Intelligent Conversational Healthcare Chat-Bot System

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Abstract: Artificial Intelligence has core branches like, Machine Learning which takes in data, search patterns then improves itself using the data, and displays the outcome. To start a good day caring of our health is really important. In few village areas, it is quite hard to find a consultation with a doctor whenever needed in emergency. The proposal here is to build an intelligent conversational healthcare chat-bot using NLP which is a part of artificial intelligence that can diagnose and provide required details about the particular disease asked by the user before consulting a doctor. A chat-bot is an artificial intelligence based program which performs communication using text, audio and video system. Some chatbots acts as virtual assistants, which helps the patient know more about their disease and helps them with the consultation to the right doctor. A user can have the benefit of a chat-bot only when it can diagnose all kinds of diseases and provide all the needed information. A rule based text-to-text healthcare chat-bot involves patients in conversation which considers their health issues and provides a set of personalized diagnoses based on their provided inputs. The bot connects with patients who will visit the website and helps them to discover specialist doctors, book an appointment and guiding them for a right treatment. This Intelligent conversational healthcare chat-bot system will provide an all-day healthcare support to the users. Python scripting language is used in the implementation of such systems.

Keywords: Artificial Intelligence, Natural Language Processing, Machine Learning, Text-to-Text, Intelligent, Healthcare, Chat-Bot, System.

I. INTRODUCTION

The current artificial intelligence has developed to a certain point where programs can learn from the humans and effectively simplify the hindrance of one-to-one conversation. Effective communication is hindered by the confliction due to the sensitivity of the subject that people are not comfortable talking to others about what they feel about themselves and their body, but they won't be embarrassed talking to a machine about themselves. So we will offer an intelligent conversational healthcare chat-bot system using artificial intelligence that will identify and deliver the basic information related to the disease before the consultation of a doctor. This system uses Q&A protocol within the cha-bot style to answer the user queries. This directs to an end-user experience in which our interaction with an industry or service is automated based on user's past behaviour or interaction. If the match is done and the answer is delivered by the chat-bot regarding the identification of the disease it will show you the concerned doctor's details for booking an appointment. The architecture of this chat-bot consists of a language model along with a calculation algorithm to change informal conversation between a user and computer. A Rule-based technique is used to create a chat-bot. A chat-bot is instructed through Natural Language Processing (NLP) with the datasets, which are conversion dialogs. Syntax and Semantic are two main steps which are used along with NLP for creating a chat-bot. Syntax is basically the order of words in a sentence used to build grammatically accurate sentences. NLP uses algorithms to interpret the meaning and architecture of sentences. Here I present a NLP based system to facilitate a user with a user friendly chat-bot without even having any prior knowledge.

II. LITERATURE REVIEW

The literature review plays a vital role in understanding the artificial intelligence domain and implementation of the working system. We have included the following literature survey papers with proper explanations.

In this paper, Megha Manilal, Shobana AJ, Belfin RV has explained the usage of healthcare chat-bot for cancer patients. This paper explains that the cancer is often detected at an early stage. Detection of disease like cancer at an early stage aids to cure the disease and save the patient's life. Most of the people detect the cancer at the last stage. Cancer is a disease which causes due to lasting growth, and spread of abnormal cells. Cancer patients lose hope to live longer and healthier lives. Depression is expeditiously becoming one of the difficult phases in the health sector. In this paper, communication helps plenty to enhance one's psychological state, this problem gets solved partially if the patient tries to open up to someone, but nobody is available at right

time. This is the reason where chat-bot comes into limelight. NLP is employed in making of this chat-bot which is a vital component of AI, so we will imbibe same thing in our chat-bot for generation of accurate and responsive answers with respect to given queries. This project creates the lucidity within the public data distribution system because the workload becomes faster. The profit to an integrated GPU unit is that it's cheaper which successively means a less expensive computer device. Integrated graphic cards such as Intel, Ryzen also produce less heat and use drastically less power. However, there is no proper security system such as biometric system.

In this paper, Kalpana Devi S, Indumati V, Ishwariya S and Priya Shankar M had taken a survey on Medical Self Diagnosis. This Paper helps to understand the current health related issues and helps by providing necessary suggestion. Here this Chabot is implemented on mobile based applications to handle the user queries. Artificial intelligence is key methodology which is used to build those intelligence bots. It is a field of computer engineering that highlights the development of smart machines that work and reacts like humans. Patients having more weight have a serious risk of developing dangerous diseases and health conditions. A rising trend of obesity isn't only limited to developed countries, but to developing nations also. As smartphones have rapidly gained For the sake of weight loss, mobile applications (apps) are used in public health as an intervention to keep track of diets, behaviour, and weight, which is considered more effective than relying on consumer self-report measures. To facilitate objective data, solution called "Smart Wireless Interactive Healthcare System" (Switches) is being developed. This Chabot system would offer a brief detection but patient will need to confirm it with the hospital. The dataset was used for cancer was not able to use for the learning model.

