A Thesis/Project/Dissertation Report

on

AI Chatbot

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Under The Supervision of
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Abstract

This paper focuses on a newly emerging tool for learning from CHATBOT, which is a learning-cum-assisted tool. A CHATBOT is an artificially created virtual entity that interacts with users using interactive textual or speech skills. This CHATBOT directly chats with the people using artificial intelligence and Machine Learning concepts. This paper reviews the technique, terminology, and different platforms used to design and develop the CHATBOT.It also presents some actual practical life typical applications and examples of CHATBOT. Theutility of the CHATBOT tool for Computer-Aided Design (CAD) applications is proposed from this review.

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CHAPTER 1

Introduction

Computer-aided design packages are the primary software to help Mechanical Designers throughout the world. The user uses these 2D drafting and 3D models developed by the software in the form of technical design to present their design ideas and concepts to other users.

Speech and textual forms of information play a vital role in communicating among peoples. Nowadays, speech and textual conversation are primary communication forms between humans and computers that occur through web applications. products and groceries. Telegram, WhatsApp messenger, Signal, IBM, Microsoft Cortana, Slack, Google Assistant, Siri, WeChat, Facebook Messenger, etc.

Design Technique / Procedure

Each task users wish CHATBOT to do will set by an intention [1]. After this designer tests CHATBOT by conversing or text like a human. As a result, every question asked or intended by clients can be expressed in many ways. That depends on the manner in which the user wants wishes to convey. For instance, Alexa's, turn off the TV. Alexa's, could you please turn off the TV? Why don't you turn off the TV? A user may use either of these phrases to instruct the Bot to turn off the television. These phrases have the same intention/task of turning off the TV, but they request different expressions /variants [1]. In the next step designer design, the flow of conversation. A designer needs to write all the logic to keep the user bound to the flow after acknowledging the user's goal. For instance, let's say the organization is building a bot to schedule a medical appointment with the doctor. The Bot asks the user to give their working mobile number, name, and a specialist to whom to consult, and then the Bot shows the open slots and then book the slot by user confirmation through a one-time password through a registered mobile number [1]. The designer has to select a suitable platform for deployment, choosing the right platform where BOT can deploy, such that it is easily accessible for users—for example, WhatsApp, Telegram, Your Website, Facebook Messenger Slack, etc.

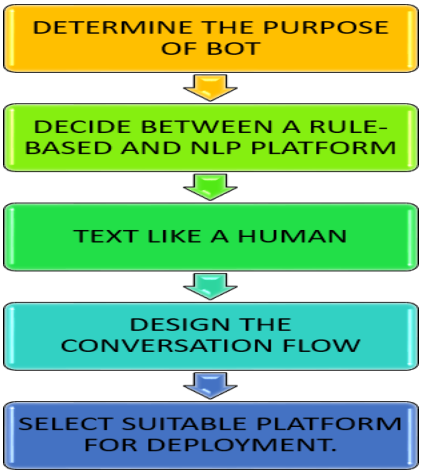

Fig 1. Designing CHATBOT [1]

CHAPTER 2

Architecture of Chatbot

The architecture means working of CHATBOT starting from user requests to the Bot response (figure 2). The Chatbot background process begins with the user's appeal, for example, "What is PTSD?" to the BOT deployed to the messenger system app like Facebook, Telegram, WhatsApp, Website, Slack, etc. or to the device using speech as input like Google Assistant, Amazon Alexa, Amazon echo dot. After receiving the user's request, the Natural Language Understanding (NLUs) component analyzes it or maps it to the user's intention and, consequently, gathers further related information (intent: "translate," entities: [word: "PTSD"]). Once a CHATBOT reaches the high-level interpretation or confidence score, it must decide how to further proceed and respond accordingly. It can act directly on new information, recall what it has understood, and wait to see what happens next, require more contextual information, or seek clarification [2]. For example, "User request to book a Train ticket from Delhi to Mumbai, but to book a ticket other additional information is also requiredlike date of journey, time for the trip. When there is a clear understanding of the request, execution/further action and retrieval of the information occurs. After retrieving the data, BOTintended to perform the requested actions or retrieves the data of interest from its data sources,a BOT Knowledge Base database, or an API call that access external resources [2]. The dialogue Management system keeps the information about all the conversations with the users.

