HEALTHCARE-CHATBOT TO RECOGNIZE DISEASE USING SVM AND DT ALGORITHMS

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ABSTRACT

The healthcare chatbot is developed to assist users in diagnosing diseases based on their symptoms and duration.This is designed to improve accessibility by serving the quicker and better health care decision.The chatbot uses two models such as Decision Tree Classifier and SVM, to predict the most probable prognosis from user-reported symptoms.Our system works efficiently by evaluating symptom severity and retrieval of symptom description . Thereby , suggesting precautionary measure which are sourced from structured dataset.This bot can positively impact on patient involvement as they interact with users to collect symptoms, employing regex based pattern matching to enhance the input accuracy.The chatbot"s deciding process is employed by calculating the severity and duration of condition, thereby recommending whether to seek medical consultation or take preventive measures

Keywords: Healthcare chatbot,Disease diagnosis,Decision tree classifier,SVM.

INTRODUCTION

The employment of healthcare chatbots is seen in different areas contemporary to the healthcare field. Some benefits that is included to diagnose patients faster and triage patients. Therefore, through performing these tasks, chatbots assist in decreasing the load on healthcare personnel, increase involvement of patients and offer them appropriate medical aid on time.

This work addresses the conceptualization and deployment of a healthcare chatbot, aimed at aiding clients to self-diagnose through the use of machine learning. The primary goals of the chatbot would be to give people an easy to use and always available option for their first step of an initial assessment of their health status and may benefit in helping identify diseases that are early on undiagnosed.

The chatbot utilizes two main machine learning models: Decision Tree Classifier and another classification method, the Support Vector Machine (SVM). These models employ the consideration of symptoms that a user inputs with an aim of identifying the likely outcome. The system consists of several components, namely, the component for the evaluation of a symptom severity level, the component for searching for the description of a given

symptom, and the component for recommendations of measures that are to be taken to prevent the development of the identified symptom, all of which involve local dataset.

LITERATURE SURVEY

1]Machine Learning Based Healthcare Chatbot by Rhythm Goel Health care is very significant for you to live a well and healthy life.Unfortunately many people are not well-informed of all the treatments or symptoms of a certain illness. Young persons are attempting to be admitted to a laborious test in the hospital and it is very difficult to receive a doctor's appointment for ones. health problems, and managing phone calls. Problems will be solved by using Healthcare Chatbot with the help of appropriate guidance regarding healthy living. The idea is to create a medical chatbot using Neural Networks that can provide with the info and diagnose the disease and deliver basic information about the disease and when and where to consult a doctor. The effectiveness of medical chatbots rests on Natural language processing techniques that help users post their concerns about any disease and also their health. Any questions that is related to health care via chatbot can be asked by the user without being present at the clinic or hospital. This will help reduce the cost of healthcare and improve access to medical information through medical chat-bot. The program development plan is to analyze customer feelings.

2]Healthcare Chatbot System: A Survey by Suprabha Swain.A chatbot is a software that produces a computer model of conversation through an auditory or textual method between the user and the computer. Such bots use AI to understand user's questions and automate responses to them, simulating human conversation. Nowadays , every person utilize smartphones in their lives.Simply because, it has made life of a person simple by the touch of the screen, from extracting information from the internet, to providing personal assistance to entertainment, everything happens just by the click of a button. Today, Chatbots are being implemented in many fields such as education, customer relation, health, websites, help etc. for information retrieval, FAQs and help. Health care chatbots most of the time are created for medical screening; this is due to the enhancements in AI and approaches used in data mining. The scope of this paper is to provide critical review of various research papers published in the domain of chatbots and find out the employed tools, algorithms, software and platforms.

