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Virtual Assistant for Medical Devices

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ABSTRACT: This paper discloses a virtual conversational method and system to guide the people who are not familiar with medical devices. It also aims at providing some positive information through continuous dialogue answers in order to guide people to how to use various medical instruments at the time of emergency. Human – computer conversation is gaining momentum as a technique of digital interaction. There has been a recent upsurge in technology - based search engines and assistants such as Siri, Google chrome and Cortana. Natural Language Processing (NLP) techniques such as NLTK for python can be applied to analyze text- to-text diagnosis and intelligent responses can be found by designing an engine to provide appropriate human like responses. This type of program is called a Chatbot. This paper also presents a survey on the techniques used to design Chatbots and a comparison is made between different design techniques selected for creation of chatbots. This paper is representative of the significant improvement in Chatbots in the last decade.

KEYWORDS: Natural processing language(NLP), Naïve Bayes, Decision Tree, Topic modelling, PoS tagging .

I. INTRODUCTION

Currently in this COVID 19 pandemic situation many people avoid to go clinic for regular checkup of BP and Sugar. Medical devices such as BP machine, Sugar machine and Pulse Oximeter are used by people for personal use. Sometimes in medical emergency it is tedious task to read the instruction manual for medical equipment. In this project we will develop a virtual assistant like which will give all information or demonstration for the medical device in just one click.

In recent years, people get addicted to the internet in obtaining information for every problem they face. This not only yet people to seek knowledge about general topics but also their health concerns. However, people are afraid of misinterpretation when they googled their symptoms since most search end up with creating unnecessary paranoid to the users and may sometimes inaccurate. Based on those needs, people start to develop several technologies to help people get the most accurate results on their disease. The need for a reliable and accurate diagnosis wakes the rise of a new generation of healthcare technology called the Medical Chatbot. The main idea of creating this chatbot is to replicate a person's discussion.

Artificial Intelligence gives the supreme power to mimic the human way of thinking and behaving to a computer. Chatbot's are such kind of computer programs that interact with users using natural language. Chatbot works basically on Artificial Intelligence. Using this technique we have decided to add some contribution to the Health Informatics.

Our project builds a text-to-text conversational agent that diagnosis patients explaining their condition using natural language. The bot asks for relevant information, e.g., age and sex, and requests a list of symptoms. The system remembers past responses and asks progressively more specific questions in order to obtain a good diagnosis. The three primary components of our system are (1) identification and extraction of symptoms from the conversation with the user, (2) accurate mapping of extracted symptoms to documented symptoms and (3) Specifying the disease and referring to an appropriate specialist if necessary. In its current form, our bot's best application would be as a

preliminary diagnosis tool that patients could use to assess their symptoms before going to the doctor, perhaps using the bot's specialist referral feature to choose the right care provider.

Chat bots or Virtual Assistants have been designed to simplify the interaction between computers and humans and have hit the market. A chat bot is a software that uses artificial intelligence (AI) that can converse (or chat) with a user in natural language via virtual chat rooms, websites, mobile apps and messaging applications or through the telephone. Generating responses to user queries in human like natural language is one of the most common examples of Natural Language Processing leveraging in various enterprises' end-use applications.



Simultaneously, chatbots offer companies various opportunities to enhance the customer's loyalty and ensure operational efficiency by minimizing the surplus cost of customer service. Chatbot solutions have to effectively perform both of the tasks for successful execution.

III. LITERATURE SURVEY

Automatized Medical Chatbot (Medibot) [1] Automatized medical chatbots are conversationally built with technology in mind with having the potential to reduce efforts to healthcare costs and improve access to medical services and knowledge. They built a diagnosis bot that engages patients in the conversation for their medical query and problems to provides an individualized diagnosis based on their diagnosed manifestation and profile. Their chatbot system is qualified to identify symptoms from user inputs with a standard precision of 65%.

Chatbot for Healthcare System [2] Healthcare is very important to lead a good life. However, it is very difficult to obtain the consultation with the doctor for every health problem. The idea is to create a medical chatbot using Artificial Intelligence that can diagnose the disease and provide basic details about the disease before consulting a doctor. This will help to reduce healthcare costs and improve accessibility to medical knowledge through medical chatbot. The chatbots are computer programs that use natural language to interact with users. The chatbot stores the data in the database to identify the sentence keywords and to make a query decision and answer the question.

A novel approach for medical assistance using trained chatbot [3] The implementation of Personalized Medical assistant heavily relies on algorithms as well as the training data as discussed in this paper. However, it is still in its early stage and levels and faces some challenges; some of which have a direct link to different technologies.

IV. PROPOSED METHODOLOGY

The chatbot for medical devices is developed using Kodular Android App Development Platform. The chatbot is designed for medical devices considering the use by normal people and medical professionals.

The splash screen of the app has logo and name of the app. The second screen of the app asks whether the user is a normal user or a medical professional. Based on the input from user the chatbot decides the questions and provides responses.

The local database stores all the information of the medical devices along with the queries. The external link database stores links of external websites which will play information videos of the medical devices. The chatbot can uses both speech to text (speech recognition) and text to speech (audio output) modules.

Algorithm :

Step 1 Start App.

Step 2 Choose Normal User/Medical Professional through button or voice input.

Step 3 Select devices from list of devices or type a device name to fetch details.

Step 4 Get details with instruction on how to use.

Step 5 Watch video by clicking on button.

