Online Health Care System

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Abstract
In health-care, Data mining and Machine Learning are proved to be effectively used in areas such as Management of health-care, predicting disease and measuring the effectiveness of certain treatments. In medicinal and health care fields, a huge quantity of information is accessible due to the availability of computers. Our idea is to use the techniques of data processing in the fields of health care to develop correct choices.

Keywords: *Naive Bayes, Online Health-care, Clinical predictions, Data Mining, Machine learning*

1. Introduction

Sometimes we need the help of doctors immediately, but due to some reasons, they are not available. So in a time like this, our system comes very handily to the users to get to know about there health conditions and also helps them to know what kind of illness they are suffering through. Our system helps on health issues instantly through the online health care system. Our system is mainly focused on the use of machine learning in health care. Machine learning has made easier to find different diseases and diagnosis correctly. In order to reach our goal to find or predict the disease we use data mining technique. In the data mining technique or so-called algorithm that is Naive Bayes classifier.

2. Literature Survey

Maradugu Anil Kumar, Y. Ravi Sekhar[1] 2015 made an android app that is used to monitor the health of the user. It consists of different types of sensors such as Body Temperature Sensor, Pulse Oximetry Sensor, Light Source Amplifier which helps to get heart rate, SPO2 and temperature reading and store this data in the webserver. The doctor can access the patient's personal information anywhere with the help of an server.

Anil Parajuli[2] 2016 has conducted research on a health care system using Naïve Bayes Classifier and it has prediction accuracy probability 60%.He created a website in which users choose the symptoms based on what they experiencing and it will predict disease based on that. Garima , Kiran , Shivani , Shraddha , and Sulochana[3] 2017 have conducted research using Naïve Bayes Algorithm to predict the heart diseases where patient provides the data which is compared with a trained set of values. Patients provide their basic information which is compared with the data and heart disease is predicted. In this research age, gender, Trest bps, Cholesterol, chest pain, FBS, Rest ECG, Slope, etc are the parameters used for making the decisions.S.Divyashree, H.R.Divakar[4] 2018 have conducted research using the decision tree technique to predict the diseases. These techniques examine the historical details of the hospital management system and predict the possibility of the diseases using the decision tree technique. In this research, patient report details contain the problem of family history, diabetes condition, cholesterol condition, and cardio problematic condition are the parameters used for making the decisions. Akash Ashish , Pritam , Rahil , Prof. Vaibhavi[5] 2019 have conducted research using the K-means, Decision tree, Naive Bayes algorithm. This proposed system achieved an accuracy of 82.26% for the data set.It takes 5 input from the user and predicts disease based on that. P. Amuthabala and R. Santhosh [6] 2019 has proposed an optimization system to handle the quality of data issue and to provide a system that effectively provides a seriousness of quality assurance. A testing methodology is used in order to develop the proposed quality assurance system for distributed data warehouses. According to their paper, the cause for the downfall of data quality in distributed warehouses are

identified as diverse data, unsure data affect predictions more.

3. Proposed System

The problem of the existing system as they were only designed to predict very specific diseases and there are also some systems which can predict multiple diseases but even after predicting they won't provide any treatment and this system have accuracy of 60%[2] and 82%[5].To beat the downside of the existing system we have developed an online health care System. The online Health care system is disease prediction project. Here we propose a online health care system that allows users to get treatment on their health issues. The system is fed with symptoms and It then processes the symptoms to check for illnesses that could be related with it and provide treatment and patients can search the doctors by name, location or type of doctor they need. Our source for Data collection is the internet. The symptoms of the disease are collected from health-related websites. We are using Asp.Net with C# to implement the online health care system and MYSQL databases are used to store the data. To explain the system, here we are using a diagrams.

