



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 10, October 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 7.569



# Public Curative Health Care & Wellness Chatbot

Raj Shah <sup>1</sup>, Rithik Gujar<sup>2</sup>, Priyanka Bokil <sup>3</sup>

U.G. Student, Department of Computer Engineering, Vishwakarma Institute of Information Technology, Pune,  
Maharashtra, India<sup>1</sup>

U.G. Student, Department of Computer Engineering, Vishwakarma Institute of Information Technology, Pune,  
Maharashtra, India<sup>2</sup>

U.G. Student, Department of Computer Engineering, Vishwakarma Institute of Information Technology, Pune,  
Maharashtra, India<sup>3</sup>

**ABSTRACT:** A bot or chatbot is meant to make a conversation between humans and machines. The machine has been embedded with the knowledge to identify the sentences and to make a decision itself as a response to answer a question. The objective of the project is to build a Health Care System (Disease Prediction) using the chatbot concept for patients or anyone who suspects they have a particular disease. This chatbot will be built by using Google's Dialogflow for NLP, React JS for the user interface, Python for building the Machine Learning Model, and Mongo DB as the database to store and retrieve information. The connections of these layers will be established by writing a webhook in fulfilments of Dialogflow and interaction through the Web App. Many companies like Dominos, KLM Royal Dutch Airlines, Ticket master have used Dialogflow for building their interactive bots. Our end product will be a Web App that will be able to interact with the patients. Thus, the proposed system will be able to process the user input using natural language processing, match the input with the Machine Learning Model and then generate a suitable response.

**KEYWORDS:** ChatBot, Machine Learning, Disease Prediction, Decision Tree Algorithm, DialogFlow, ReactJs.

## I. INTRODUCTION

At present, when someone suffers from a particular disease, they have to visit a doctor, which is time-consuming and costly. If the user is out of reach of doctors and hospitals it may be difficult for the user as the disease cannot be identified. So, if the above process can be completed using an automated program which can save time as well as money, it can be very helpful to the user and can make the process easier. The aim of Disease prediction is to predict the disease of patient provides the symptoms. As there is advancements in digital technology the use of internet is at pace, people are curious towards new things. People always attempt to ask the web if any problem arises. People have access to the internet faster than hospitals and doctors. So, this system can be helpful to people to know how serious their symptoms are and which doctor they need to go to.

There are many tools related to disease prediction. But generally, there are no such tools that are used for the prediction of general diseases. So, our Disease Predictor helps for the prediction of these general diseases. It takes in input from the user such as their symptoms if they have any heart problems etc. and gives a probable disease that they may be suffering from, along with some immediate suggestions as well as which doctor, they should refer to. It also gives a list of nearby hospitals in the user's vicinity. This paper aims to provide a web platform to predict the occurrences of disease based on various symptoms and they can also check nearby hospitals.

The objective of the paper is to build a chatbot that can predict diseases and provide information on the disease as well as nearby hospitals.

1. Provide accurate prediction of diseases.
2. Save the efforts of getting unnecessary checkups from different doctors.
3. Interactive and easy chatbot.



## II. RELATED WORK

We can implement the chatbot using various approaches. Development of Machine Learning Based chatbots is becoming popular and easier for software developers using Dialogflow. Developers can use it to make interfaces (e.g. chatbots) that are capable of natural and rich interactions between users and businesses. It is powered by machine learning to perceive the intent and context of what a user says, allowing the conversational interface to produce highly efficient and accurate responses. Thus, we are implementing our chatbot using Dialogflow.

K.M. Al-Aidaroos, A.A. Bakar and Z. Othman [1] have researched the best medical diagnosis mining technique. For this author compared Naïve Bayes with five other classifiers i.e. Logistic Regression (LR), KStar (K\*), Decision Tree (DT), Neural Network (NN) and a simple rule-based algorithm (ZeroR). For this, 15 real-world medical problems from the UCI machine learning repository (Asuncion and Newman, 2007) were selected for evaluating the performance of all algorithms. In the experiment, it was found that NB outperforms the other algorithms in 8 out of 15 data sets so it was concluded that the predictive accuracy results in Naïve Bayes are better than other techniques.

Jyoti Soni, Ujma Ansari, Dipesh Sharma and Sunita Soni [2] have done this research paper into providing a survey of current techniques of knowledge discovery in databases using data mining techniques that are in use in today's medical research particularly in Heart Disease Prediction. The number of experiment has been conducted to compare the performance of predictive data mining technique on the same dataset and the outcome reveals that Decision Tree outperforms and some time Bayesian classification is having similar accuracy as of decision tree but other predictive methods like KNN, Neural Networks, Classification based on clustering is not performing well.

