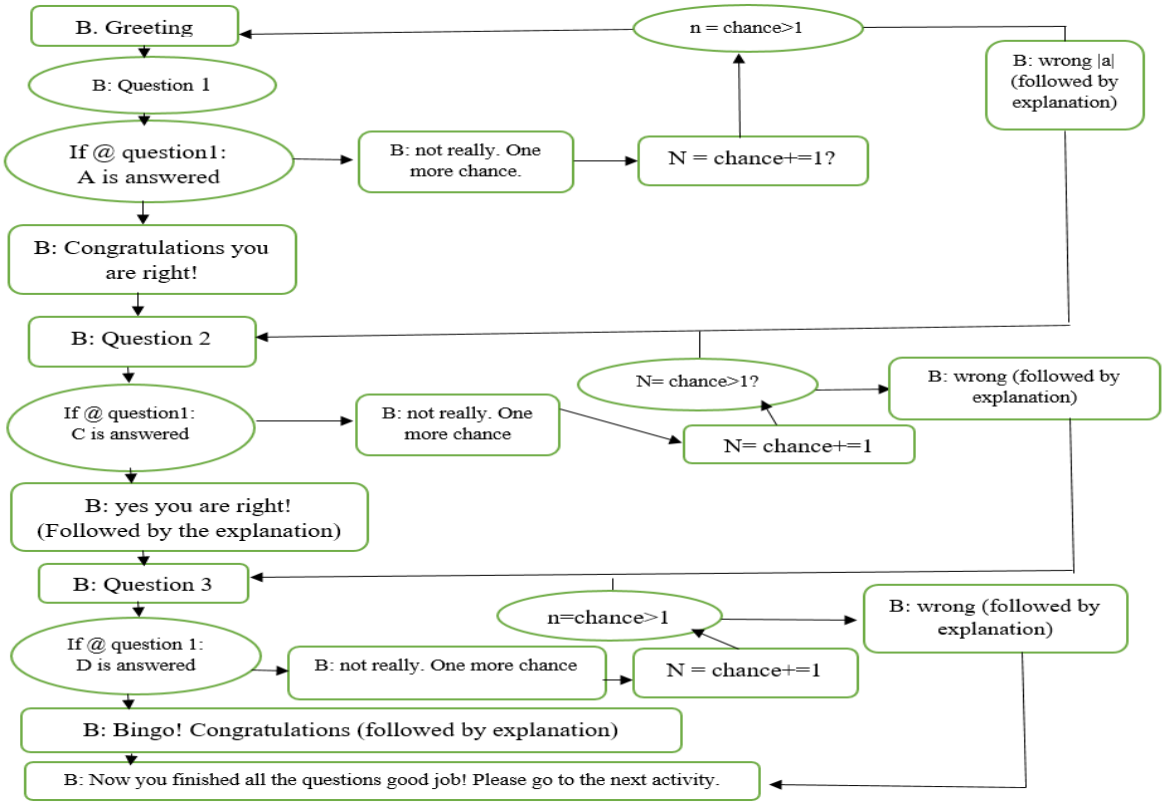

Fig. 9 MCQ bot design [35].