A **system architecture** is theoretical model that explains the structure of a system.
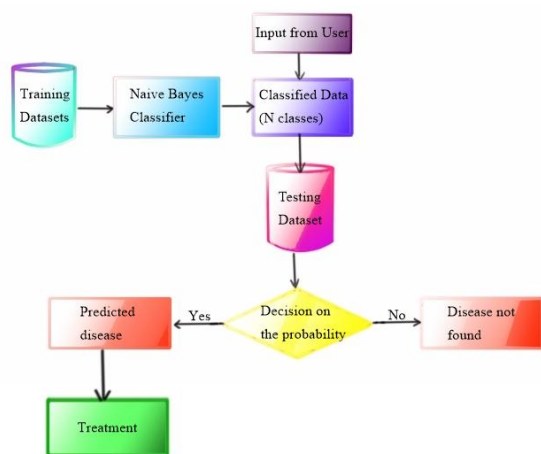

Figure 1: System Architecture

4. Methodology

Feature of system

Here, we are explaining what are the feature there in site.

Patient Module

Patient Login: -User can log in to the site using his User ID and Password.
Patient membership: -If the user is new he will enter his details and he will be given a user id and password using which he can log in into the site.
Disease-prediction:-The user has to provide its symptoms then the system will predict the disease based on the symptoms mentioned by the user and the system will also provide treatment to take based on the result.

Doctor Module

Doctor Login: - The doctor will log in to the site using his User id and Password.
Doctor membership: -If the Doctor is a new user he will enter his details and he will be given a user id and password using which he can log in into the site.
Patient detail: The Doctor can view the user's details.

Activity diagram is a flowchart to explain the flow from one activity to another activity and also used to explains the operation of the system.
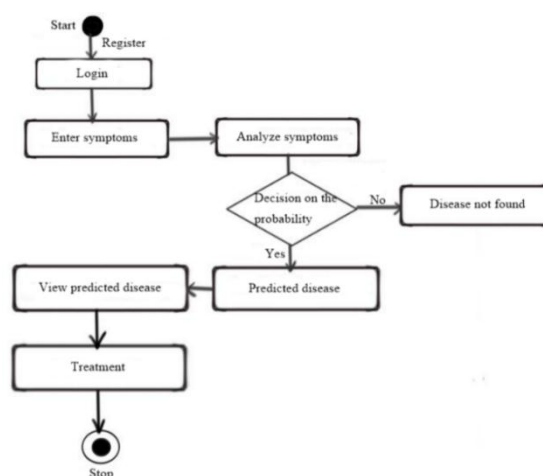

Figure 2: Activity diagram for health care system

Sequence diagrams used to explain how and order in which the objects in a system works and the vertical axis used to show the messages and what time they are sent.
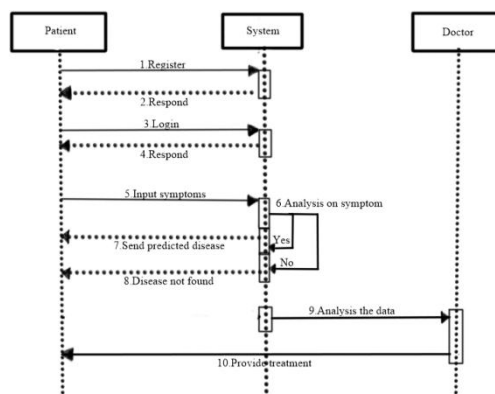

Figure 3: Sequence diagram for health care system

It explains the sequence of the health care system. Initially, the system shows the symptoms to be selected. The user selects the symptoms based on how he is feeling and submits to the system. The health care system predicts and displays the result and provides treatment and doctors can also see the patient details

and provide treatment.

Working of the System

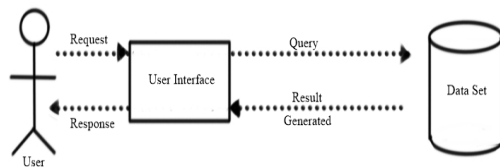It explains the how our health care system works.

Figure 4: Database details

Based on diagram, it's a two-tier design. we offer a form that shows symptoms. The patient will choose yes or no based on symptoms that he experiences. There are a complete of 16 parameters. When he's finished selecting symptoms the patient submits the symptoms. On the idea of selected symptoms, the system will analyze the symptoms and display the result and therefore the patient also can see the treatment for that disease.

