



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A SMART HEALTH CARE SYSTEM

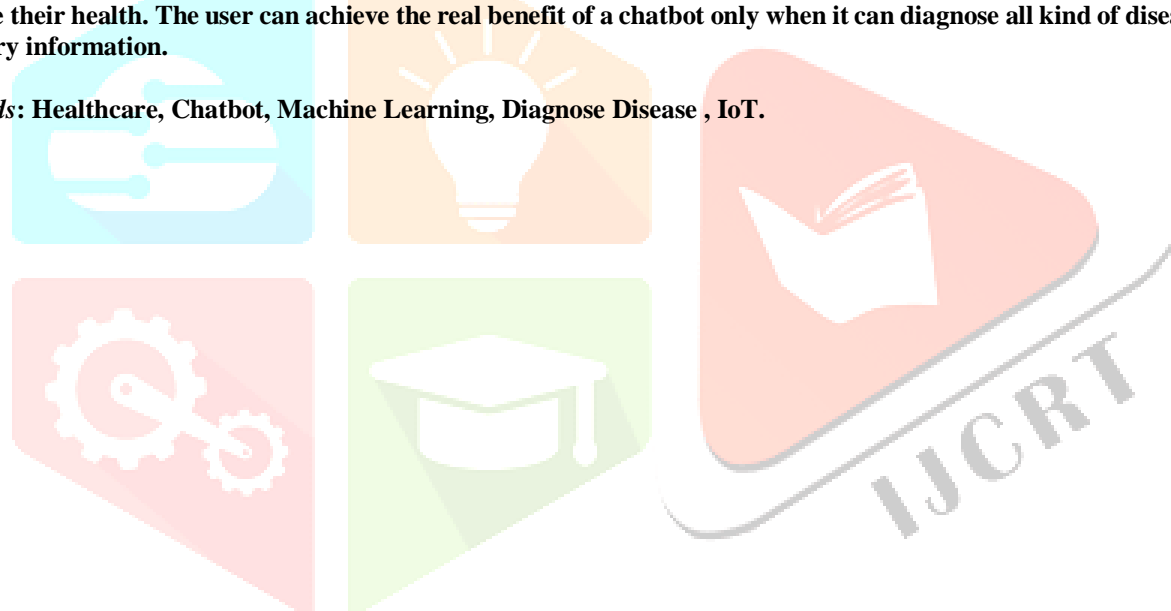
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Abstract: To lead a good life healthcare is very much important. But it is very difficult to obtain the consultation with the doctor in case of any health issues. The proposed idea is to create a medical chatbot using machine learning that can diagnose 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 chatbot is built. It 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 kind of disease and provide necessary information.

Keywords: Healthcare, Chatbot, Machine Learning, Diagnose Disease, IoT.



I. INTRODUCTION

Sometimes we need the help of doctors immediately, but due to some reasons they are unavailable. In our project we propose a system that is user favorable to get guidance on health issues instantly through online health care system. In medical fields, many students have solved some medical issues that are very difficult to be settled in classic statistics by the help of algorithms. Decision Tree Algorithm is among the foremost common technique comes in classification and regression techniques. With no extra information, classification rules are generated by the samples trained by them. We have built up a specialist framework called Smart Healthcare Prediction framework, which is utilized for improving the task of specialists[1].

The framework asks and checks the symptoms of a patient and proposes the possible diseases. It begins with getting some information about the patient,

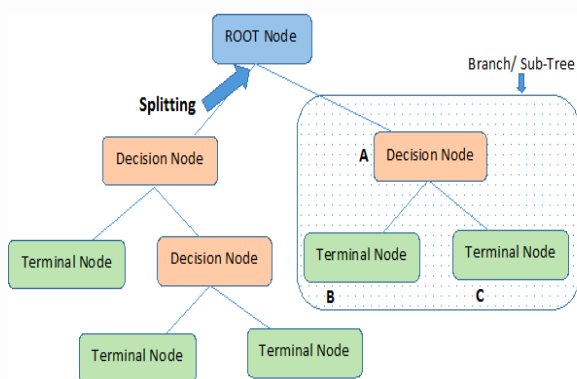
It will then ask few questions to the patients, when it is satisfied with an appropriate number of inputs. Then it will generate a response in the form of the predicted disease and the recommendation for the doctor to visit next[2].

It also provides a link to book an appointment with the concerned doctor. Here we utilize some intelligent mining methods to figure the most precise disorder that could be associated with patient's calculation (Decision Tree Algorithm) and is connected for mapping the side effects with conceivable diseases.