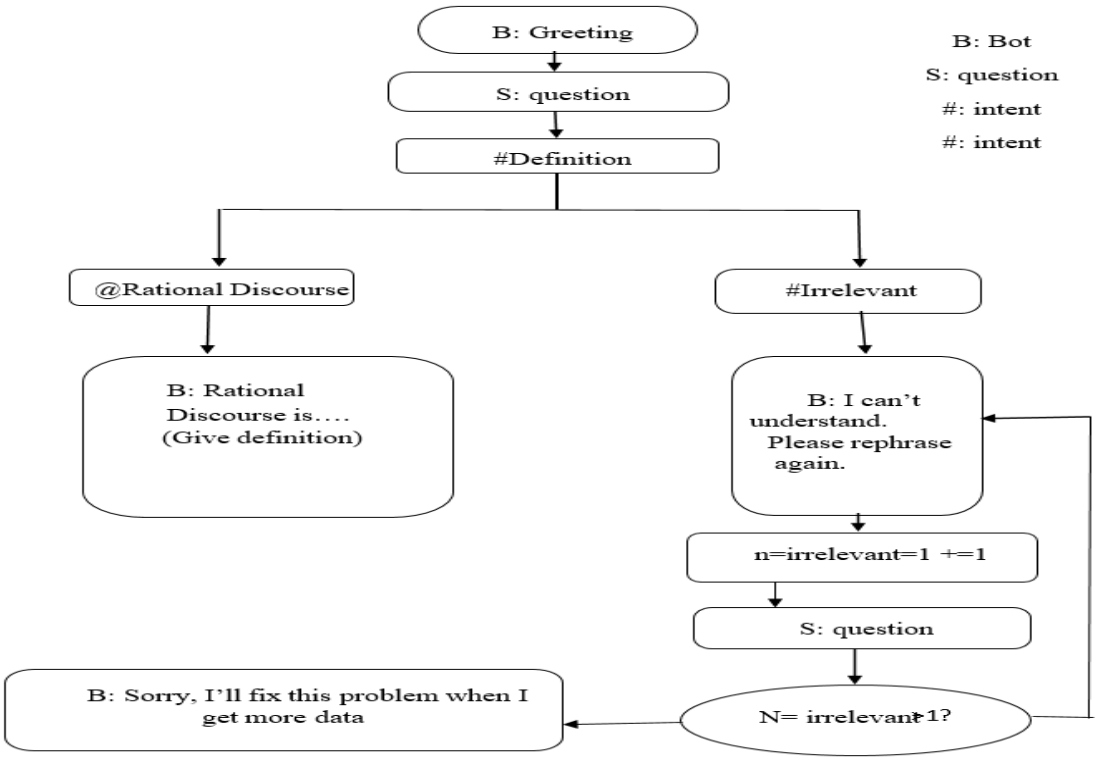

Fig. 10 Design of dictionary bot [35].

3. Dictionary Bot Design

This chatbot design is to specify the meaning of the word. In case of online learning through bots sometimes the bot asked a question in a manner which is quite difficult for learners to understand, then learner has an opportunity that he can ask the bot what does it mean by putting hashtag or at the rate before the word.

If the bot get the question then it answered, but in any case he does not find the data, it asks the user to rephrase the word, but if it does not know the answer it should say it's irrelevant. The design of dictionary bot is illustrated in Figure 10.

VIII. PRELIMINARY APPLICATION OF FAQ CHATBOT

A starter form of a FAQ chatbot is presently being created, and tried in a class climate. The Chatbot at present can respond to normally pose inquiries around evaluation, and test necessities, just as inquiries around class times. Given table shows a structure for the execution of this Chatbot. The structure incorporates parts like fostering the FAQs, and acquiring criticism from different partners. One key component in this execution Stream charges the requirement for persistent improvement of the chatbot. However, the preliminary application of FAQ chatbot implementation is given in Figure 11.

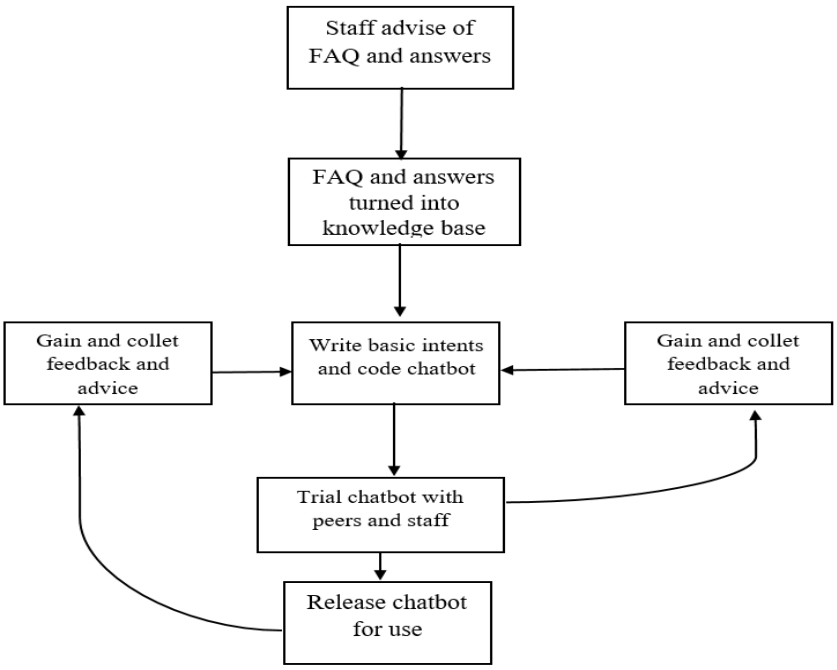

Fig. 11 FAQ chatbot implementation [38]

However, the search, screening & selection process for educational chatbot is depicted in Figure 12.

