
Health Proctor using Artificial Intelligence

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Abstract: Healthcare bot is a technology that makes interaction between man and machine possible by using Artificial Intelligence with the support of dialog flow. Now a day people tend to seek knowledge or information from internet that concern with health through online healthcare services. To lead a good life healthcare is very much important. But it is very difficult to obtain the consultation with the doctor in case of any health issues. The basic aim of this system is to bridge the vocabulary gap between the doctors by giving self-diagnosis from the comfort of one's place. The proposed idea is to create a medical bot using Artificial Intelligence that can diagnose the disease and provide basic details about the disease before consulting a doctor. To reduce the healthcare costs and improve accessibility to medical knowledge the medical bot is built. Certain bots act as a medical reference books, which helps the patient know more about their disease and helps to improve their health. The user can achieve the real benefit of a bot only when it can diagnose all kind of disease and provide necessary information. Hence, people will have an idea about their health and have the right protection.

KEYWORDS: Health Bot, Artificial Intelligence, Self-Diagnosis



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INTRODUCTION

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.

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.

Chatbot as Health Bot

As chatbots in healthcare are highly in demand, medical institutions can offer various services from symptom checking and appointment scheduling to dealing with additional questions. People are able to get answers to their additional questions with the help of chatbot. There is no need for them to call the clinic to clarify some misunderstanding.

Nationally, medical attention was missing in the case of nearly one-third of all deaths. It is likely that most of those deaths warranted some kind of medical attention, and that such attention would have been provided if the households in which these deaths took place were as rich as the top 15%.

LITERATURE SURVEY

Divya Madhu proposed an idea in which the AI can predict the diseases based on the symptoms and give the list of available treatments. If a person's body is analysed periodically, it is possible to predict any possible problem even before they start to cause any damage to the body. Some Challenges are research and implementation costs, and government regulations for the successful implementation of personalized medicine, they are not mentioned in the paper.

Luba Belokon's findings were published in year 2015 were about chatbots with Machine Learning: Building Neural Conversational Agents. There are two major types of dialogue systems: goal-oriented (i.e. Siri, Alexa, Cortana, etc.) And general conversation (i.e. Microsoft Tay bot). The former help people to solve everyday problems using natural language, while the latter attempt to talk with people on a wide range of topics.

Saurav Kumar Mishra says that the chatbot will act as a virtual doctor and makes possible for the patient to interact with virtual doctor. Natural language processing and pattern matching algorithm for the development of this chatbot. It is developed using the python Language. Based on the survey given it is found that the no of correct answer given by the chatbot is 80% and incorrect/ambiguous answer given is 20%. From this survey of chatbot and analysis of result suggested that this software can be used for teaching and as a virtual doctor for awareness and primary care.

Simon Hoermann discuss the current evidence for the feasibility and effectiveness of online one-on-one mental health interventions that use text-based synchronous chat. Synchronous written conversations (or "chats") are becoming increasingly popular as Web-based mental health interventions. This review is based on an evaluation of individual synchronous Web-based chat technologies. Through the current evidence of the application of this technology, the tentative support for mode of intervention is seen. Interventions utilizing text-based synchronous communication showed better outcomes compared with Waitlist conditions and overall equivalent outcomes compared with Treatment

As usual, and were at least as good as the comparison interventions. However, the issue of whether these technologies are cost effective in clinical practice remains a consideration for future research studies.

