Survey on various attributes and algorithms used in chat-bots

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***Abstract*— If someone in the early 1950's thought of creating a machine that is able to replicate human conversations, everyone would've ridiculed this notion .The thought of a machine talking to human beings without them realizing that it's a machine talking to them, got Alan Turing intrigued. This idea later became the foundation of chat-bots and came to be known as the Turing Test. Joseph Weinbaum, inspired by the Turing Test, created the world's first chat-bot Eliza. A chat-bot is an individual creature which holds discussions with human beings despite "It" not being a human. It can be based on book based discussion, a conversation or even a non-verbal discussion. A chat-bot - in some cases**

Insinuates to as a chatterbot - it is a modifier that reproduces the discussion of an individual through book or voice communications.

Deployment, logical and efficient implementation of chat-bot helps to not only decrease overhead expenses by utilizing bolster staff time, it likewise permits organizations to give 24/7 of client care during hours when the staff aren't accessible. Chatbot for various purposes will be developed using intelligent design algorithms that will analyze and resolve users' questions in response to prompt response. This framework will be an application that will provide answers to the client's separate questions. Clients will need to select a class of questions and then ask a question to the bot that will be used to comment on you. User queries will be resolved using natural language processing and artificial intelligence. Chat-bots will work 24/7 and 365 days of a year with little or no maintenance required. The appropriate responses will be given utilizing the man-made calculations made by the developer of the chat-bot. Clients won't actually need to go to the school for requests.

Our generation is used to getting everything instantly – whether it's sending an email, making a purchase, posting a picture or searching for assistance with assignments, it needs to be done in a matter of a few clicks , therefore there is a growing need of chat-bots which can provide solutions instantly and within a few clicks .

Keywords*— *Natural Language Processing and Artificial Intelligence, Chat-bot

I. INTRODUCTION

CHAT-BOT IS AN APPLICATION THAT USES TECHNIQUES SUCH AS ARTIFICIAL INTELLIGENCE, NATURAL LANGUAGE PROCESSING AND DEEP LEARNING TO UNDERSTAND WHAT HUMAN (END-USER) WANTS. ALL THESE TECHNIQUES CAN BE USED INDIVIDUALLY OR IN A COMBINATION TO PROCESS THE QUERIES AND GENERATE ACCURATE RESULTS.

CHAT-BOTS CAN BE DIVIDED INTO THREE MAJOR CATEGORIES:

1. RULE – BASED CHAT-BOTS
2. AI CHAT-BOTS

1. RULE – BASED CHAT-BOTS

THESE CHAT-BOTS WORK ON A SET OF PREDEFINED RULES. IF THE USERS QUERY MATCHES WITH THE SET OF PREDEFINED QUESTIONS THEN THE RESULT IS GENERATED. IF NOT AN ERROR MESSAGE IS GENERATED.

2. AI CHAT-BOTS

THIS TYPE OF CHAT-BOT DOESN'T REQUIRE ANY SET OF PRE-DEFINED RULES. BUT INITIAL TRAINING SHOULD BE PROVIDED BY THE DEVELOPER. AFTER THAT, CHAT-BOTS CONTINUES TO LEARN ON ITSELF AND GETS OVER TIME.

II. LITERATURE SURVEY

A. Automatized Educational Chat-bot using Deep Neural Network [1]

Chat-bots developed on rule-based approach their ability to generate accurate response is limited upon the knowledge set provided. These chat-bot struggle to keep when the data set is fairly large. Key process involved in making of online chat system are as follows:
(i)Word Segmentation Whenever users enter an input it requires processing as the computer can't understand it. NLP helps to process the input. The users sentence is broken down into individual words, these individual words are referred as tokens. This process is referred as tokenization.
(ii)Deep Neural Network Artificial Neural Network (ANN) replicates the human brain. It has several number of interconnected nodes which can be compared to neurons. Deep neural network can be understood as multiple layers of ANN.
(iii)Chat-bot According to Rashid Khan [2] and Sofie Ross [3], Chat-bot is a conversation program on a computer or smartphone. The interaction of the chat-bot is called a conversation, which is text-based or voice. This chabot uses primarily three users: Students, teachers and administrators. Students can access various menus such as subjects, assignments, calendars. Teachers can assign assignments. Administrator manages the knowledge data base.