Darcy A. Davis, Nitesh V. Chawla, Nicholas Blumm, Nicholas Christakis, Albert-Laszlo Barabasi [3] have found that global treatment of chronic disease is neither time nor cost-efficient. So the authors conducted this research to predict future disease risk. For this CARE was used (which relies only on a patient's medical history using ICD- 9-CM codes to predict future disease risks). CARE combines collaborative filtering methods with clustering to predict each patient's greatest disease risks based on their medical history and that of similar patients. Authors have also described an Iterative version, ICARE, which incorporates ensemble concepts for improved performance. These novel systems require no specialized information and provide predictions for medical conditions of all kinds in a single run. The impressive future disease coverage of ICARE represents more accurate early warnings for thousands of diseases, some even years in advance. Applied to full potential, the CARE framework can be used to explore a broader disease Disease Predictor 7 histories, suggest previously unconsidered concerns, and facilitating discussion about early testing and prevention.

Disease Prediction has been already being implemented using different techniques like Neural Network, the Naive Bayes algorithm, etc. We have proposed the Decision Tree Algorithm as it was found to be more accurate than other techniques. Kommunicate provides customized User interface for the chatbot. Kommunicate was being integrated with React js.

## III. METHODOLOGY

We have designed a linear based retrieval based chatbot which acts as a tool of communication to predict disease based on the input, the symptoms given by the user. It has 2 phases of conversation i.e. extraction of symptoms and diagnosis of the symptoms. The input given to the chatbot is in the form of unstructured text and thus we have used natural language understanding of Dialogflow to extract symptoms from it. These symptom vector arrays are now passed to the machine learning model, the model shortlists several diseases based on the input. Here one of the models used is a decision tree whose root node returns the most likely disease. Another 3 model used is Gaussian Naive Bayes, Support Vector Machine, and K Nearest Neighbour Classifier to match which model finds the best response based on the highest accuracy. To get a better understanding of the disease the chatbot responds with several questions and thus finally the most likely disease is predicted based on the number of symptoms matched. The front end of the system is designed using React js. A chatbot is being customized using Kommunicate.

### Symptom Extraction

Symptom extraction is performed to identify symptoms from the user's text input. A results of misspellings may lead to no or wrong symptoms mapping and may not always map to the database's symptoms. To handle this, a variety of



symptoms are extracted and compared with the symptoms in the database using its synonyms. which are defined in entities in Dialogflow.

#### **Diagnosis of Symptoms**

Various machine learning models were trained on the disease-symptom database. Once symptoms are extracted from the user, the decision Tree model was applied to the set of symptoms, and the predicted disease is specified to the end-user by the chatbot.

#### **Database**

The database is required for the security as well as the integrity of the project. The machine learning module requires input data which is fed from the database. All the results obtained from the machine learning module extract final data from the database. It provides a reliable groundwork for machine learning to train and store important aspects of the data. The database consists of three different master tables of all categories which in turn are connected to their respective attributes.

#### **User Interface**

The user interface is the only module through which the users get connected to the system. it's a React-based user interface. it is integrated into the system through the Node js and Python (Flask)server.

#### **Tools& TechnologiesUsed**

##### **Tools and technologies used for Web Development:**

1. Visual Studio Code
2. React js
3. Node js
4. Kommunicate

##### **Tools and technologies used for Machine Learning:**

1. Dialogflow
2. Python 3.8
3. Scikit-learn
4. Pandas
5. Decision Tress Library
6. Ngrok

#### **Database**

1. MongoDB

#### **API**

1. Google API
2. MailGun

#### **Architecture**

Once the patient login into the system he/she can have a conversation with the healthcare chatbot. The bot is basically trained over the database having 5000 records. The decision Tree algorithm is applied to correctly depict the disease for the corresponding symptoms provided by the patient. We start by asking the patients a set of questions like what his/her is undergoing. After that, we ask 3 fixed questions to have a better understanding of the patients. Symptoms extraction takes place from Dialogflow, Webhook and finally the trained Decision Tree Model helps to predict the disease, it's description, precautions and doctor the patients may consult. The following Figure 1 shows the Dataflow Diagram of the system.