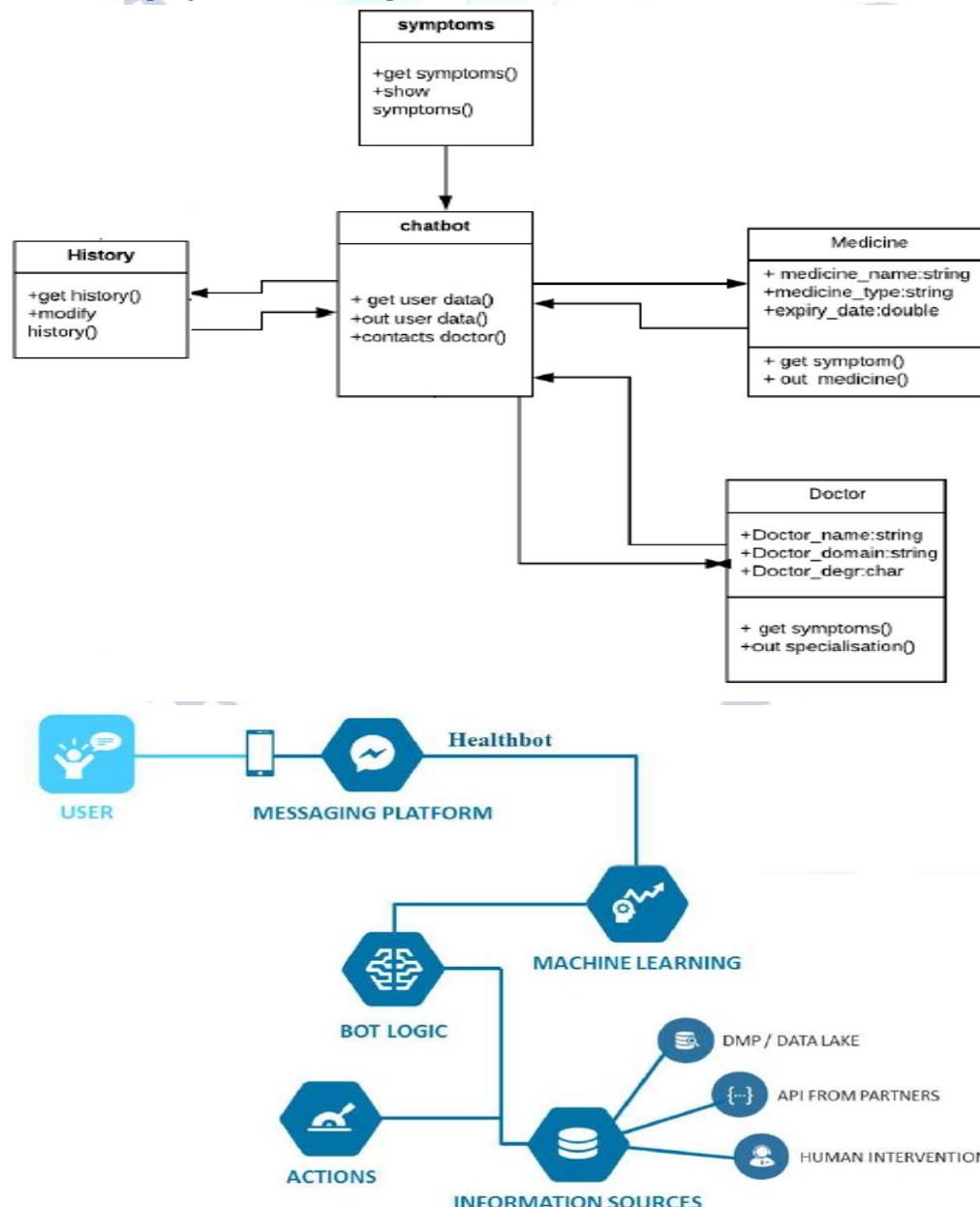
PROPOSED INTERACTION THROUGH HEALTHBOT

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.

PROPOSED ARCHITECTURE



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.

DESIGN AND IMPLEMENTATION

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.

NEWLY ADDED FUNCTIONALITIES

- Heart Disease Predictor:** In the direction of predicting heart disease, Machine Learning can present remarkable features that simplify the identification of unseen patterns, eventually providing clinical insights that assist physicians in planning and providing care.
- Liver Disease Predictor:** Liver disease is any disturbance of liver function that causes illness. Machine learning can provide remarkable results in predicting liver disease which is added as a new functionality to the website.
- BreastCancer Predictor:** The main objective of the analysis is to perform classification of tumors i.e., benign(B) or malignant(M). A benign tumor is a tumor that does not invade its surrounding tissue or spread around the body. A malignant tumor is a tumor that may invade its surrounding tissue or spread around the body.

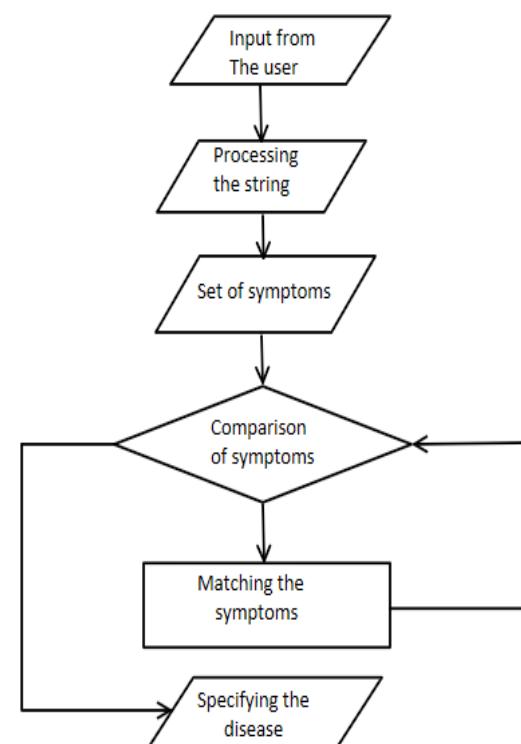
DATASETS

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. Associations for the 150 most frequent diseases based on these notes were computed and the symptoms are shown ranked based on the strength of association. The method 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.

EXTRACTION OF SYMPTOMS

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.



RESULT

Previous research results:

The results obtained in previous research after applying decision tree are given below:

In [26]: `dt.score(X,y)*100`

Out[26]: 90.10526315789474

New Results:

After some research it is found out that Naïve Bayes classifier performs well in datasets that contain text-based data. So, after applying naïve bayes classifier the results are given below.

In [7]: `from sklearn.naive_bayes import MultinomialNB
mnb = MultinomialNB()
mnb = mnb.fit(X, y)`

In [28]: `mnb.score(X,y)*100`

Out[28]: 92.10526315789474

Hence, results improved by 2%. Due to small dataset the improvement is not very significant.

Newly added features prediction accuracy results:

- **Heart Disease Predictor Accuracy:** After using bagging classifier its accuracy comes out to be around 83%.
- **Liver Disease Predictor Accuracy:** After using random forest classifier its accuracy comes out to be around 75%.
- **Breast Cancer Predictor Accuracy:** After using bagging classifier its accuracy comes out to be around 95%.

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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