B. Design of Integrated Messenger Anti-Virus System using Chat-bot Service [4]

Everyone uses a messaging application these days. As the number of user increases, malware attacks to steal users data also increases. These attacks are usually in form of URL based scripts or download links .In this paper an Integrated Malicious Anti-virus System was proposed to detect any malicious activity. Webhook is used by most of messaging applications and it provides a chat-bot i.e. a service based upon Webhook. Server sends the redirecting URL to the Messengers Server, then the end user sends a message to Webhook server. It receives the message and then the message processing is done and send the message back to messengers server i.e. Webhook. Finally the message is received by the client. Message Oriented Middleware (MOM) is processing method that manages the communication between producer's clients and consumer's clients. When any user sends a malicious URL or file to the messenger's chat-bot the server redirects it to IMAS handler call-back URL which is registered in Webhook. Then this message is processed to extract the malicious file or URL. Message is sent to several anti-virus to inspect the URL or the file and based upon the scan from anti-virus the result is stored in a database. The analysis report via producer client to the chat-bot handler which initially sent the scan request. The handler sends a response to the user based upon the scan via the chat-bot.

C. Fuzzy Prediction Model to Measure Chat-bot Quality of Service [5]

In this paper fuzzy prediction model used to determine the breakdown points faced by the end-users while using the chat-bots. When a chat-bot fails to understand the user's intentions and produces inaccurate outputs this is known as breakdown. Fuzzy logic can be interpreted as human thinking .Human thinking is not a binary process, it takes ambiguity into account. Hence, fuzzy logic can deal with ambiguity and linguistic barrier. A dialogue system can be classified into two categories i.e. Task oriented and Non-task oriented. Non – Task oriented chat-bots are gaining lots of attention because it helps to engage the end – user in an open domain conversation. Here fuzzy logic is used to measure the quality of service provided by a chat-bot. In other terms, human thinking is taken into account. The model proposed by here combines pre-processing and fuzzy logic to measure the quality of chat-bot. First stage contains the pre-processing and the data set used for the fuzzy model. Second stage consist of measuring the quality of chat-bot. Pre-processing, Two inputs are used to determine the quality of service provided by the chat-bot i.e. sentiment and length of utterance, each of the utterance is then automated. Primarily user's satisfaction is the most important task and hence understanding it for the chat-bot plays a crucial role. To measure the sentiment VADER lexicon (Valence Aware Dictionary is used. Secondly, length of utterance is measured by a simple word count function .Fuzzy Logic Model Fuzzy logic model initially begins with crisp values as input and then later is fuzzfied using rule inference and fuzzification returns an output.

D. Implementation Chat-bot WhatsApp using Python Programming for Broadcast and Reply Message Automatically [6]

This study focuses on the WhatsApp system and Chatbot development in Python. The goal of this study was to avoid using a Raspberry Pi in the chat simulation. The data retrieval process began by delivering a broadcast message to the user, outlining the various answer alternatives

Once the particular user responds, the application will transmit the particular reply in compliance with the customer's request. The designed chatbot system may only handle fifteen contacts at a time. The Chatbot server's connection acceleration influences the speed with which text messages are sent plus received. If the message contains peel-off stickers, emoticons, or gifs, the chatbot simulation software will by no means be able to interpret it. This particular is due to Python's inability to read the information .Incoming messages can be read by the Python programming language, but they must be in text format. The response time of reading and transmitting messages is affected by the Chatbot server's internet speed. This results in a timing delay between each contact who receives a message. The checking of each contact to view the incoming message is also affected by the internet speed. When the Internet network is unavailable, the Python programming system will read system problems at a later time.

The particular server doesn't have to record the device amount to distribute the text messages. This study may also utilize the system that may read all text messages and send all of them back without the particular need for the particular contact's name to be entered. The particular only way to construct a Raspberry Pi that will access the site browser. WhatsApp would certainly substitute the operating system upon the Raspberry pi with Windows ten or Linux. Alternatively, a tiny PC other than the Raspberry Pi can be utilized as a Chatbot server, making this study more usable.