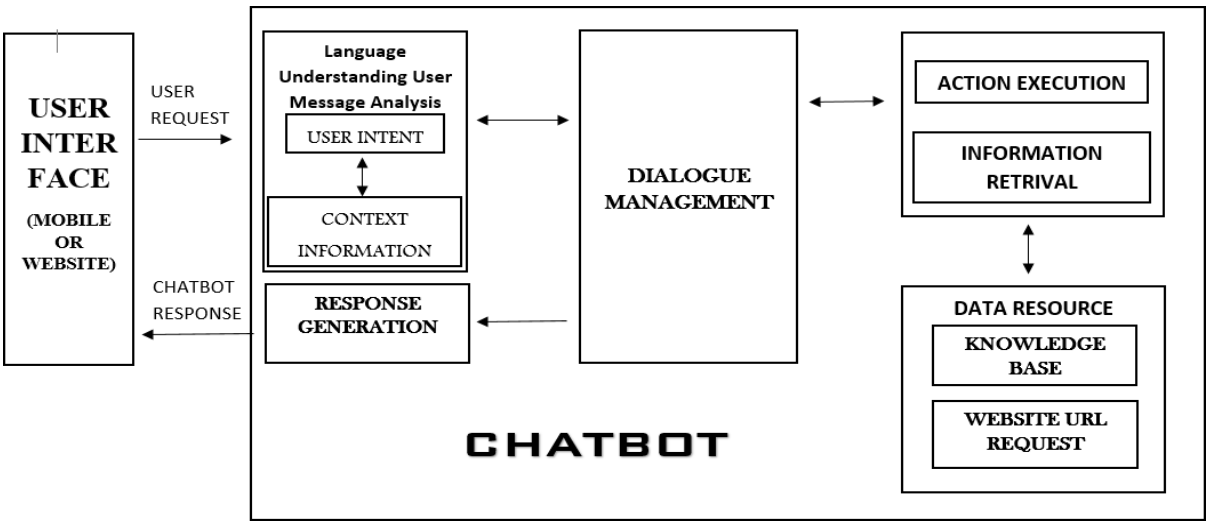

Fig 2. Architecture of CHATBOT

Types of Chatbot: -

CHATBOTS can be classed using other variables, such as the interaction level and how responses are generated [3]. The first type of CHATBOT is a domain of knowledge classified according to the knowledge available to them or the amount of data trained. They are further classified into Open Domain and Closed domain. Interpersonal bots are for communication and allow services such as Table booking in Restaurants, Train booking, FAQ bots, etc. These CHATBOTS are supposed to get information and pass it on to the user.