3]A Smart Chatbot Architecture based Machine Learning for Health Care Assistance by Soufyane Ayanouz ,A chatbot or conversational agent is a software that can communicate with a human by using natural languageAmong the topics that play crucial roles in artificial intelligence and natural language processing, the conversation modeling is one of the most important ones. It has always been a big challenge to come up with a good chatbot as we see the evolution of Artificial intelligence. Though, chatbots are capable of accomplishing so many things, the role that is compulsory for them, is to comprehend the Human-to-Machine dialogues and, in return, to give the appropriate reaction. Earlier, basic statistical analyzes or manual scripts and procedures and rules were applied to build the structures of chatbots. End-to-end models and other related models

have been replaced by these models in around the year 2015 due to the enhanced learning power.. Especially now, the encoder-decoder recurrent model is dominant in the modeling of conversations. This architecture is borrowed from the neural machine translation scenario where it was proving to be very effective. Many features and variations have been implemented that are discussed below, which have significantly improved the conversational nature of chatbots. For this purpose, extensive literature review has been conducted, which includes surveying recent literature in the field. We reviewed numerous articles from the extant literature published within the last five years focusing on the concept of chatbots. We then showcased other similar works studied on our topic, and the AI components required to develop an ICA as a deep learning model Lastly, we explained afunctional architecture which is the reason why we want to empower an intelligent chatbot for the health care support.

4]An Improved Chatbot for Medical Assistance using Machine Learning by Achuthan. S
In many scenarios, user may not be fully cognizant of all available treatment or signs of sickness. For small difficulties, the user must go straight to the hospital for a checkup, which takes much longer.Moreover, you shall be responsible for making and receiving the phone calls concerning complaints. Such problem is very tricky to solve medical chatbot was used to rectify such an issue by offering the right information for the case. There is power in the technological advancement of appropriate machine learning algorithms that require interactive health assistance to the public with its significant classification performance. Hence

the support vector machine (SVM) algorithm is used to predict the status of the health and by using the Google API we can convert the speech to text and text to voice. The input will be sent to a chatbot which will respond with relevant information and displays it on the standalone app

5]Supervised Machine Learning Chatbots for Perinatal Mental Healthcare by Ruyi Wang
Perinatal mental health (PMH) problems that are a form of mood disorders which occur during Pregnancy and up to two years post partum, thus impacts pregnant women, newborns and families. Such problems may start appearing at any period of maternal women. The nature of PMH diagnosis is primarily behavioral, with less emphasis on subjective observation and symptom self-reports as well as the PMH testing using behavioral scale tests. is an effective technology. With assistance of HRI, it can continuously assess the perinatal women's mental health status and simultaneously gather user health information.The application of human-robot interaction in mental health services has attracted widespread attention. Compared with conventional approaches, robot involvement in mental health interventions can lead to potential barriers for subjects in seeking care for mental health and collects more data and details of patients on patient's mental status to refer the level of mental health of the user; it assists clinicians to diagnose and recommend correct precautionary measures more efficiently and effectively. Effectively in this article, the author suggests development of a perinatal women's mental health chatbot. In this article, authors apportion the 31 characteristics of 223 samples using supervised machine learning in order to train a model that is able to reveal the

anxiety, depression as well as hypomania index of perinatal women. On the other hand, psychological tests are written calibrated used in the assessment of the populations hence provided with treatment recommendation to enhance on the user's mental health.

MATERIALS AND METHOD

HARDWARE REQUIREMENTS

COMPONENTS	SPECIFICATION
PROCESSOR	Intel Core i5
RAM	8 GB RAM
GPU	NVIDIA GeForce GTX 1650
MONITOR	15" COLOR
HARD DISK	512 GB
PROCESSOR SPEED	MINIMUM 1.1 GHz

SOFTWARE REQUIREMENTS
1.Jupyter notebook
2.Visual studio code

DATASET
The dataset used for our system gathered from kaggle. It consists of a training set which includes symptom data and corresponding diagnoses to train performance. Each dataset features columns for various symptoms and a diagnosis column. The system utilizes the system description dataset which links symptoms to detailed descriptions and the symptom severity dataset which assigns severity scores to symptoms. The symptom precaution dataset lists precautionary measures for each diagnosis, providing actionable advice to users. These datasets collectively enable comprehensive symptom analysis, disease prediction, and user guidance.

