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A Self-Diagnosis Medical Chatbot Using in Artificial Intelligence

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ABSTRACT: The proposed 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. To reduce healthcare costs and improve accessibility to medical knowledge the medical Chatbot is built. Certain Chatbots act as a medical reference book, which helps the patient know more about their disease and helps to improve their health. The user can achieve the real benefit of a Chatbot only when it can diagnose all kinds of diseases and provide the necessary information. Chatbots are programs that mimic human conversation using Machine Learning algorithms. It is designed to be the ultimate virtual assistant helping one to complete tasks ranging from answering questions in the health care domain. Chatbots are currently one of the best trending technologies available. But yet to accomplish many tasks there is a need to make Chatbots efficient in the medical field as well. To address the problem this project provides a platform where humans can interact with a Chatbot that is highly trained on datasets using Machine Learning algorithms. Machine Learning algorithms take a more natural approach to computation rather than taking a logical approach. The output is dependent on the dataset they are trained on. We can implement the real-time medical system and convert the text results into voice format.

KEYWORDS: NLP, Text Mining Algorithm , Support Vector Machine algorithm, Text to Voice Format, Chatbot , ML,

I. INTRODUCTION

AI is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions), and self-correction. Particular applications of AI include expert systems speech recognition and machine vision. AI can be categorized in any number of ways, but here are two examples. The first classifies AI systems as either weak AI or strong AI. Weak AI, also known as narrow AI, is an AI system that is designed and trained for a particular task. Virtual personal assistants, such as Apple's Siri, are a form of weak AI. Strong AI, also known as artificial general intelligence, is an AI system with generalized human cognitive abilities so that when presented with an unfamiliar task, it has enough intelligence to find a solution. The Turing Test, developed by mathematician Alan Turing in 1950, is a method used to determine if a computer can actually think like a human, although the method is controversial.

Artificial Intelligence is based on how any device perceives its Environment and takes actions based on the perceived data to achieve the result successfully. We have seen robots performing and executing jobs without human assistance in over last 10 years. Not just the mechanical robots but also automated programs which can modify their output based on self-learning. Use of machine learning is increasing tremendously in computer industry. There is multiple industry that have significantly impacted through machine learning. Healthcare sector is no different. Right now, Machine learning or AI is being used in Medical diagnosis and treatment.
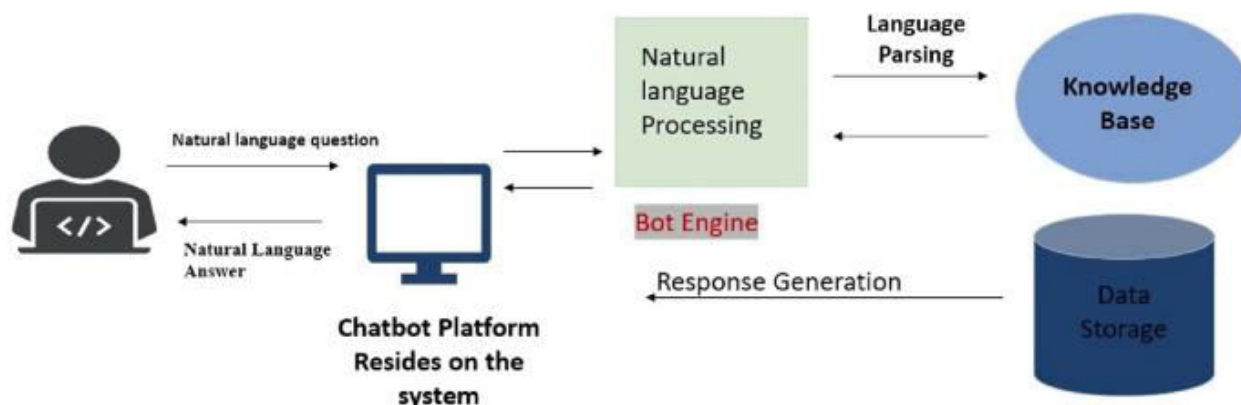
Fig 1: A Self Diagnosis Medical Chatbot Using Sklearn

The integration of Machine Learning in healthcare with a Chabot as your doctor is set to witness a significant paradigm. shift. We are already seeing image recognition algorithms assisting in detecting diseases at an astounding rate and are only beginning to scratch the surface. Chat-bots are slowly being adopted in healthcare. The global chat-bot market is estimated to touch at least $1.23 billion by 2025. ELIZA was interestingly one of the first chat-bots developed in 1966, which happened to be a psychotherapist. It was just a computer program designed to answer user queries like a psychology professional to an extent where user believed that it is talking to real doctor.