Thereby, we also introduced Internet Of Things by using two sensors namely LM-35 Body Temperature and Pulse Sensor, from which we will be having the patient's readings which then will contribute in getting better results by the system

II. DECISION TREE ALGORITHM

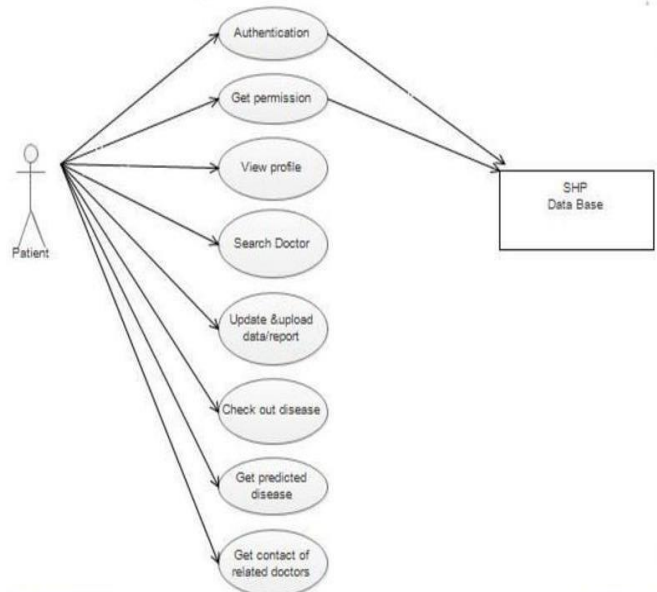
It is a sort of supervised learning algorithmic program that's largely used for classification issues. Surprisingly, it works for each categorical and continuous dependent variable.



Note:- A is parent node of B and C.

In this algorithmic program, we tend to split the population into 2 or a lot of homogenized sets. As the name goes, it uses tree-like model of decisions. Though a commonly used tool in data mining for deriving a strategy to reach a particular goal, it's widely used in machine learning. Once we completed modelling the Decision Tree classifier, we will use the trained model to predict whether the balance scale tip to the right or tip to the left

or be balanced[3].



Decision trees classify the examples by sorting them down the tree from the root to some leaf/terminal node, with the leaf/terminal node providing the classification of the example. Each node in the tree acts as a test case for some attribute, and each edge descending from the node corresponds to the possible answers to the test case. This process is recursive in nature and is repeated for every subtree rooted at the new node.

Unfortunately some problems with decision trees include, the problem that data fitted needs be continuous, choosing the required attribute selection, seeing how deep the tree needs to grow and as with any algorithm and the computational speed at which it processes data.

Important Terminology related to Decision Trees

- **Root Node:** It represents the entire population or sample and this further gets divided into two or more homogeneous sets.
- **Splitting:** It is a process of dividing a node into two or more sub-nodes.
- **Decision Node:** When a sub-node splits into further sub-nodes, then it is called the decision node.
- **Leaf / Terminal Node:** Nodes do not split is called Leaf or Terminal node[6].
 - **Pruning:** When we remove sub-nodes of a decision node, this process is called pruning. You can say the opposite process of splitting.
- **Branch / Sub-Tree:** A subsection of the entire tree is called branch or sub-tree.
- **Parent and Child Node:** A node, which is divided into sub-nodes is called a parent node of sub-nodes whereas sub-nodes are the child of a parent node.

Terminology used in Decision Tree

III. PROPOSED SYSTEM

- A. *Hardware Requirements*
 - System with at least 2 GB RAM

- Standard USB Keyboard and Mouse
- Window-7 or above
- LM35 sensor

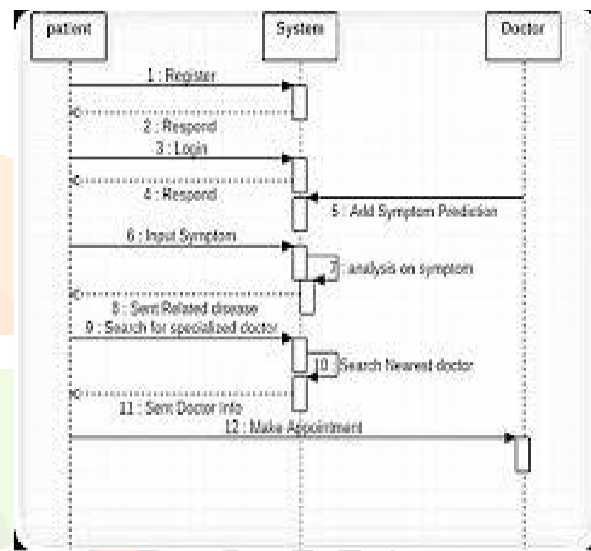
- Arduino uno
- Pulse sensor
- Jumper wires
- LED's

B. Software Requirements

- Operating System: Windows 7 or Above
- Front End Programming :TKinter
- Back End Database : MS EXCEL
- Anaconda Sypder

IV. DESIGN DETAIL

Module 1: Patient Module



Patient login: Patient login to the framework using ID and password.

Patient registration: If a patient is a new client, the framework asks for personal details by giving client ID and secret key through which he can login to the framework.