Naive Bayes Algorithm

A Naive Bayes classifier is a oldest and most common used algorithm in Machine Learning. It is a probabilistic classification technique. The algorithm uses the existing data to predict what the outcome of a certain event will be for given set of conditions. We make use of this algorithm because it is Real-time prediction which is extremely fast and easy to predict class of test data set and also it perform well in muti-class prediction. It performs well compared to other classifications algorithms. Naive Bayes is one of the simplest supervised learning algorithms.. Here is the flow chart for Naive Bayes.
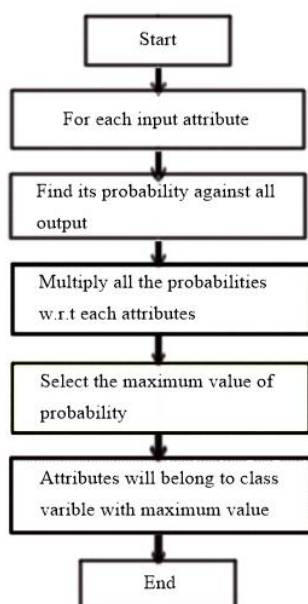

Figure 5: Flow chart for Naive Bayes

Algorithm

Step1.The symptoms entered goes through the processes
of Naive Bayes coded formula
$P(x|d) = (P(d|x) * P(x)) / P(d)$
where,
$P(x|d)$ is probability of the class x by the given input data d.
$P(d|x)$ is the probability of the inputted data d that the class x was true.
$P(x)$ is the probability of class x that's true.
$P(d)$ is acting as a stabilizer to the algorithm.
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Step2. After the symptoms are picked by the Naive Bayes code is then compared to the data set and then the probabilities for each class are calculated.
Step3. The probabilities results are stored in the database and on the basis of the highest probabilities we decided that the patient belongs to which class.
Step4. By concluding all the above processes we can decide that patient is suffering from diseases or not.
Step5. After calculating, it will pick the class which has probability(P) higher than the other class.

5. Result

This proposed system is designed using visual studio. MYSQL databases are used to store the data. C# is used for front end design. The test conducted on the training data consisting of symptoms of patients. The system uses a Naive Bayes algorithm for the prediction of disease based on patient symptoms. The accuracy of the Naive Bayes algorithm is 89%.
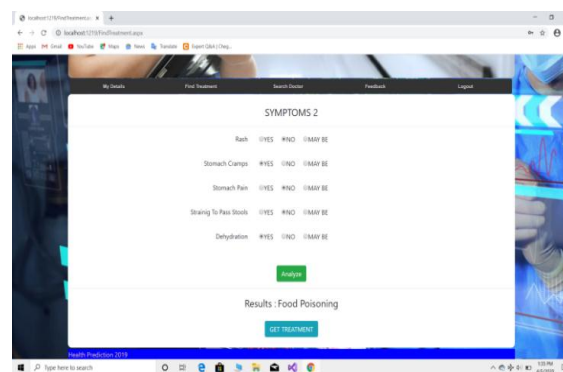

Figure 6: Result of disease predicted

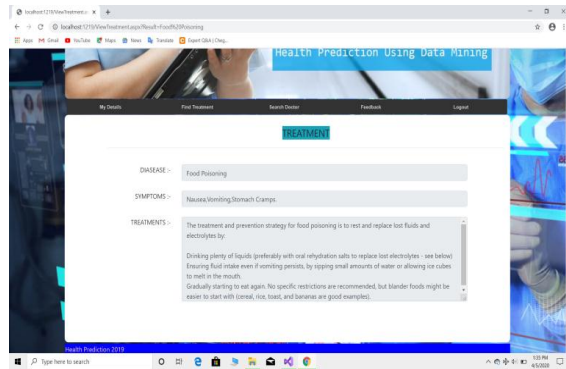Based on prediction it will provide treatment to the patient.

Figure 7: Providing treatment for the disease

6. Conclusion and Future Work

There might be a case when you need doctor assistance, yet they are not present because of some reason. In machine learning, disease prediction is based on Naive Bayes Algorithm. The system is fed with symptoms and gives disease as an outcome and provides treatment for the disease. To improve the project we can do this by using more data-sets related to different diseases and by using different types of data reduction approach to enhance the classification. This web site can be converted into an app. This will be accessible to users on android, tablets and I phone users and its user can be further widened. Our system is only capable to handle small diseases so it can be further enhanced and expanded for many more disease predictions.

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