E. Infini – A Keyword Recognition Chat-bot [7]

This particular research focuses upon the development and application of a keyword identification chat-bot, which tests the user's query and returns the particular very best plus the appropriate solution from its data source. The goal associated with the built chat-bot is too gradual up the quantity of time the user spends searching for the correct information.

The hard effort of investigating is reduced to insignificance. The discussion between your user and the chat-bot is pretty beneficial. It permits the

user to type in organic language with appropriate responses.

Using a one-touch, you're on the door. Generally, there are many chat-bots available designed along with a variety associated with technologies to obtain the variety of targets. This chat-bot offers with research section and their software needs. You can find information gaps between your school and its linked clients. They have got currently implemented the chat-bot for the particular University in which usually the client, learners here may request useful questions regarding the College-related mental fields that can be seen through the chat-bot. The particular bot can assist men and women save time and obtaining the particular data effectively.

The main constraint of the chat-bot is the organization's ever-growing data, which must be regularly hardcoded and updated in the chat-bots knowledge but soon the. A framework for updating wherein the data may be created. It can be processed as plain text and updated in the understanding of the relevant format.

Enhancements for the bot, which could be constructed in the particular near future, complex algorithms will end up being developed

F. Investigating the Effect of Chat-bot-to-User Questions and Directives on Student Participation [8]

It was discovered in this study that students created creative stories with the assistance of an in-house built chat-bot. In chat-bot learning activities, it is important to maintain knowledge of how questions and assignments elicit varied levels of user-generated results. The amount of time spent on recall questions and the most time spent on questions asking students to use creative considering skills was proportional to the amount of time spent on Bloom's revised taxonomy, with a fraction of the time spent on recall questions and the most time spent on questions asking students to use creative considering skills. Most materials were created as a result of chat-bot-to-user assignments. Because these directions required students to develop original story content, they were placed at the bottom of Bloom's taxonomy.

This study has some drawbacks, including a small sample size of younger and senior Southern Korean university British majors. As a result, more studies may be conducted to examine the elements impacting students' involvement by comparing chat-bots with other activities and with other types of students. In future research, a larger sample of people will need to be collected to give more meaningful and widely used insights regarding chat-bot technology in the hybrid and entirely online learning environment. Questions should be compared in L1 contexts with diverse age groups and geographic areas. Furthermore, consistency in findings with educational research is required before reaching any procedure-based conclusion. A new effort is undoubtedly required to untangle these issues in locating working websites for additional evidence to supplement the present data. Furthermore, investigations are needed to corroborate these initial conclusions about the effectiveness of chat-bots. When it comes to embracing chat-bot technology, consumers must assess the performance and usability of chat-bots. By combining pertinent data from all stored papers, the computer may be able to provide solutions to complex problems. Communication features, such as the quality of user answers, apply across diverse robotic designs since it is bot communication techniques, such as the evaluation of bot-to-user question kinds and instructions that are in dispute, not the bot's intelligence.

G. The Software Challenges of Building Smart Chat-bots [9]

The practical implementation is generally organized into two subsections which are predefined exercises and community-built bots. Predefined exercises means building a series of bots where each exercise explores new dimensions of bot building. The first exercise widens the core aspects of Chabot i.e. it deals with subjects like interaction platform, communication medium, user intention, input errors. After building this initial framework of bot we move on to the next step which is entity extraction and tuning our bot with privatized messages. This exercise comprises of crafting training sentences for best/optimal results using strong NLP engines like DialogFlow5 and

NLP. It shows how different entities are used to extract town names, date and time or custom domain-specific information. We proceed further by integrating our bot with sentiment analysis which helps the bot to understand and reply according to user's sentiments which helps in making the interaction more humane. Fourth exercise includes integrating complex processing in a bot that includes retrieving information and formatting using REST API. The fifth exercise includes subscribing to the external events. This includes providing feedback on formatting guidelines and alerting the maintainers of software to report on any issue being created. Finally step include continuous integration and deployment. The bot is tested continuously and monitoring while correcting the issues at run time and after various such processes before the bot is deployed. Community built bots involve various user interactive sessions where they gather concrete requirements and focus on the feedback provided by them which also helps in instigating new features and improved response in the chat-bot.