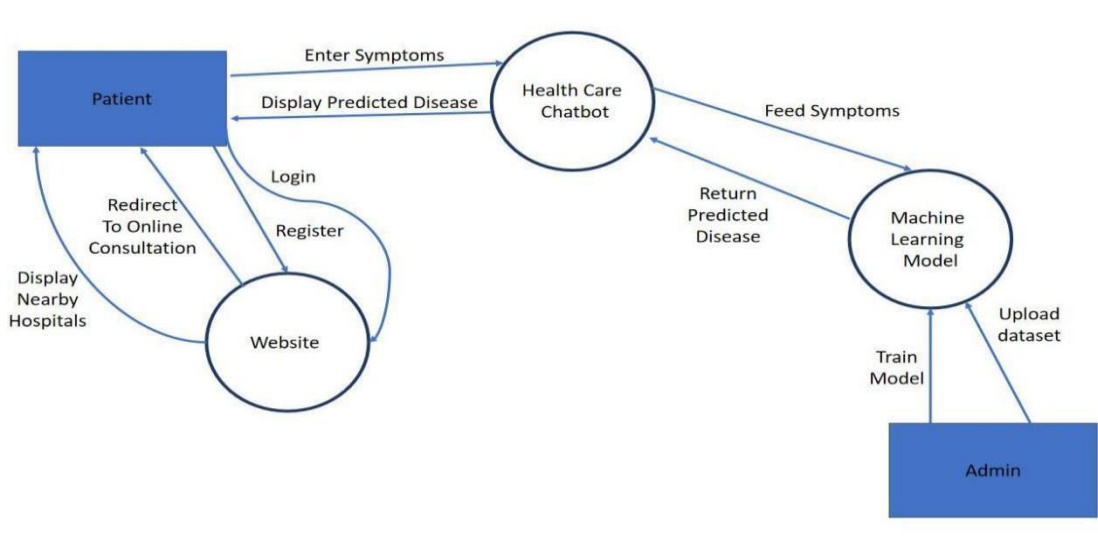


Figure 1 : Dataflow Diagram of the system.

#### IV. EXPERIMENTAL RESULTS

The user will have a text to a text conversation with the chatbot and the chatbot will identify the symptoms the user is undergoing through. The user needed to enter his/her symptom and answer a few fixed questions to help the chatbot identify the disease. Once the symptoms are entered the Machine Learning algorithm determines the most probable disease, its description, precautions and the doctor you may consult. The application also provides another feature of a nearby hospital and online consultation.

##### Training Results

The model was trained for 5000 records and tested for 2000 records during the entire process.

The final results are:

Training accuracy - 0.961

Test accuracy - 0.944

##### Testing

For testing, we collected a new set of data which was collected from users which are typically followed by symptom extraction, followed by fixed questionnaire. Thus the model would then really try to predict the disease and corresponding activities based on custom user inputs. Following Figures 2 & 3 show the functionality of chatbot.

