Chatbot based Disease Prediction and Treatment Recommendation using AI

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***Abstract*— Healthcare systems are the widely used , by which a patient and people gets medical help, check-ups, disease understanding and issue and resolving it by using NLP and machine learning to create a chatbot system for healthcare. People can interact with the chatbot same as they communicate with other people. Chatbot system will detect the symptoms of the user and predicts the disease and recommends treatment for patient. This chatbot can be used for people in conducting daily follow up and makes people get to know about their problem and health issue. using this proposed architecture system can help people to detect the disease based on their symptoms and get predicted diagnosis and if user want get that medicine than they can get that through automatic order booking and get medicine through nearest pharmacy shop. Also in proposed if user or patient want book the order online he will able to that using proposed system. And people who is not capable to go pharmacy shop , it will help such patient too.**

***Keywords* — chatbot system, Machine Learning, Disease Prediction, treatment, KNN.**

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I. INTRODUCTION

Information technology shows to the use of different type of systems, such as telecom and computers, to save, retrieve, and send data. Healthcare information technology, then, refers to the use of technical systems that are used to store health-related information. we can see that people are not giving much importance to their health issue. So using proposed system they are able to do that and also in this busy life people do not have time to go to doctor for medical help for their small issue. Also people have some concern about their health issue will also get help from this as don't have go any where for their medical help, they can do this from their home and will get benefiting by this proposed system. In many ways the proposed system will going to benefit the people.

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Medical Chabot application is used for resolving user query specially the patient. And medical chatbot will chat with the user and predict that user has any disease symptoms are not based on conversation. Currently the main application of medical chatbot system to provide the user or patient a support when doctors not free or they are busy with their work. It also used the cases when user or customer has no clue that what I is happening with them the they can communicate with medical chat and guess about disease. And that will patient to detect the proper diagnosis.

The main purpose of medical chatbot application for patient disease prediction and treatment is do detect the disease of user with conversation that happened and also medical chatbot will book medicine from near pharmacy.

The organization of paper is as follows: section 2 provides information about overview of related work. Section 3 provide the outline of proposed approach with discussion of overview, KNN K-Nearest Neighbor and methodology and flow of working which can be implemented and section provide the overall conclusion.

II. LITERATURE REVIEW

Medical Chatbot system help user to predict disease based on their symptoms. Most Chatbot system uses Natural language processing models combine well-known methodologies and algorithms such as statistical techniques and machine learning. They require historical data in terms of symptoms information as training data to learn and predict the accurate disease & based on predicted disease, it provides treatment plan.

A. Chatbot Types

There are specially two types of chatbot in which mostly people used AI based and rule based. Actually what happen in rule based AI that it specify certain condition and situation by which model is able to predict some of decision by predicting based on data. And sometime it happens that even after specifying the condition rule based AI , sometime it is not able to predict the proper result and giving false result by understanding proper prediction Therefore, we have to use such machine learning and data science model for such purpose where the prediction need to be correct and getting accuracy for that is much more important and not able to understand is different issue.

There are some other type of chat bot technique where it named as AI based technique where the prediction is done based on the chat bot itself where it learn by it self and do the thigs by it self and predicting data based on which will help in predicting the things to more accurate and this will make model more power full and strong in terms of prediction rate.

Typically, the basis of implementation chatbot requires already created already set up model or architecture based on which the model learn the things and give proper answer in terms of giving exact info. We can create the machine chat bot in different ways there is no need of coding and we can do that using auto generated model and google API that are helpful.

B. Disease prediction with the help of K-Nearest Neighbor

Execution is based on the K- Nearest neighbor is the algorithm of the prediction model. *K*-NN is a type

of classification in which uses a distance as main factor. Since this algorithm relies on distance for classification, if the features represent different units or come in different scales then normalizing the training info can improve accuracy of it.

We have used a *K-Nearest Neighbor* for different reasons. First of all, it is a broadly used, accurate and strong machine learning technique in various applications such as pattern recognition, medical diagnosis and fault prediction. Secondly, pattern prediction models with a *K-Nearest Neighbor* the best prediction accuracy on public datasets compared with models with other classifiers. One of the reasons of the *K-Nearest Neighbor* over other methods is that it combines signals coming from multiple datasets and sources.

KNN uses a similarity metric to determine the nearest neighbors. This similarity metric is used than not the Euclidean distance between our unknown point an the another points in the dataset. The formula for Euclidean distance is:

$$d(p,q)=\sqrt{(q_1-p_1)^2+(q_2-p_2)^2+\cdots+(q_n-p_n)^2}$$

where q_1 to q_n represent the attribute values for one observation and p_1 to p_n represent the attriubute values for the other observation.

C. *Chatbot Conversation with help of dialogflow*

Dialogflow is API which used to create the chat bot which will help user to create the chat bot which will able to predict the user requirement and needs and predict the things accurately by conversation between users.

D. Related work

In the paper by Neeta [5]**,** the proposed system , in this chat bot created by Neeta in which she is using text to voice and voice to text system to recognize what user want to do and want chat bot to do something as per their requirement and need , she created the chatbot where it detect the symptoms user or patient by getting or extracting it from voice or text and based on the predicted information from user or patient the chat bot reply the patient a appropriate predicted data or set of recommendation and which states the treatment plan for the patient and user.

. The proposed concept of the paper a self-diagnosis medical chatbot using artificial intelligence" by Ishwarya [6] is to build a system using artificial intelligence that can help people to avoid help with a doctor because sometimes doctors are busy with work and they don't have much time foe medical consultations. It is made to treat the disease of the user and provide needed details about the disease. This is made to be a less costly system with more accessibility to information about diseases. A chatbot is helpful to users only when it can trat any type of disease and provide needed information. The proposed system is a agent which communicate with users to get information about their medical conditions, and providing a proper treatment plan.