II. LITERATURE SURVEY

The major objective of this work is to explain the importance of medical chatbots and present our developed medical Chatbot, developed on internet technologies. Our Chatbot also assists user queries regarding hospital information, including specialists' availability, OPD timings, room registration, the number of beds, emergency information, and doctor availability, among others. This is the first real-time developed medical Chatbot for query queue management in hospitals based on the literature survey. Additionally, it improves users' satisfaction by providing answers to all their health and personal assistance-related queries. The proposed Chatbot virtually assists users like the real reception staff of a hospital. It provides users with total medical assistance 24*7. However, these existing systems failed to save the chat history and were not fully customized to understand the user's ultimate message. Thus, these bots did not fully understand what the user said and provided responses from the knowledge stored in the chatbot brain. Therefore, we developed a special Chatbot that includes collecting local hospital information responses by integrating web-based techniques. Present medical chatbots are integrated with speech recognition such that users can communicate through either voice or text messages. To implement a Chatbot, several techniques and optimization algorithms are available. Gradient Descent (GD) is an optimization algorithm used to evaluate the coefficients of function (f) that minimize the cost function. It is a primary optimization algorithm to assess the minimum cost function.

Chatbot, a type of digital healthcare tool, is the rule-based or artificial intelligence-based communication software that uses a mobile device to provide answers and relevant information in response to questions posed through text or voice conversations. This technology is increasingly used for applications in credit scoring and marketing strategies due to the universalization of smart devices and mobile (online) communication and the expanding influence of messenger apps. Recently, chatbots have been increasingly used as a tool for digital healthcare. For example, the chatbot program "Kohby" at Kangbuk Samsung Hospital provides information on health check-ups and administrative services such as appointments or payments. In addition, the chatbot also provides appropriate answers to questions about symptoms and diseases, and connects the patient with an appropriate doctor through "HealthTap" and "Babylon Healthcare". The chatbot additionally provides information regarding treatment and management for cancer patients or interventions for stress or mental health problems. Furthermore, the chatbot also plays a role in motivating and sustaining lifestyle changes, for example, quitting smoking. Because chatbots are optimized for mobile devices and can therefore obtain the necessary information without the need to install a separate app, the number of users and the service area are becoming increasing significantly. However, no chatbot program has yet been developed that explains the results of the general health examination explicitly and provides methods for follow-up management that are easily understood by the general public.

Interactive chatbot applications are the latest inventions of the modern era. The healthcare sector is closely associated with human interaction, and it seems that conversational AI applications like chatbots are more prevalent. A chatbot should respond in a way that the user should feel like they are conversing with a real person. The chatbot responds according to the clear dataset and sustainable backend logic for the outcome generation. A medical chatbot facilitates the job of a healthcare provider and helps to improve their performance by interacting with users in a human-like way. Chatbots in health care may have the potential to provide patients with access to immediate medical information, recommend diagnoses at the first sign of illness, or connect patients with suitable health care providers (HCPs) across their community Healthcare chatbots are the future of the medical field as it aids in reducing the amount of physical contact between patient and the doctor in the day to day growing population. Our chatbot (Dr.bot) uses natural language processing to interact with the user. Dr.bot uses pattern matching to recognize the user input and provide a suitable response from the provided dataset. The proposed system will include a brief summary of herbal medicines, their uses, and suitable home remedies that can be used to treat and cure the most common diseases. In this pandemic, we could decrease physical contact by the usage of medical chatbots which will provide herbal methods to cure the disease in the home itself. By using a healthcare chatbot people can avoid an unnecessary visits to clinics and hospitals. Especially in remote areas, it is becoming more difficult to consult a medical specialist when there is an emergency situation.

III. METHODS

The Goal is to introduce Health Bot, a system designed to improve the eHealth paradigm by using a webapp to simulate human interaction in medical contexts. Based on Machine Learning and Artificial Intelligence techniques, the webapp is able to overcome the limitation of classical human machine interaction, thus removing bias and allowing the patient to a freer and natural communication. A webapp can successfully be designed to work as a helping tool in doctor-patient communication, but it must be emphasized that it should work as a supplement and never replacement. All healthcare providers are always willing to help their patients and they understand how it is vital to be available if there is urgent need of medical attention. Unfortunately, doctors have limited time and a lot of patients which doesn't allow them to be available anytime. In their turn, webapp are there for those who need medical assistance at all time. Furthermore, virtual assistants may be responsible for reminding users to take their medicine and monitoring a patient's health status.