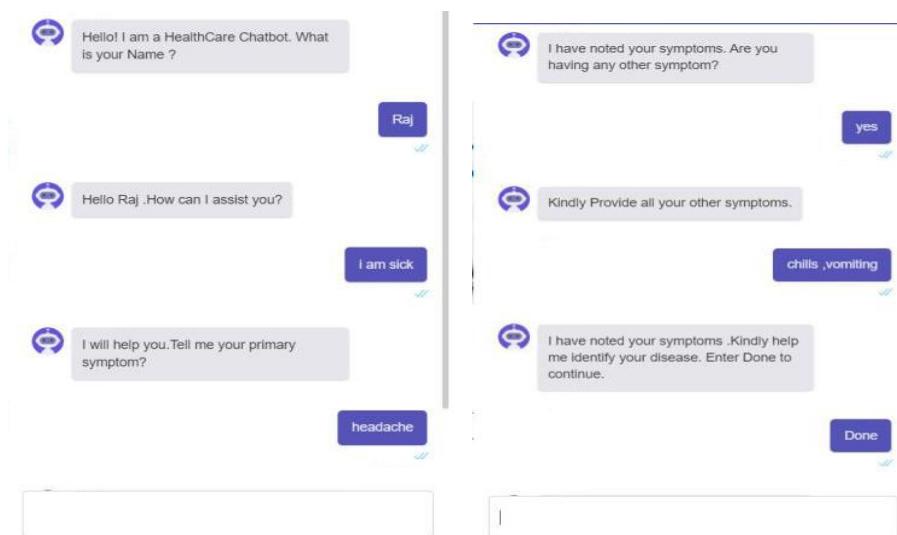


Figure 2:Chatbot Conversation

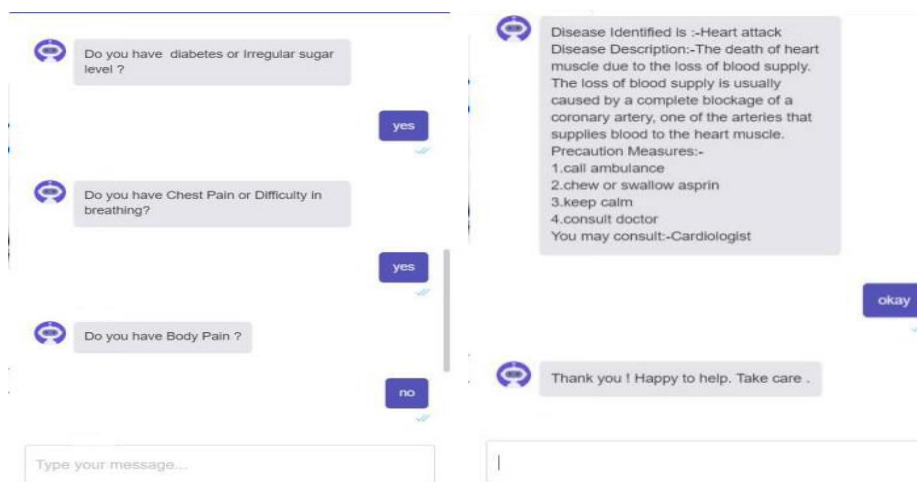


Figure 3: Chatbot Conversation

## V. CONCLUSION

As the field of Healthcare is moving towards AI technology, Machine learning is now being adopted into this field and a wide variety of methods are being used for various tasks in the diagnosis of diseases in patients. We have built a working medical bot that is user-friendly who knows how to type in the English language and provides a personalized diagnosis of the user's health. It heavily relies on machine learning algorithms as well as the data to train the chatbot and also predict diseases. Patients get a better understanding beforehand about the disease they might be facing so they could consult doctors and ensure their safety. The portal also provides the feature of Nearby Hospitals and Virtual consultation.

In the future, the conversational flow can be improved with better APIs.

1. Given, the disease is predicted accurately, the chatbot can prescribe medicine to the user.
2. The database can be improved by adding all sorts of diseases and symptoms to make it easier to use.
3. Additional details like gender, blood group, hereditary information, and the patient's previous medical condition could also be incorporated into the analysis.
4. Once a user takes the test his/her a proper summary can be generated from the results of the test.

## REFERENCES

- [1]. K.M. Al-Aidaroos, A.A. Bakar and Z. Othman "Medical Data Classification with Naive Bayes Approach".
- [2]. Jyoti Soni Ujma Ansari Dipesh Sharma Sunita Soni "Predictive Data Mining for Medical Diagnosis: An Overview of Heart Disease Prediction" International Journal of Computer Applications (0975 – 8887) Volume 17– No.8, March 2011.
- [3]. Darcy A. Davis Nitesh V. Chawla · Nicholas A. Christakis Albert-László Barabási "Time to CARE: a collaborative engine for practical disease prediction".
- [4]. Anil Parajuli "Disease Predictor-Department of Computer Science and Information Technology DWIT College| August 26
- [5]. Gajendra Prasad K. C. Satvik Ranjan Tathagat Ankit Vivek Kumar "A Personalized Medical Assistant Chatbot: MediBot" IJSTE - International Journal of Science Technology & Engineering | Volume 5 | Issue 7 | January 2019.
- [6]. Arash Shaban-Nejad Martin Michalowski David L Buckeridge "Health intelligence: How Artificial Intelligence Transforms Population and Personalized Health".
- [7]. Kobrinski, O.G. Grigoriev, A.I. Molodchenkov, I.V. Smirnov, N.A. Blagosklonov "Artificial Intelligence Technologies Application for Personal Health Management" IFAC Papers On Line 52-25 (2019) 70–74.
- [8]. Dimitrios Mantzaris George Anastassopoulos Dimitrios Lymberopoulos "Medical disease prediction using Artificial Neural Networks".
- [9]. Swapnil Chaudhari "A Parallel System Implementation of Classification and Disease Prediction on Machine Learning from Healthcare Communities".
- [10]. Hiba Hussain, Komal Aswani, Mahima Gupta, Dr. G.T. Thampi "Implementation of Disease Prediction Chatbot and Report Analyzer using the Concepts of NLP, Machine Learning and OCR" International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: 04 | Apr 2020.



**Impact Factor:  
7.569**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 **9940 572 462**  **6381 907 438**  **ijirset@gmail.com**



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details