Module2: Prediction of the disease

The patient will show the side effects caused as a result of his ailment. The system will make certain request with respect to his ailment and after that anticipate the disease depending on the indications determined by patient and the framework will likewise propose specialists dependent on the illness.

Module3: Inquiry about Doctor

Patient can scan for specialist by indicating name, address or type.

Module4: IOT

IOT will help to get the body temp and pulse rate which is very basic and imp thing to be checked.

V CONCLUSION

Our Medical Chatbot will have a great impact on the life of its users. It would provide them the advantage of carrying a virtual Doctor in their pockets. It would also give them the freedom to consult a doctor 24/7 and also can get a real doctor's advice if needed. This will be very helpful for people with busy schedule as they won't have to hamper their schedule to consult a doctor for minor health queries. This will also be very helpful for elderly and physically disabled people as this can help them get solutions to all their health related issue at their fingertips. Having lots of medical data would make our Chatbot function more effectively and accurately.

In the proposed system, hidden knowledge will be extracted from the historical data by preparing datasets by applying Decision Tree algorithm. Predicting smart health can be done only if system responds that way. These datasets will be compared with the incoming queries and the final report will be generated. Since this proposed methodology will work on real historical data, it will provide accurate and efficient results, which will help patients get diagnosis instantly.

Now and again the circumstance happens when you need the specialist's assistance promptly, however they are not accessible because of some reason. In our venture, we have planned another wellbeing forecast framework, which is an online framework, and different patients from any areas can see it. Our framework involves fundamental parts, for example, quiet login, enter symptoms by replying yes/no, and finally get to know about the disease, the name of the doctor one should consult and also the link of that doctor to take appointment.

Also Vital signs derive its significance from the fact that they can be considered as an indication of the person's health. Any change in the measurements of these signs indicates an abnormality in the physical condition of the patient. A considerable number of medical conditions can be detected from variations in one or more of the vital sign. There are two vital signs which are standard in medical are Pulse rate and body temperature. Thus, our system help user to measure both pulse rate in bpm and body temperature.

At end of this proposal we want to remember that this is fully unique system and we are sure that it will be helpful to us all as well as many hospital business can add this with their existing feature. Hope this system will be very demandable in coming future[7][8].

VI. FUTURE SCOPE

A medical chatbot provides personalized diagnosis 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. The implementation of Personalized Medical assistant heavily relies on ML algorithms as well as the training data. At last, the implementation of personalized medicine would successfully save many lives and will create a medical

awareness among the people. As we all know, the future era is the era of messaging app because people spend more time in messaging app than any other apps. Thus medical chatbot has wide and vast future scope. No matter how far people are, they can have this medical conversation. The only requirement they need is a simple desktop or Smartphone with internet connection. The efficiency of the chatbot can be improved by increasing the use of database so that of the medical chatbot could handle all type of diseases

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Design robust system to improve measuring efficiency even in the presence of noise. In addition to propose a new method for efficient transmission of data between the MCU and the Android application.

To ensure the accuracy of heart rate monitor device, more testing can be performed to larger number of people with different ages and weights.

- Replace the LM35 with specific temperature sensor of body measurement in order to make it more accurate and more functional to use.
- Implement pulse and other parameters measurements using the mobile phone camera along with other built-in sensors in order to obtain these parameters on demand if the patient started experiencing some symptoms or abnormalities.
- The device should be miniaturized into a PCB making its weight lighter in order to make the device commercial for public use.
- More vital signs parameters should be added to increase the value of the project to the patients. These can include: Blood Pressure, Respiratory Rate and other parameters.
- A serial output can be incorporated into the device so that the heart rates can be sent to a Personal Computer (PC) for further online or offline analysis.
- It could be integrated with mobile technology for e-health cloud transmission to health care providers
- Using the proposed model other type of heart disease also can be determined. Different heart diseases such as rheumatic heart disease, hypertensive heart

disease, ischemic heart disease, cerebrovascular disease and inflammatory heart disease can be identified.

- Other health care systems can be formulated using this proposed model in order to identify the diseases in the early stage. The proposed model requires an efficient processor with good memory configuration to implement it in real time.
- This system can be accessed by others in future to make android apps, or can be embedded in other applications locally available doctors could be referred to the patients. Further, the software we made may be extended, by adding a link, for buying medicines online, for predicted diseases, prescribed by doctors. Also, features like, detecting the causes of the detected diseases can be added. For more concern of the patients, the software can have features, saying what things should be avoided by the patients, during the illness period.
- This web application can be further enhanced in an Android app. This will be available to users on mobile basis and its use can be further increased. Also, feature like getting the doctor online on chat so that patients can directly talk to the concerned doctors. The modules doing cancer analysis can be integrated to find how close the person associated with cancer is. This will make this web application predictable in true sense.

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