H. Chat-bot integration in few patterns [10]

In the present times there are many ways to improve chat-bots, the patterns depend on the type of service and the skill of developer that he brings to his users. From this perspective, there exist usually two categories of chat-bots i.e. focused on work, designed to perform specific tasks on a specific domain, e.g., weather chat-bot and chit-chat bots, which generally used for specific service based purposes but aims to hold open domain discussions with users. Modern task-based chat-bots are built on a framework-based structure, based on domain ontology (structured by frame, spaces and values) specifies the type of user intentions that the system has the ability to perform i.e. perceive and reply accordingly. The vastly used patterns are e stand-alone, information retriever, IOT interface, query engine, GUI agent, in-app assistant, business process interface and API caller. Standalone agent has generic intent defined by developers which uses ad hoc training and configuration. The next pattern In-app assistant is basically used in Contextual Question and answers, navigation, data input, guided App content used in exploration, chitchat models for help in contextual guidance and transaction processes. The GUI agent is the pattern vastly used for Generic app navigation, app-specific functions, training external data, retrained for specific UI actions which are GUI-driven. For next pattern API Caller is a pattern used for various functionalities in API access or exploration, resource exploration API specification, sample data, reuse training data from analogous APIs. Various Business process interfaces have an intent to obtain the process model information or process status updates that executes activities Business process model, pre-trained domain models etc. IoT interface is used to obtain device info, operate devices, and automate operation Device capabilities, device properties, pre-trained models Device. The next pattern Query engine is frequently used to create bots that deal with Query metadata, traverse through the data schema, query data instances, obtain statistical analysis on the Database schema, data instances, domain-specific Data structure, iterative query construction etc. The Information retriever intents Generic Q&A with generic search and Document recommendation and also Explicit follow up for Guessing answers from KB / KG question and answers Maker. As the presence of such patterns shows the efforts in establishing conversational access at for each level of the reference architecture, various patterns are still not developed. Except for stand-alone agents, in-app assistants and conversational information retrievers, we are lacking in the pattern specific development aids.

I. A Chat-bot for Changing Lifestyle in Education [11]

This research focuses on the creation of an instructive chat-bot, the system implies a deep learning technique. As the number of e-learners grows, the framework may be utilized to receive quick responses rather than waiting for someone to answer. When a student asks a question about the lab manual, the bot can appropriately answer the user's inquiries.

In this manner, the user's concerns and questions can be resolved without the need for human intervention. E-learner's practical performance

will be enhanced by this chat-bot. The technology uses a chat-bot for academic purposes using NLP and ML that may be utilized by a variety of educational institutions. There are two modes used including audio mode and text mode. Users can engage with the bot rather than being waited on the inquiry desk's waiting list. The same inquiry is used to verify for accuracy.
The plan is to create an interactive user interface. And to create a chat-bot based on intent categorization and natural language processing.

J. Language Chat-bot–The Design and Implementation of English Language Transfer Learning Agent Apps [12]

The Language Chatbot is widely used for providing customer service and as a personal assistant for end users. Interactive user chats in particular domains, such as fact-based question-answer systems, A real-time English learning chatbot has been developed using the technique known as Transfer Learning. These findings led to the development of a transfer learning-based chatbot that had three levels of learning modules. In truth, there are an infinite number of English learning programs and chat-bot systems which are readily available for an end-user, with the majority stating that the chat-bot uses artificial intelligence. As a consequence of the experience of these industrial systems, they have improved in the integration of learning English systematically on three levels (i) phonetic, (ii) syntactic, and (iii) semantic levels in Natural Language Processing, as well as in identifying how to learn in the chat-bot and AI ecosystem.

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IV. CONCLUSION

Through this paper we focus on various chat-bot development features and its design dimensions. Researchers have discussed involving the complexity of the style of interaction which shapes the definition of intent, actions and the dialog control. These Intents are the conceptual requests by the user, i.e., the tasks to be performed. They are provided in natural language through so-called utterances, where various utterances may express the same intent. Researchers have used natural language processing unit (NLP) for Identifying user intents from these utterances. In the bot NLP unit is trained with a dataset to know map utterances to intents.
After the bot identifies intent, the dialog management component of the bot enacts an appropriate action, i.e., a specific operation serving the user intent. The dialog control used in bots is designed either by externally determining the flow of conversation or derived from previous conversations, or using a combination of both the techniques.

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