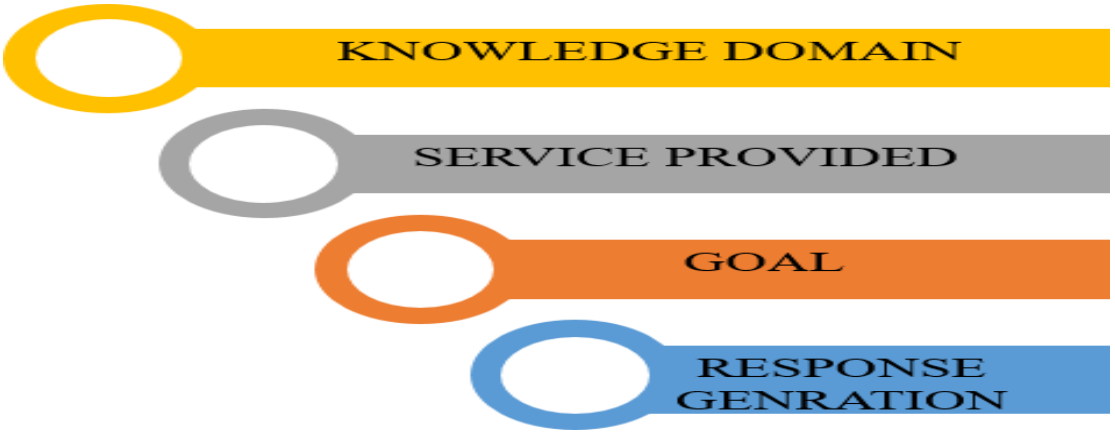

Fig 3. Classification of CHATBOT

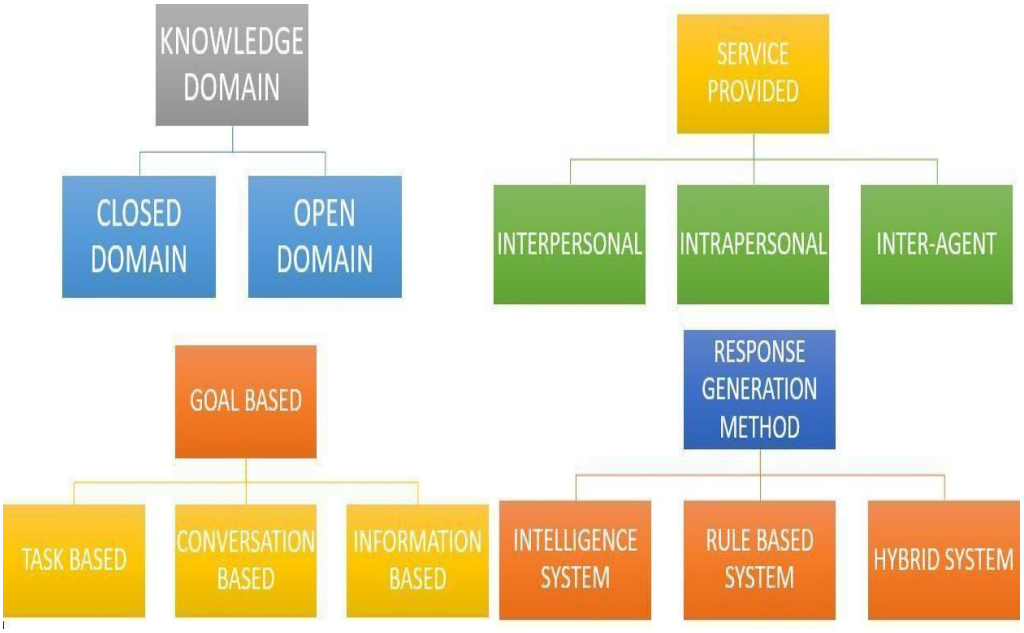

Fig 4 Classification of CHATBOT

The third type of Bot is goal-based Bot; these Bots are categorized according to the primary purpose they are intended to achieve. Informative bots provide the user with intel or data from a fixed database, like the FAQ BOTS and inventory database at the warehouse [3]. Intelligence Methods are knowledgeable systems to generate responses, and they use the natural language understanding (NLUs) component to comprehends the user's query.

Chatbot Engineering and Design Approaches: -

To develop a Bot, the developer must be aware of several techniques. Some techniques used to build CHATBOT are shown in Figure 5. The parsing involves input text analysis and uses several NLP functions to manipulate the inputs, such as Python NLTK decision trees [4]. Besides, it includes Dependency Tree, Syntactical Parsing, Parts-of-Speech Tagging, Named Entity Recognition, Entity Parsing, and Topic Modeling [4]. Pattern matching is the technique employed by almost all CHATBOTs. In a question-answering Bot, systems depend on the types of correspondence, such as natural language inputs, simple statements, or domain- specific inquiries. *AIML* Artificial intelligence Mark-up Language, insights from PatternMatching and Pattern Recognition technique. The stimulus-response approach is to model natural language to understand the human and Bot dialogue system [4]. Chat script comes into play when no matches happen with user input phrase in AIML. It emphasizes the structurebest sentence for constructing a sensitive default response. It involves a network of functionalities, for instance, factor ideas, logic, etc. [4].

