

Hospital Centre & Multiple Disease Prediction Using Machine Learning

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Abstract- *The use of machine learning and data science has opened the door for healthcare communities and medical institutions to detect diseases earliest as possible and provide better patient care. To improve accuracy, a disease prediction system is being proposed based on symptoms and machine learning algorithms. The proposed system has an accuracy of up to 87%. It has the potential to anticipate possible diseases more precisely and help non-technical people and freshman doctors make correct opinions about diseases. This project helps doctors manage the schedules of their appointments with their patients. The system consists of three sides: the administrator, the doctor, and the patient. The administrator will populate the list of doctors with their specialties and doctor's details and system credentials. The patient will browse the doctor's appointment system website to find a doctor that has the specialty of their needs and check the weekly schedule to help them to choose the day and time for the appointment. The doctors can then view all their appointments and the appointment request of the patients for their availability. The patient can check the doctor's weekly schedule. After that, the doctors can view all their appointments and the appointment request of the patients for their availability.*

Keywords- Disease Prediction System, Machine Learning, Support Vector Machine (SVM).

I. INTRODUCTION

It is a system that is made by the use of machine learning algorithms for guessing the possible diseases based on the patient's symptoms. The growth of technology has been improving our lives so far. It provides many tools that can save millions of lives, and machine learning is one of them. Machine Learning is used to develop systems that can help us predict so many diseases based on symptoms. It can suggest the doctors, probability of the possible diseases. And diagnosis can be done based on suggestion, thus cost could be reduced. We are living in the age of technology and nowadays humans can say that almost anything is possible with the help of technology. Today we have so many tools and methods to access information from any region of this world and

Information at this age is so important that without information we would not survive. We have tools that can give us or suggest relevant information at our fingertips and the internet is one of those tools. Today billions of search queries are performed daily and sometimes there given results are relevant and sometimes they are not. In those search queries, thousands of searches are related to medical advice. People often want to know if they have any serious diseases based on their signs and symptoms. But there are no tools available to give them proper information. This research tries to give them tools so that possible disease prediction information can be provided to the end-user. The human heart is the body's most crucial and important organ. Because even a slight miscalculation might result in weariness or death, diagnosing and forecasting heart problems requires higher precision, fineness, and accuracy (Singh and Kumar 2020). There are numerous heart-related deaths, and the number is steadily increasing (Gaziano et al. 2010). A classification method for heart disease surveillance is needed to solve the problem. This research uses the UCI machine learning repository dataset for training and testing to calculate the accuracy of novel support vector machine (SVM) and linear regression (LR) machine learning algorithms for predicting heart disease (Anggoro and Kurnia 2020). If anybody is ill and wants to visit a doctor for check-up, he or she needs to visit the hospital and waits until the doctor is available. The patient also waits in a queue while getting appointment. If the doctor cancels the appointment for some emergency reasons then the patient is not able to know about the cancelation of the appointment unless or until he or she visits the hospital. As the mobile communication technology is developing rapidly, therefore, one can use the mobile's applications to overcome such problems and inconvenience for the patients. The proposed work in this paper is an Online Hospital Management Application that uses an android platform that makes the task of making an appointment from the doctor easy and reliable for the users. Android based online doctor appointment application contains two modules. One module is the application designed for the patient that contains a login screen. The patient has to register himself before logging in to the application. After logging in, the patient can select a hospital and can view the hospital details. The patient has the option of selecting a doctor from

the list of doctors and can view the doctor’s details. The patient can request for an appointment on his/her preferred day/time. The selected day/time slot will be reserved and patient will receive the notification of the successfully added appointment. The patient can view the location of the hospital on map. In addition, the patient can contact to the hospital and the doctor by making a call or may send an email to the doctor. There are considerable online scheduling tools in the internet, a few of which are trait loaded, simple to setup and economical For practitioners, online appointment reservation and scheduling delivers a lot of merit added benefits and services, like captivating the patient, composing the patient to feel welcomed, and being capable to save patients’ details safely for future information. But the most admirable and useful preference is that online appointment reservation and scheduling is remarkably in expensive .Both doctors and patients can access the portal through their unique ID’s.

. EXISTING SYSTEM

The data set in the current method is frequently limited to patients and diseases with particular conditions. These methods are primarily created for the more severe illnesses like cancer, heart disease, etc. Results may occasionally be inaccurate due to the pre-selected characteristics failing to account for changes in the disease and its influencing variables. In the current system, patients must visit the hospital and stand in line at the appointment desk in order to schedule and receive an appointment. However, they typically wind up waiting for extremely long periods of time. The patient may decide to schedule an appointment, but this option is not always feasible and is probably not ideal for all parties engaged in the system. The following parties are involved: the patient, the facility, and the medical staff. The patient yearns for easily available and convenient times. They feel as though they would have to wait forever to get an appointment when they can't find one that is open right away. Additionally, whether or not an appointment has been made in advance, the patient expects to be seen right away or within a short period of time after arriving at the hospital or clinic.