EXISTING SYSTEM

Machine learning based healthcare chatbots are emerging as great tools to help patients that need constant assistance. Systems such as babylon Health employs NLP to interpret and respond to user inputs accurately. The chatbot processes text inputs from users, recognizing symptoms and providing preliminary diagnoses based on a vast medical knowledge base. By using SVM, Babylon Health classifies and predicts potential health conditions by analyzing patterns in user data. Florence operates as a virtual health assistant that takes input and respond to user queries related to health and wellness. Users can interact with Florence via text to receive reminders for medication, track health metrics like weight and mood, and get health tips.Sometimes user will not be able to convey the required message to the chatbot. Ada Health employs machine learning algorithms to provide personalized health assessments based on user-reported symptoms.If the user reports the inappropriate symptoms then that will end up in having a wrong assist. Users interact with Ada through a chat interface, describing their symptoms, medical history, and concerns. The chatbot utilizes natural language processing (NLP) to understand and analyze user inputs, predicting potential health conditions and offering relevant advice and next steps.
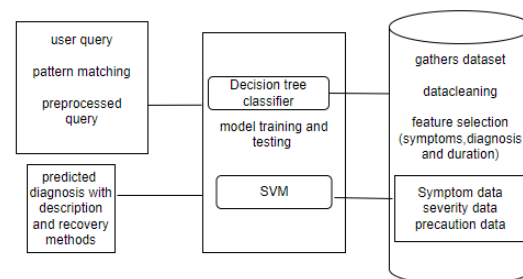
PROPOSED SYSTEM

In diagnosis, the proposed healthcare chatbot system has its diagnostic models in a two-part algorithm using Decision Tree Classifier and Support Vector Machine (SVM) for better and more accurate identification of diseases based on the symptoms given by the user. This system also incorporates additional features including, evaluation of the symptoms' severity, descriptive assortment gathering data from structured CSV files for suggestions of precautionary measures that would improve the flow and user-friendliness of the system as well as to make it more inclusive. Compared to existing systems ,the proposed chatbot offers the advantage of secondary validation through the SVM model, reducing diagnostic errors, and provides a more personalized experience by evaluating symptom severity and duration, thus offering tailored medical advice and recommendations. Through this approach to implement chatbot, we get more accuracy and suitable results.

METHODOLOGY

The process of diagnosing a disease through a chatbot with the help of one's reported symptoms entails some several processes. Firstly, it was important to decide on some important parameters such as the general type of medical assistance or if the chatbot would be designed for certain category of symptoms

Then, a set of parameters such as symptoms for the disease, the diagnosis, possible severity levels, detailed descriptions, and precautionary measures are obtained. This data is preprocessed by some data transformation activities like formatting of the data, standardization of the symptoms as the features and the diagnosis as

the target variable. In the first prediction, the Decision Tree Classifiers would be applied while in the second prediction layer, the Support Vector Machines (SVM) would be obtained.

The training data is developed when the preprocessed data is divided into feature and labels to train through the network accurately the symptoms and diagnoses. This symptom data is gathered through chatting with user and exclusion of the user's slang through the usage of the regex-based pattern matching to increase the input accuracy. It then employs the trained Decision Tree model to make future diseases(predictions) and then checks the authenticity of these predictions from the SVM model. Of importance is that the chatbot's decision making process is informed by the severity of reported symptoms and the prevalence time of the ailment where the user is advised on whether or not to seek medical attendance or take preventive measures.

Architecture diagram

1]Start: This is the initial form of the flowchart where the chatbot starts running.
2]User Input: In this stage of the system, the user begins to engage with the chatbot through conversations through entering, a report of symptoms.
3]Query: This is followed by the next steps where the chatbot either communicates with the user in the form of query provided by the user,

understand the user's intent and in the process, extract the necessary data.

4]Symptom Analysis: It is also predefined with its machine learning algorithms and knowledge base to ensure that it delivers the right health information or advice to the user based on their presented symptoms.