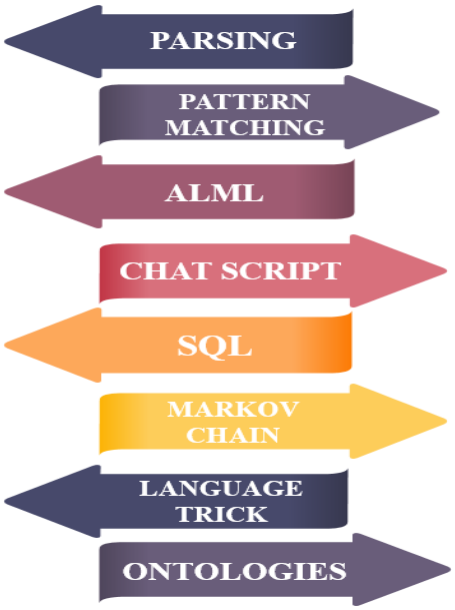

Fig 5 Techniques use in CHATBOT

SQL tool used to memorize earlier conversations for Bot [4]. Markov Chain is used to construct better probabilistic and precise responses. Markov Chains states a fixed probability of every letter or word occurrence in the same textual dataset [4]. Language tricks are a formof phrases and fragments of sentences available for Bot to attach knowledge base such that make that part more convincing. Canned responses are that predetermined answers to some particular questions are known, Typo errors and simulating keystrokes, personal history, and non-Sequitur are not logical conclusions used as language trick. These linguistic tricks are used to assure user input and provide alternative responses to respective questions [5]. An ontology represents a structural representation of the domain's entities and relationships between them. It is a treelike arrangement that assembles all entities into one realm, their subclasses, and instances. Additionally, it establishes connections between the tree leaves by specifying one way, two ways, and transient relationships. Moreover, it creates links between the tree leaves by defining unilateral and bilateral pathways and temporary relations.

Common Terminologies Used in Chatbot: -

Since Dialog flow Essential, IBM Watson, Amazon Lex, Many Chat, etc., provide ML algorithms training, this section addresses how user intentions, entities, & fulfillment are utilized to build and train Bot. Figure 6 shows the common terminologies used in the CHATBOT.

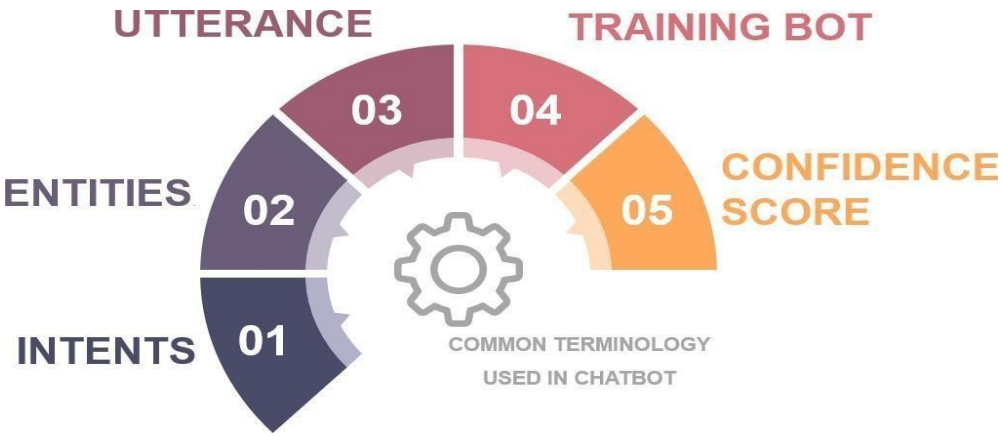

Fig 6 Terminologies used in CHATBOT

Intents are potential user statements that can trigger the user's purpose [6]. Intents are the aim, purpose, goal, motives of the users interacting with the BOT application or web service. Examples for utterances from different travel-agent are; "Book a flight from London to Paris today," Could you please, book a flight from London to Paris today," "I want to fly on December 22, 2017, from Mumbai to Hong Kong." [7]. The confidence score is that score that tells how confident or the amount in percentage model is recognizing user intents with the intents exiting into the trained database.

Platform to Build Chatbot: -

A CHATBOT platform is a program that makes system software by the developer to create and improve Bot. The platform selection depends on a different parameter, such as what type of Bot organization has to develop, whether Bot will be goal-oriented, use for conversation, etc. [8]. A conversational-based Bot concentrates on conversing with the user only; it does not rely upon understanding what the user is requesting, and also Bot need not remember the entireor previous conversations. The whole purpose of making this Bot is used for entertainment purposes. While goal-oriented CHATBOT is often used for business, education, FAQ purpose only. This type of Bot helps users achieve the requested tasks such as buying movie tickets, detailed information admission at XYZ college, ordering groceries or pantry. [8].

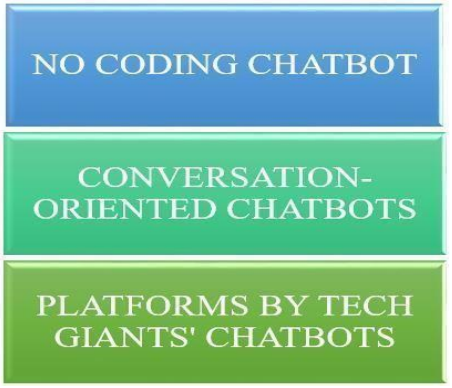

Fig 7. The platform used to build to CHATBOT

No-programming platforms are that platform design by the developer uses to build Bot without any programming language, machine learning algorithm, and natural language processing and understanding skills. These platforms are impeccable for small-scale projects and simple Bot. GOOGLE DIALOGFLOW (Figure 8) allows users to use a new methodology to unite with their product by building CHATBOT by involving text, speech, or voice conversation in the interfaces. GOOGLE DIALOGFLOW allows its users to connect or deploy on the organization's website, mobile application, Google Assistant, Amazon Alexa, Facebook Messenger, and other popular platforms.