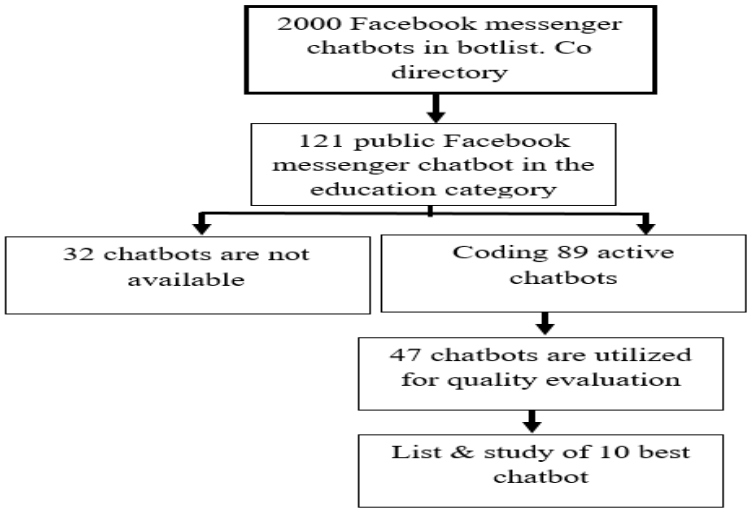

Fig. 12 Selection process for educational chatbots [39]

IX. FUTURE OF CHATBOT IN EDUCATION

In an education system Chatbot is used at large scale, in fact, in the covid 19 situation, most of the students do study via chatbot. It is expected that in upcoming years all the learners prefer mostly through chatbot, as analytical data describes. The traditional approach to teaching usually students score more marks in comparison of earlier, the rest of the class give exams without clarifying the concept. In contrast, the use of artificial intelligence (AI) in educational software creates a better learning system for the students for each subject to score well. AI will help to make E-learning more efficient and effective with interesting and joyful methods and real-time analytics. In addition, chatbot provide on-demand information related to health issues [40-43]. The utilization of chatbot in foregoing years is shown in Fig. 13.