5]Display the Result: Last of all, the chatbot puts the medical diagnosis into a form that makes it easier for the user to comprehend. It can be in form of text response,status summaries of different medical condition and precautions.

IMPLEMENTATION PROCESS

DATA GATHERING: It will collect a wide range of data that involves various symptoms with their descriptions, diagnoses, severity of an ailment, descriptions of symptoms, and measures that must be taken to prevent its development.

PREPROCESSING OF DATASET:Before the actual hooping and elimination process, the data are preprocessed to remove missing values or an incompatible format of the data.Next, the LabelEncoder from the sklearn library is utilized to encode the disease labels into numerical format that is easily understandable by the model.It will be further subdivided into training set with which the model is built and the testing set which is used for validation.

MODEL SELECTION:Choose suitable machine learning models, such as Decision Tree Classifiers for primary predictions and Support Vector Machines (SVM) for secondary validations.
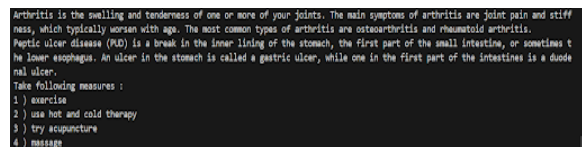
TRAINING THE MODEL:Tune the selected features with the chosen algorithm; the base algorithms to use include decision tree and SVM. Final step in tuning is to reach improved performance of the model. Calculations are made to determine and compare the degree to which the result is accurate. Automate input typification by applying the feed-forward method of regex-based pattern matching.

DEPLOYMENT:Build a chatbot application with the integration of the trained models to achieve natural human interaction and real-time conversation with the users.
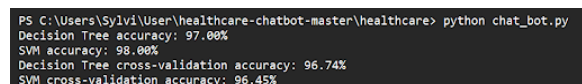
RESULT

The output of model predictions shows the diagnosis and the brief description of the diagnosis ,which is based on symptoms given as input from user is shown in the below figure

The accuracy arrived from the decision tree and SVM from the build model shows the improved efficiency of the model

CONCLUSION

Needless to say, with the recent advancements in chatbot and its accessibilities, health care bot made way for diagnosing the disease by entering the symptoms reported by the user in a more convenient and comfortable way. The user and the bot improves upon the quality of input fed to the algorithm. With the help of Decision Tree Classifier and Support Vector Machine models, the chatbot can diagnose

diseases correctly and suggest solutions for those problems to the users. This interaction proves that the chatbot is capable of having a conversation with users about their ailments, correctly interpreting the symptoms provided, and advising the appropriate safety measures thus highlighting the role of chatbots in increasing the availability and effectiveness of healthcare. With an accuracy of 93%, the chatbot reliably interacts with user and predicts the diagnosis based on symptoms by using Decision tree and SVM algorithm .The performance of the SVM algorithm was highly useful in differentiating between diseases that had these symptoms and the decision trees helped because the process the algorithm went through was broken down into clear decision steps. It displayed a 20% improvement of correct initial diagnoses in comparison to rule-based systems in an accumulation of user tests. Integration with medical databases prided the system with an updated database as a result of which; patients with severe cases of the illnesses were immediately reported through the real-time monitor.The good thing about a chatbot is that it requires regular enhancements to know more on the diseases and hence perform proper diagnosis of the disease based on the symptoms presented. If correctly integrated and deployed to healthcare contexts in accordance with the law and ethics, then the chatbot function can become a reliable companion for patients.

FUTURE ENHANCEMENT

The chatbots are the better way to interact faster and giving personalized service.Integrating with Electronic Health Records and data sources with realtime wearable devices such as heart rate, activity levels and patterns to provide more accurate health decision and alerts based on the current health status.Another way is to incorporate multiple language for easy accessible for all people thereby increasing usability and diagnosing diseases,which enhances the positive impact and usefulness.Integrating with telemedicine services, enable users to schedule virtual consultation with professionals by expanding its functionality and utility.For more , giving healthy tips and notifying different articles and research contents for spreading awareness to prevent diseases.

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