IBM WATSON (Figure 8) has a service, IBM Assistant, that lets designers develop, train, test, and deploy on the web server, application, devices. CHATBOTs are built to mimic human interactions, such that conversations between Bot and customer should like conversing between two humans. Watson Assistant can search for an answer from a knowledge base, ask for clarification for the question requested, and direct users to a human if the Bot cannot solve the user's queries. CHATBOT builds using IBM Watson, for instance, A Voice Interactive, Multilingual Student Assistance System, based on IBM Watson [9], Implementation of CHATBOT for ITSM Application based on IBM Watson [10], Smart Assistance supporting Students and Staff Living in a Campus [11].

Facebook Messenger. This enables the designer to make Bot even more targeted broadcasts by deploying onto the Facebook Messenger system. Like several other big tech companies, Microsoft offers a comprehensive bot development framework and additional services that streamline the creation of full- featured CHATBOT. CHATBOT builds using Microsoft Bot

Framework, for example, Understanding CHATBOT-mediated Task Management. In PYTHON , Chatterbot is a library enable the automated response to user's request.[12]

Advancement in Chatbot and Filed Chatbot Used: -

There is the various domain in which Chatbot is used such as Customer service, Feedback, Education, Business, Railway, etc. Some of the most common examples are:

HUMAN-TYPE ACADEMIC INTERACTIVE ROBOT BASED ON ARTIFICIAL INTELLIGENCE AND THE WEB (UNIBOT) [13]. Generally, when students have to admission to any college, they have to visit universities or colleges to gather various information like Tuition Fees, Hostel Fee, Library, Term Schedule, etc. It is a time-consuming process, which requires human presence to give a visit to collect the required information. As a result, CHATBOT has been developed. This project aims to interact between users and Academic CHATBOT [14], accessed from anywhere, anytime. The CHATBOT can be easily integrated with a university or college website with few simple language conversions.[15].

TELEGRAM CHATBOT FOR SMART WORKSPACE BASED IOT WITH ARTIFICIAL INTELLIGENCE [16]. The concept of IoT (Internet of things) allows us to take advantage of internet connectivity continuously. IoT has abilities that include sharing data, remote control, and controlling several electronic devices on the workspace through the internet, such as a lamp, fan, AC, washing machine, electrical outlet, and temperature check [17]. This research was carried out using ESP 8266 remote control devices to access local control using Artificial Intelligence CHATBOT by using Telegram Messenger. This made it easier for employees to control several electronic devices on their respective workspace through smartphones or PCs without manually switching ON or OFF and going back to the office to turn off or turn on the lights. As a result, this workspace is called Smart Workspace.

INTELLIBOT: A DIALOGUE-BASED CHATBOT FOR THE INSURANCE INDUSTRY [18]. CHATBOT is now being used in various businesses to provide their customers with a virtual assistant to answer their requested questions. Using AI Bot, companies can develop an improvised way to connect with their retail and corporate customers and increasing customer satisfaction. For customers, the organization provides a better and convenient way of conversing with company peoples without waiting on the phone or sending many emails. In countries such as South Korea, China, Japan, Singapore, India, and the USA, CHATBOTs is the customers' preferred platform for communication with a business [19].

Conclusions

In this paper, a review of a new learning-cum assistance tool, i.e., CHATBOT, is introduced. The CHATBOT utilizes the concepts of Artificial Intelligence and Machine Learning to interact with people virtually. Firstly, the development history is reviewed, followed by an explanation of the architecture, and different CHATBOT classifications according to their utility are presented. After that, various design techniques and approaches and varying platforms of build Bot are reviewed, followed by the advancement in CHATBOT is presented. Real-life practical examples and application of CHATBOT are also presented. This review proposed that CHATBOT can be very well utilized for Computer Aided Design (CAD) [20] software applications, which can overcome the difficulty faced in procedural-based knowledge method. Since Artificial Intelligence concepts are used in CHATBOT, it can give the best alternative way to solve the same CAD problem.

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