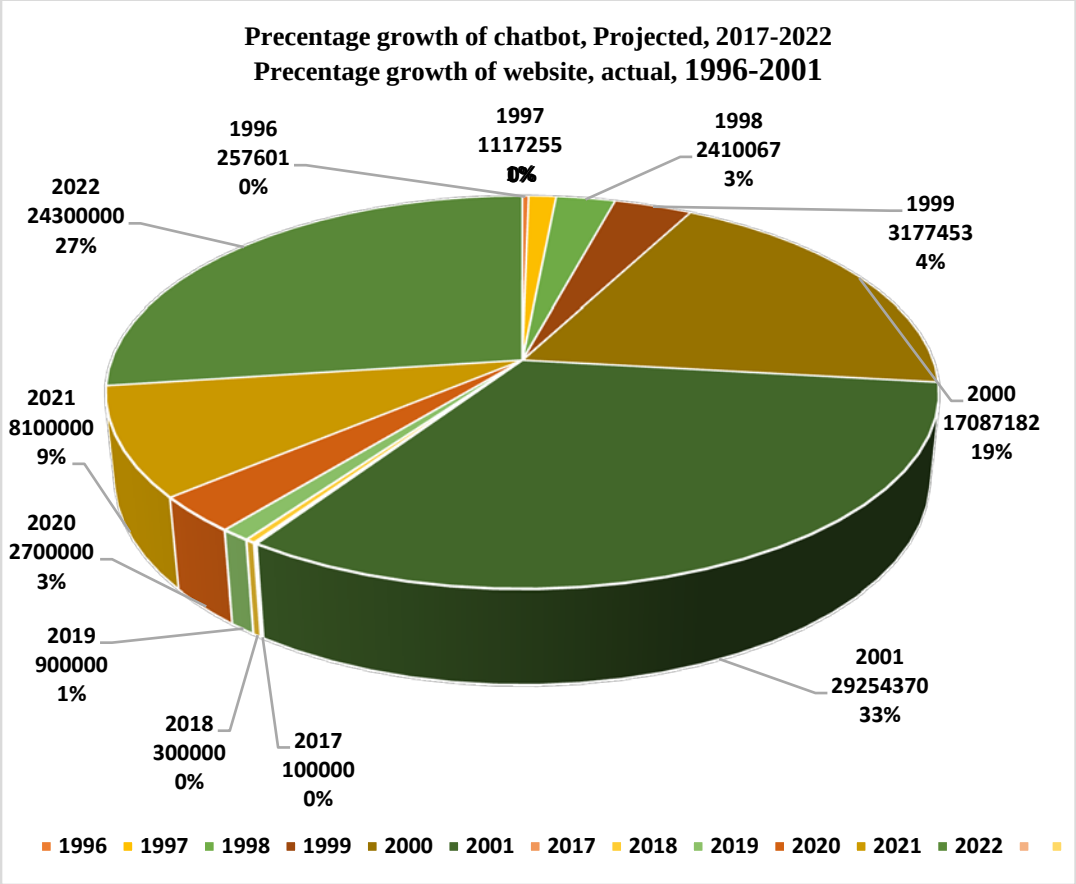

Fig. 13 Chatbot growth [44, 45]

X. CONCLUSION

The chatbot application is not in a limited area, but it has several applications in different sectors such as quality of customer service, robotics, health care, etc. However, it has some drawbacks in understanding as well as producing natural speech and personal data security. The chatbot is an innovative approach to automate human personalize message. If it is designed properly it could be a tool to attract user engagement & exhibits superior user experience between human. But it was seen that designing as well as implementing of such smart software is not too easy. Recently, chatbot technology is growing very fast, and new features released from time to time. Thus, the development of this smart software (chatbot) should be carefully planned, selecting the reasonable platform tools is more important, since it can help in boosting the effectiveness and efficiency of the chatbots.

REFERENCES

[1] F. Colace, M. De Santo, M. Lombardi, F. Pascale, and A. P. DIIn., "Chatbot for e-learning: a case of study", *International Journal of Mechanical Engineering and Robotics Research*, Vol. 7, No. 5, pp. 528-533, 2018.

[2] T. Lalwani, S. Bhalotia, A. Pal and S. Bisen., "Implementation of a Chatbot System using AI and NLP", *International Journal of Innovative Research in Computer Science & Technology (IJIRCST)*, Vol. 6, No. 3, pp. 26-30, 2018.

[3] Z. Safi, A. Abd-Alrazaq, M. Khalifa and M. Househ., "Technical aspects of developing chatbots for medical applications: scoping review", *J Med Internet Res.,* Vol. 22, No. 12, 2020. DOI: 10.2196/19127.

[4] Md. S. Satu, Md. H. Parvez and S. Al Mamun, "Review of integrated applications with AIML based chatbot", *1st International Conference on Computer and Information Engineering (ICCIE)*, pp. 87-90, 2015. DOI: 10.1109/ccie.2015.7399324

[5] A. Kerlyl, P. Hall, and S. Bull, "Bringing Chatbots into Education: Towards Natural Language Negotiation of Open Learner Models", in R. Ellis, T. Allen & A. Tuson (eds), Applications and Innovations in Intelligent Systems XIV - *Proceedings of AI-2006, 26th SGAI International Conference on Innovative Techniques and Applications*

of Artificial Intelligence, Springer, pp. 179–192. 2007. DOI: 10.1007/978-1-84628-666-7_14.

[6] R. Singh, "AI and chatbots in education: what does the future hold?", 2018. [Online]. Available: https://chatbotsmagazine.com/ai-and-chatbots-in-education-what-does-the-futurehold-9772f5c13960.

[7] L. C. Page and H. Gehlbach, "How an artificially intelligent virtual assistant helps students navigate the road to college", *AERA Open*, Vol. 3, No. 4, 2017. DOI: 10.1177/2332858417749220.

[8] J. Cahn, "Chatbot: architecture, design, and development", senior Thesis (EAS499) University of Pennsylvania School of Engineering and Applied Science Department of Computer and Information Science, pp. 1-46. 2017. [Online]. Available: https://www.coursehero.com/file/42508762/CHATBOT-Architecture-Design-and-Developm pdf/

[9] P. B. Brandtzaeg and A. Følstad., "Why people use chatbots in: kompatsiaris I. *et al.,* (eds) internet science". *INSCI 2017. Lecture Notes in Computer Science*, *Springer, Cham.,* Vol. 10673. 2017. https://doi.org/10.1007/978-3-319-70284-1_30

[10] A. Kulkarni, "Why the World Needs Chatbots. 2018". [Online]. Available: https://chatbotsmagazine.com/why-the-world-needs-chatbots-ae0c4abc33d5

[11] M. Dahiya, "A Tool of conversation: chatbot", *International Journal of Computer Sciences and Engineering*, Vol. 5, No. 5, pp. 2347-2693. [Online]. Available: www.ijcseonline.org.