Step 6 Go back to Step 3 or exit.

Step 7 Go back to Step 2 or exit.

Step 8 Stop App.



Working Principle: -

Algorithm inspection approach works by analyzing the inner working of the chatbot and ensuring that each individual algorithm is functioning as expected. This helps developers to not only assess the performance of the chatbot but also identify specifically where faults lie and where adjustments are required. This approach overcomes the challenges faced by the output testing approach by being rigorous, intensive and precise. Among other things, some of the most popular algorithms used by conventional Chatbots are Naïve Bayes, Decision Trees, Support Vector Machines and Natural Language Processing (NLP). Classification algorithms are used by chatbots primarily to identify the intent in phrases. This helps in deriving context pertaining to that intended by the user in the input. Topic Modelling using algorithms such as LDA and feature extraction (NLP) is useful in extracting the overall topic or domain of the conversation. NLP is of particular importance for chatbots because this technique determines how the bot will understand and interpret the text input. The goal of an ideal chatbot would be to converse with the user in such a way that the user is completely unaware that they are talking with a machine. This algorithm attempts to learn through machine learning and an abundance of conversational data, the intricacies of human language. NLP helps the bot understand text data, comprehend grammar, sentiment and intent. This is primarily due to the wide range of functionalities offered by NLP such as text summarizations, word vectorization, topic modelling, PoS tagging, n-gram and sentiment polarity analysis.

V. RESULTS

In order to know about how to use medical devices this app will help professionals and non-professionals.

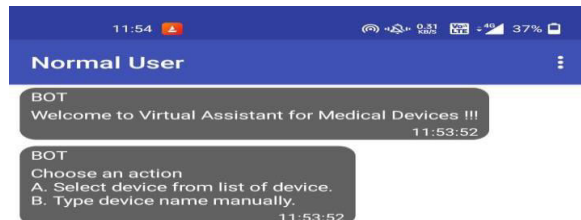
The splash screen of the app will be like:



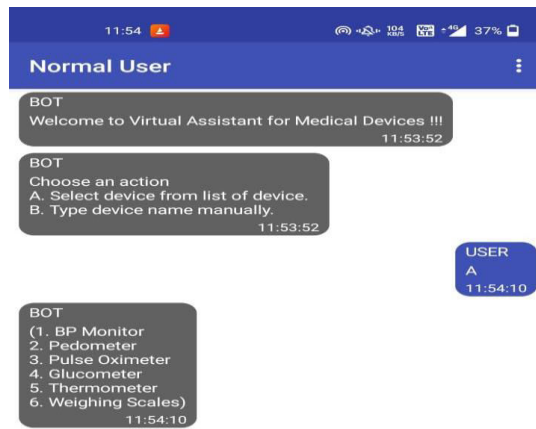
After this screen the app will ask like you are Normal user (non- professional) or you are Medical professional or else you want only voice input related your search:



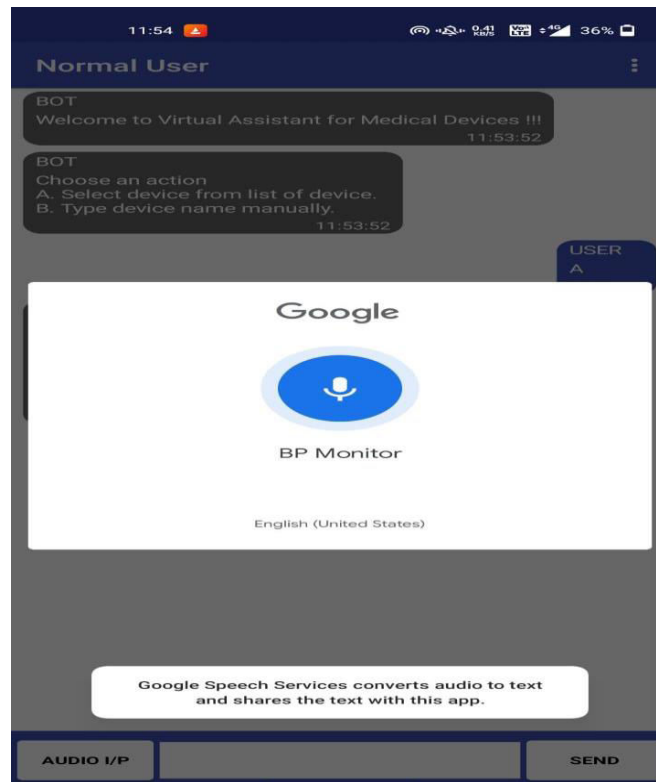
If you choose as Normal user then it will redirect to the screen like as:



Later it will give us 2 options whether we want to search a device from the list given in app or we want to search other device which is different from the list. We can give our choice as A or B:



If user wants to give voice input then a screen will appear like this:



After entering a device name app will give detail information about that device and how to use that device. Also there is a video link, user can go through it and can watch that video to understand more about the device. This screen will appear like this:



This is for Normal user. In same way this app will work for medical professionals but for professionals it will give descript information.

VI. CONCLUSION

It is determined that the modern chatbots perform at a very high standard to provide a reliable response to users compared to the traditional chatbots. Unlike existing chatbots which focused on various domains of healthcare. This is the best solution for people who are busy with their job schedules. They do not need to wait for a medical professional every time instead they can chat with the bot to get desired knowledge regarding different types of medical devices.

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