The system can go forward to do medical counselling based on their symptoms to provide the medicines at first aid level. The users can get a library of various diseases which will provide the basic information about the disease, symptoms, causes, diagnosis, treatment, prevention and other frequently asked questions. It will improve the healthcare in India at reduced costs. They can always ask medical questions and receive answers promptly and in a timely manner.
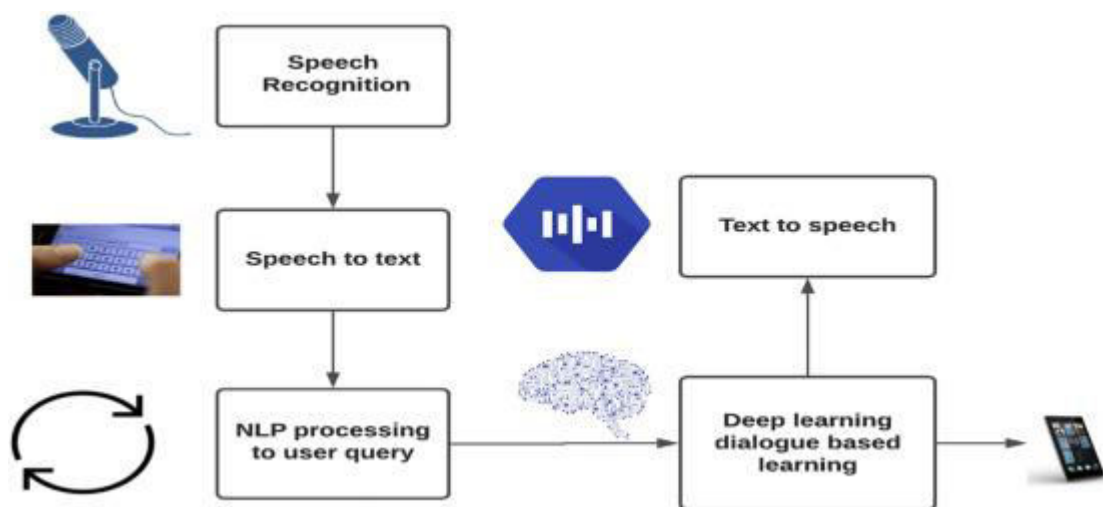

Fig 2: Web-based chatbot for Frequently Asked Queries

The proposed system will interact with user via web-based platform. After that the application asks for symptoms that the patient is facing. The user inputs the symptoms to which the application responds and provides the disease it predicts the patient can have. The webapp can answer to the users based on their disease related queries based on

symptoms, causes, and prevention or medicine suggestion. used the MedLEE natural language processing system to obtain UMLS codes for diseases and symptoms from the notes; then statistical methods based on frequencies and co-occurrences were used to obtain the associations. A more detailed description of the automated method can be found in Wang X, Chused A, Elhadad N, Friedman C, Markatou M. Automated knowledge acquisition from clinical reports.

The webapp asks the user to choose the symptoms from the dropdown provided to which the user responds and the webapp provides all the information regarding the disease it predicted based on the symptoms provided by the user. The system will identify the symptoms by providing the symptoms to the trained machine learning model which is trained on Naive Bayes algorithm which in turn will predict the disease according to symptoms.

IV. RESULT ANALYSIS

This table below is a knowledge database of disease-symptom associations generated by an automated method based on information in textual discharge summaries of patients at New York Presbyterian Hospital admitted during 2004. The first column shows the disease, the second the number of discharge summaries containing a positive and current mention of the disease, and the associated symptom. The user will choose the symptoms he/she is facing from the dropdown. The symptoms are passed on to a Naive Bayes trained machine learning model. This model will then predict the disease on the provided symptoms and all the necessary details about the disease.
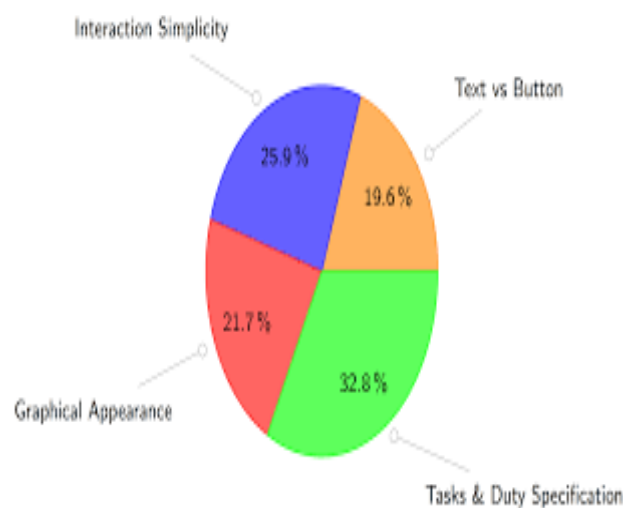

Fig 3: Designing for Health Chatbots

After analysis of various machine learning algorithms, it is found out that Naïve Bayes classifier is giving the best outputs as Naïve Bayes works best on text data. Naive Bayes Classifier Algorithm is a family of probabilistic algorithms based on applying Bayes' theorem with the "naive" assumption of conditional independence between every pair of a feature. Bayes theorem calculates probability $P(c|x)$ where c is the class of the possible outcomes and x is the given instance which has to be classified, representing some certain features.

V. CONCLUSION

From the review of various journals, it is concluded that, the usage of Healthbot is user friendly and can be used by any person who knows how to use internet in mobile app or desktop version. A medical bot provides personalized diagnoses based on symptoms. In the future, the bot's symptom recognition and diagnosis performance could be greatly improved by adding support for more medical features, such as location, duration, and intensity of symptoms, and more detailed symptom description. I am working on adding a new chatting system in the webapp which will make webapp more interactive to use. At last, the implementation of personalized medicine would successfully save many lives and create a medical awareness among the people. As said before, the future era is the era of messaging app because people going to spend more time in messaging app than any other apps. Thus, medical bot has wide and vast future scope.

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