[12] D. Bourgeois and D. T. Bourgeois, "Networking and communication", *Information Systems for Business and Beyond,* [Online]. Available: https://bus206.pressbooks.com/chapter/chapter-5-networking-and-communication/

[13] E. Adamopoulou, L. Moussiades, "Chatbots: History, technology, and applications", *Machine Learning with Applications*" Vol. 2, 2020. [Online]. Available: https://doi.org/10.1016/j.mlwa.2020.100006.

[14] S. Roos, "Chatbots in education: A passing trend or a valuable pedagogical tool? 1-58, 2018. [Online]. Available: http://www.diva-portal.org/smash/get/diva2:1223692/FULLTEXT01.pdf

[15] L. M. Villaseñor, I. Batyrshin, and A. M. Hernández, "Advances in soft computing. lecture notes in computer science", *18th Mexican International Conference on Artificial Intelligence, MICAI 2019, Xalapa, Mexico, 2019, Proceedings,* [Online]. Available: https://doi.org/10.1007/978-3-030-33749-0.

[16] N. Norouzi, M. Fokaefs and M. Litoiu, "Chatbots as assistants: an architectural framework", *CASCON '17: Proceedings of the 27th Annual International Conference on Computer Science and Software Engineering,* pp. 76-86, 2017.

[17] C. Lebeuf, M. A. Storey and A. Zagalsky, "Software bots", *IEEE Software,* Vol. 35, No. 1, pp. 18-23, 2018. DOI: 10.1109/ms.2017.4541027.

[18] J. Espinoza, K. Crown, O. Kulkarni, "A guide to chatbots for COVID-19 screening at pediatric health care facilities", *JMIR Public Health Surveill,* Vol. 6, No. 2, 2020. DOI: 10.2196/18808.

[19] W. Maroengsit, T. Piyakulpinyo, K. Phonyiam, S. Pongnumkul, P. Chaovalit and Theeramunkong, "A Survey on Evaluation Methods for Chatbots", *ICIET 2019: Proceedings of the 2019 7th International Conference on Information and Education Technology,* pp. 111-119, 2019. [Online]. Available: https://doi.org/10.1145/3323771.3323824.

[20] A. L. Berger, V. J. D. Pietra and S. A. D. Pietra, "A maximum entropy approach to natural language processing", *Computational Linguistics*, 1996. [Online]. Available: https://dl.acm.org/doi/abs/10.5555/234285.234289

[21] R. R. Winkler and M. Söllner, "Unleashing the potential of chatbots in education: a state-of-the-art analysis", Conference: 78th annual meeting of the academy of management At: Chicago, Illinois, 1-40, 2018. [Online]. Available: file:///C:/Users/Mr.Santosh/Downloads/Unleashing_the_Potential_of_Chatbots_in_Education_.pdf.

[22] S. Ondas, M. Pleva and D. Hladek, "How chatbots can be involved in the education process", *2019 17th International Conference on Emerging eLearning Technologies and Applications (ICETA).* DOI:10.1109/iceta48886.2019.9040095.

[23] S. Yang and C. Evans, "LB2300 Higher education-Warwick WRAP", *ICEEL 2019: Proceedings of the 2019 3rd International Conference on Education and E-Learning,* pp. 79-83, 2019. [Online]. Available: https://doi.org/10.1145/3371647.3371659.

[24] N. A. Ahmad, M. H. C. Hamid, A. Zainal, M. F. A. Rauf and Z. Adnan, "Review of Chatbots Design Techniques", *International Journal of Computer Applications,* Vol. 181, No. 8, pp. 7-10, 2018.

[25] A. Følstad, C. B. Nordheimand C. A. Bjørkli, "What makes users trust a chatbot for customer service?", *An exploratory interview study. Lecture Notes in Computer Science*, Vol. 194, pp. 208, 2018. DOI:10.1007/978-3-030-01437-7_16

[26] M. Skjuve, A. Følstad, K.I. Fostervold and P. B. Brandtzaeg, "My chatbot companion - A study of human-chatbot relationships", *International Journal of Human-Computer Studies*, Vol. 149, 2021.

[27] X. Fan, D. Chao, Z. D. Zhang, *et al.,* "Utilization of self-diagnosis health chatbots in real-world settings: case study", *J Med Internet Res*., Vol. 23, No. 1, 2021. DOI: 10.2196/19928.