In this paper, Divya Madhu, Shinoy Shaji, Neeraj Jain had implemented medical assistance with the assistance of natural language processing and mobile development technology. The healthcare chat-bot had used and tested on several android devices. Nowadays mobile conversations are becoming the trend in communication. The speciality of such conversations is, they are really simple and time saving mode of communication. So, chat-bot can be really successful if it follows all the simplicity of an instant messaging application. Chabot's are usually text driven, with images and unified widgets, which makes it easy to begin interacting with a bot. Also, clarity is what helped the most successful brands win confidence users. These things are the core of a Chatbot concept that's the uses gained the success are doomed for success. Basically, there are two types of Chabot's are available unintelligent ones that act using predefined conversation flows written by people and intelligent AI Chabot's that use machine learning. User can examine these two in more detail information in some of our other blog posts. User can fill it with your personality, user brand's identity, make it speak to your users like you would, change its message depending on the input from the user. Nowadays medicine description portal are really stirring and unconventional in interaction and detailing of medication.

III. PROPOSED MODEL

We begin this segment by introducing chat-bot and describing how we use it to present healthcare by using the concepts of Natural Language Processing. This chat-bot is being created using python programming language. Python programming is a platform that gives user friendly interface to make the application simpler and efficient. This language has built-in dictionary and list data structures which can be used to build effective runtime data structures. In this system the user can get all required details by typing in their query. The input includes the login details of the user and if the details are not present the user has to create an account, after that the bot's Q&A window will be opened where the user will have a friendly four button click interface namely- start, reset, yes and no respectively. By clicking on start the bot will start showing questions related to different diseases for example - Redness in eyes?, Headache?, Sore throat? Etc. When the user chooses yes the bot will show the possible diseases and will share the concerned doctor's details from where you can book an appointment of the doctor and if the user chooses no as an input the bot will show another question and will follow the same procedure on choosing yes after that. The system has been created to help users to overcome their insecurities as a machine is the best option one can have to share something which they cannot share with other person except a doctor. The whole concept can be understood by the architecture diagram, data flow diagram and the used case diagram which have been shown in the paper.
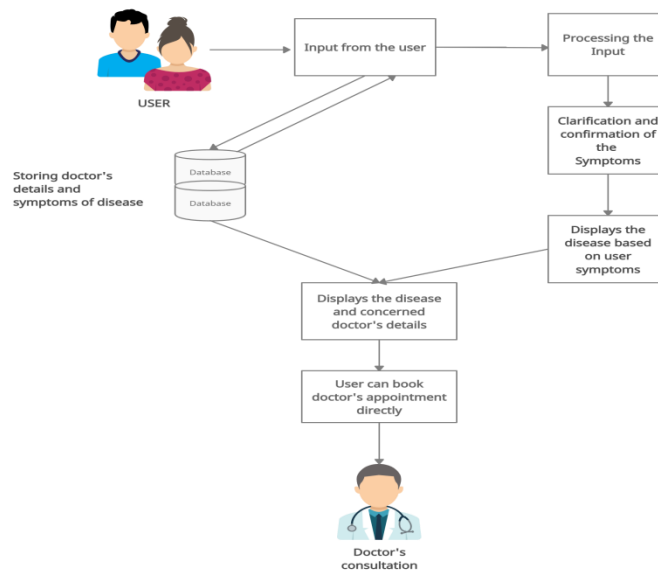
Fig.1.System Architecture

The system architecture figure shows that the user can start a conversation with the chat-bot in a user friendly manner and it will be stored in the database for future reference. The chat-bot will clarify the symptoms of the user with various sets of questions and the disease confirmation will be done. According to the user's input and symptoms confirmation the chat-bot will show the disease caused. The chat-bot will also display the concerned doctor's details and will also show a link to book immediate appointment. This system is user friendly and thus old age users can also use this system without any hassle.
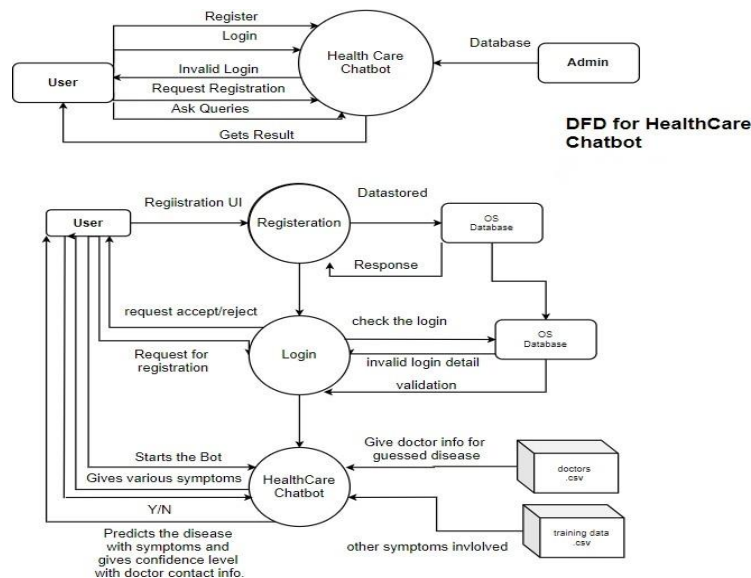