In the paper by Rebeck Carvalho [7], it mentions the need of advanced technology that provides user with a proper healthcare management software system, where people can rely on it instead of a medical provider. need of such a system to be accurate and accessible so that user can carry with them, this reliable system. The proposed system contain mobile heart rate detection and measurement where heart rate can be calculated and detected based on this, a proper diagnosis plan will be provided with a one click. The system also provides video conferencing where one can connect with medical doctors in case of emergency. The bot-doc which was designed for same purpose is changed to android app platform and is to gather the idea of providing treatment plan based on symptoms.

In the paper by Elmy Sebastain [8], it proposes the idea of a smart voice recognition chatbot. This proposes the design of such a system and the needed technology needed to develop the system. This is a web-service that allows any client to connect with the server from any location. This also uses the concept of black box approach to control the conversation, to and from. This is accessible through an interface that allows fast xml processing. By the use of an artificial memory, the web-based chatbot reacts to the user query. If the question from users is not known, it will be further Analyze using an online intelligent research agent and the output will be saved so as to given efficient ouput in the future.

In proposed idea of paper by Taweesak Samanchuen [11] , the development of chatbot using Dialogflow was done. Sixteen of symptoms with diagnosis are trained to the chatbot. The chatbot can react the proper response to the user with the proper guidance for handling the symptom of users. It can apply to several medical application. That system helped maximize convenience to the people, increase service ability..

In proposed idea of paper by Arif Nursetyo [12] chatbot system based on Artificial intelligence and machine learning in the social media platform and digital marketing and where she actually used proper data set and data crawling technique by which the system is capable enough to print and extract the data by means by the help extracted data will help the user the predict what type of dish or food the user like the most by combining the effort by which it will do something extra and do proper prediction and movement in data as per their need of satisfaction with AI and machine learning. By differently classify the data in terms in the way it needed so that their will be the different need to be specific and at most that will be helpful in market to predict the exact food menu.

using artificial intelligence that can help user to identify the best treatment plan for the disease. There are multiple treatments available for user and no one can probably know the proper treatment which is good for their disease. In this proposed model, AI takes up the main role of providing a list of available diagnosis plan depend on the disease identified from the symptoms list. The system can also list out the combination of medicines and their pre described uses, helping users to select the proper plan. This system help user to have a basic idea of their health issues and status so motivating them to take proper diagnosis.

III. METHODOLOGY

A thorough implementation of the approached machine learning recognition- is the solution. The implementation comprises two steps: training models, detection of the disease with added disease. In the prediction using symptoms first step, the training model component shows the way we prepare the dataset and select the pre-trained detection system model.

For explanation, we use disease data information. The extra data we have, the higher the accuracy of our model can achieve. After collecting the information, we label our data and break them into a training set (80%) and a test set (20%). The collecting-labeling is not a single time process. We operate it in an iterative fashion so that the machine learning model could find the capability to generate and give back a more accurate

outcome.

AI makes it capable for machines to learn from previous data set and information, learn from its mistakes and try to make it right. Using deep learning technologies, a machine can be trained to achieve particular work by processing large amount of information data and identifying patterns in the them.

Artificial Intelligence is become popular due to the following reasons:

- Fast & Accurate prediction: Disease can be identified fast due the system ability to learn from past information and task done.
- Reduction in human errors: No person is 100% efficient, after a certain amount time, people will be tired due to work and scheduled fix job. An AI will not get tired.

For communication chatbot uses dialogflow which is google API that is used to create interface for website and mobile application and IOT based applications. And chat bot uses natural language processing.

When the user do conversation with chatbot. The conversation data later forwarded to text processing unit. This then identifies the symptoms from the data and forward to disease predication model.

In the proposed system the user or patient will enter the data after entering the data which can be the personal details like name and the address and phone number and also the blood group details for any emergency. Once user entered the needed details, then user will reach the screen where they can communicate with medical chatbot system and discuss about their health. With help of conversation, system will able to understand the user issues.

The system will now start predicting the treatment plan for user based on the symptoms identified by KNN K-nearest Neighbor which is best for the classification of any data information set. The treatment can be a combination of plan or medicine list, which can given to user to take care of their health and also user can be aware of their health status. Proposed system uses natural language processing for processing the text. And after that predicting treatment plan for user. The proposed system will help user to access this device from their mobile application and in one touch they are able to access it. And know about their health issues with help of chatbot.

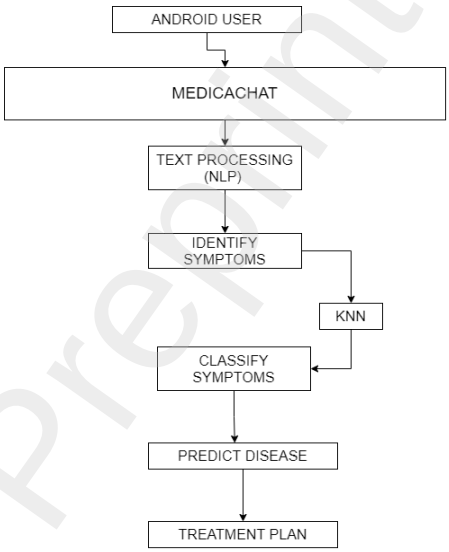

Fig 2: Block diagram of the setup

IV. Conclusion

There exist many chatbot for the predicting of disease based on symptoms, but they just predict the disease of patient. Aim of this research is to propose a way to construct a device which will predict the disease and suggest treatment plan process it with the help of artificial intelligence along with text recognition which would be helpful for patient and also healthcare sector by eliminating overhead of doctors. This device will prove to be portable and easy to use. It will be much helpful for the people who isn't tech savvy and technically sound.

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