[28] M. Adam, M. Wessel and A. Benlian. "AI-based chatbots in customer service and their effects on user compliance" *Electronic Markets*, pp. 1-19, 2020. [Online]. Available: https://doi.org/10.1007/s12525-020-00414-7.

[29] A. Følstad and M. Skjuve, "Chatbots for customer service", *Proceedings of the 1st International Conference on Conversational User Interfaces-CUI 19*, pp. 1-9, 2019. DOI:10.1145/3342775.3342784.

[30] Top chatbot development platforms for ecommerce websites, 2021. Emizentech (your idea and our invention. [Online]. Available: https://www.emizentech.com/blog/chatbot-development-platforms-for-ecommerce.html

[31] S. V. Sai Abitha, "ChatBots and Virtual Assistants", Computer Science and Engineering, pp. 1-4, 2021. [Online]. Available: https://d197for5662m48.cloudfront.net/documents/publicationstatus/62852/preprint_pdf/f5e3a45b6fa1d73532bc2a48198879e7.pdf

[32] S. Yang and C. Evans, "Opportunities and challenges in using AI chatbots in higher education", *ICEEL 2019: Proceedings of the 2019 3rd International Conference on Education and E-Learning*, pp. 79-83, 2019. https://doi.org/10.1145/3371647.3371659

[33] B. K. Pursul, L. Zhang, K. W. Jablokow, G. W. Choi and D. Velegol, "Understanding MOOC students: Motivations and behaviours indicative of MOOC completion. *Journal of Computer Assisted Learning*, 32, No. 3, 202-217. [Online]. Available: https://doi.org/10.1111/jcal.12131

[34] A. Fadhil and A. Villafiorita, "An adaptive learning with gamification and conversational UIs," *in Proc. Adjun. Publ. 25th Conf. User Model. Adapt. Pers.- UMAP'17*, pp. 408-412, 2017.

[35] W. Huang and K. Foon, "Designing and evaluating three chatbot enhanced activities for a flipped graduate course", *International Journal of Mechanical Engineering and Robotics Research,* Vol. 8, No. 5, pp. 813-818, 2019. DOI: 10.18178/ijmerr.8.5.813-81.

[36] B. Santhosh Kumar, N. Kanagavalli, T. Daniya, "A subject-specific chatbots for primary education end-users using machine learning techniques", *International Journal of Control and Automation,* Vol. 13, No. 02, pp. 407-415, 2020.

[37] S. Wang and L. Tiong, "Case study of government initiatives for PRC's BOT power plant project", *International Journal of Project Management,* Vol. 18, No. 1, pp. 69–78, 2000. DOI: 10.1016/s0263-7863(98)00072-6

[38] J. Sharma, "The chatbot dictionary. Key technology concepts that go behind building a chatbot", 2018. [Online]. Available: https://tutorials.botsfloor.com/the-chatbot-dictionary-8aea8478faf1

[39] P. Smutny, P. Schreiberova, "Chatbots for learning: A review of educational chatbots for the Facebook Messenger", *Computers & Education,* Vol. 151, pp. 1-11, 2020.

[40] A.S. Miner, L. Laranjo and A. B. Kocaballi, "Chatbots in the fight against the COVID-19 pandemic", *NPJ Digit. Med*. Vol. 3, No. 65, 2020. [Online]. Available: https://doi.org/10.1038/s41746-020-02800.

[41] H. Singh, S. Kumar and R. Kumar, "Impact of Covid-19 on Economy: A Critical Review". *I-manager's Journal on Humanities & Social Sciences*, Vol. 1, No. 3, pp. 19-25, 2020.

[42] H. Jindal, D. Kumar, Ishika, S. Kumar, and R. Kumar, "Role of Artificial Intelligence in Distinct Sector: A Study", *Asian Journal of Computer Science and Technology*, Vol. 10, No. 1, pp. 1-12, 2021.

[43] H. Jindal, S. Kumar and R. Kumar, "Environmental pollution and its impact on public health: a critical review", *Asian Review of Mechanical Engineering*, Vol. 9, No. 1, pp. 11-18, 2020.

[44] Key chatbot stats for 2021. Engati Team, [Online]. Available: https://www.engati.com/blog/chatbot-industry-trends.

[45] Lyons, Karl, "Intelligent Chatbot: Technical Report", Undergraduate thesis, Dublin, National College of Ireland. 2017. [Online]. Available: http://norma.ncirl.ie/id/eprint/2697.