Fig.2. Data flow Diagram

In the above diagram the user will register itself on the system and then logins into the system. After that the chat-bot will take the input from the user and then it will process the inputs by using algorithms. System will apply algorithms on every input that has been given by the user. The chat-bot will clarify user's symptoms with different sets of questions and the disease confirmation will be done after that. Different diseases will be categorized as per the symptoms. After the confirmation chat-bot will show all the possibilities that might happen with the user and system will suggest a concerned doctor to the user from where he/she can book an appointment and get them checked.
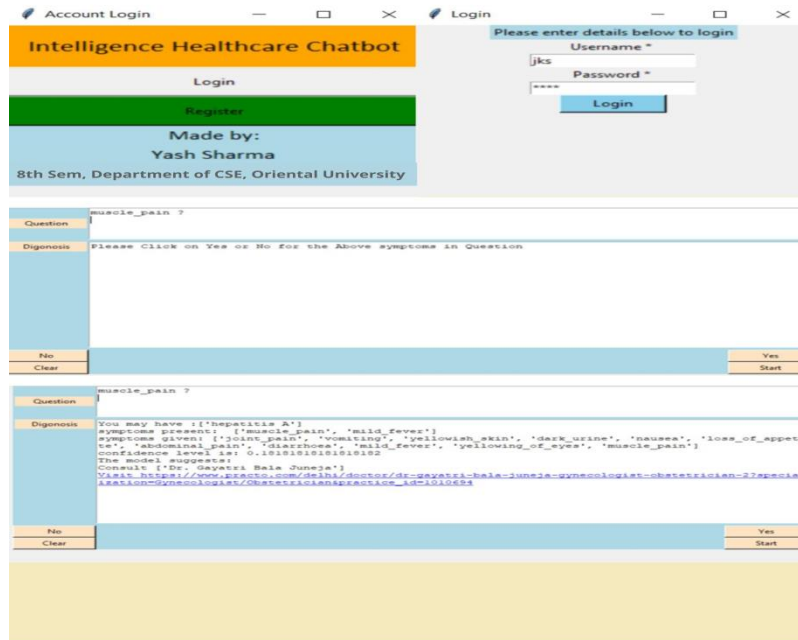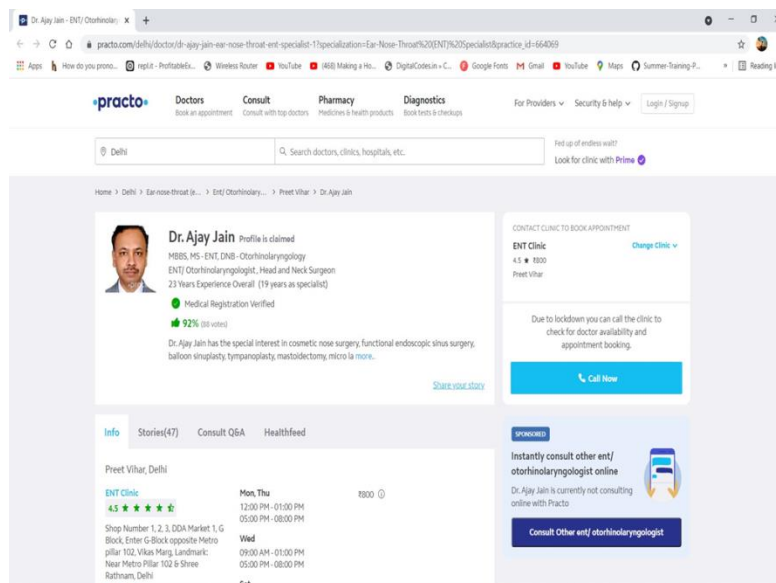
IV. SCREENSHOTS

Fig.3. Chat-bot UI

Fig.4. Doctor's appointment booking window

V. CONCLUSION AND FUTURE SCOPE

In this system we have built the chat-bot using python programming language along with the concepts of NLP and artificial intelligence. The system is based on healthcare so a large number of people would be able to resolve their issues by interacting with the chat-bot. With this system we conclude that chat-bots are a great tool for conversation between user and machine. This particular system is developed for obtaining fast response from the chat-bot with no delay and providing the correct output to the user. This conclusion ends with the line that chat-bot is a user friendly system and can be utilized by anyone even if they don't have any prior knowledge to use chat-bot. This system will provide personalized diagnosis supported symptoms.

Future work includes connection of chat-bot with the server to increase larger access of the system. Analysis on AI and interaction build models can bring a good interface for the users and healthcare industries.

ACKNOWLEDGMENT

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