. PROPOSED SYSTEM

We are using structured database in our suggested system, which can be made by gathering patient symptoms and diagnoses from nearby hospitals and online open source libraries. We are using real datasets, which provide greater precision. In this suggested method, we use machine learning algorithms to forecast diseases base on the symptoms of the patient. We are using this system to forecast five disease based on symptoms, but it is also capable of forecasting additional diseases if we give it datasets for additional diseases. A smart

appointment scheduling system is the suggested project, which gives patient any user a simple way to schedule a doctor's appointment online. This web-based application solves the problem of managing and scheduling meetings in accordance with the user's preference or demands. The job of manually assigning appointments for the users in accordance with their availability can occasionally become extremely tedious for the compounder or doctor himself. As a result, this project provides a useful solution that allows users to view the different booking slots that are accessible and choose the preferred date and time. The reserved spot will be highlighted in yellow and unavailable to others for the designated period of time. Users of this system may also cancel their reservations at any moment.

. DATASET AND MODEL DESCRIPTION

In our proposed system we are using structured datasets that can be created by collecting patient’s symptoms and diagnosis from local hospitals and from open source libraries available online. We are using true datasets that gives higher accuracy. In proposed system we utilize machine learning algorithms to predict diseases based on patient's symptoms. In this system we are predicting five diseases based on symptoms but if we feed datasets of other diseases to the system then it can also predict other diseases.

V. THE ARCHITECTURE OF DISEASE PREDICTION SYSTEM

The architecture of DPS includes multiple following fields:

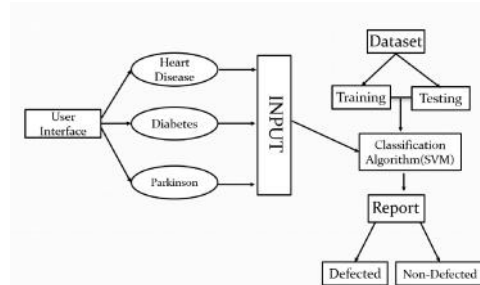


Fig 1: The architecture of Disease Prediction System

Input

We are taking input from the user of the disease prediction system as a symptoms list.

Get Data

In this field, the user will provide data about their symptoms.

Data Acquisition and Processing

In this field, the input is provided for processing. Data acquisition and processing perform two operations, first is the acquiring the data and then second is the processing of the data and extracting information based on that acquired data.

Get Symptoms of the Body

In this field symptoms of the body are gathered and analyzed. So that this information can be used by the algorithm to predict the possible diseases. Get Functional Problem of Body In this field, functional problems of the body that is associated with the symptoms are gathered. So that it is analyzed to get the possible disease.

Dataset_Disease (symptoms, functions)

In this field, we have a predefined dataset of diseases that involves symptoms and functions that are caused by the disease. This dataset is further used to match the data that has been obtained from the user and if matched properly then the system will suggest the possible diseases.

Train_Data ()

In this field training of the system is performed. Our disease prediction system is trained using the SVM (support vector machine) algorithm. Here we are using the SVM algorithm to solve a problem related to regression.

Prev_Disease (Dataset_Disease)

In this field Dataset of the diseases is provided as parameter and processing are performed based on this dataset.

Predict_MultiLinear_Regression(symptoms,function)

In this field, the prediction is performed using the MLR algorithm. In MLR, multiple independent variables are used to perform the prediction of the disease. Symptoms and their functions in the user’s body are involved in the prediction. Possible_Disease (symptoms, function) In this field symptoms and functions are passed as a parameter and possible diseases are calculated based on these parameters.

Data Processing

This field contains the above five data processing fields and is the main part of our disease prediction system. It has all the necessary fields for processing the data.

Output

After Data Acquisition and Processing, possible diseases are generated as output.

Max Possible Disease

This field contains the maximum possible disease as output.

Min Possible Disease

This field contains the minimum possible diseases as output.

VI. RESULT ANALYSIS

Result analysis in our proposed system is an essential part of this research paper. By the analysis of results we can compare that how much better this proposed system is performing. In result analysis we will see accuracy of different diseases that are predicted using our proposed system. We have taken datasets of 100 cases for result analysis.

Disease based accuracy analysis for 100 cases:

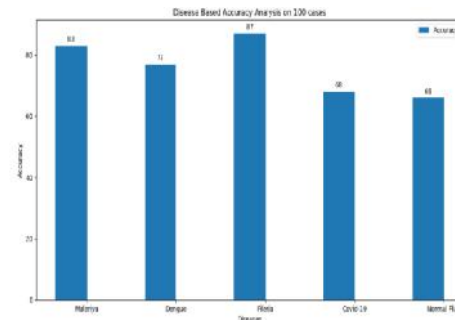


Fig 2: Disease Based Accuracy analysis on 100 cases

Above diagram shows the accuracy of 5 diseases that are malaria, dengue, filaria, covid-19 and normal flu.

Disease based accuracy analysis for 100 cases using SVM and CNN:

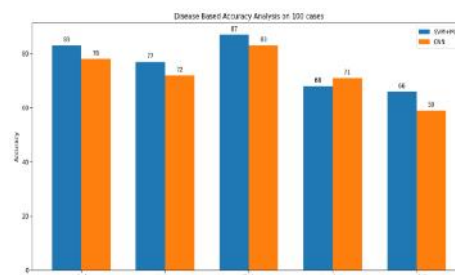


Fig 3: Disease Based Accuracy Analysis on 100 cases comparison

In the above chart we can see that five diseases are given and for these 5 diseases there accuracies are also given. These five diseases are processed using two different algorithms for each consecutive bars. The blue bar shows accuracy for the diseases processed using SVM. The Orange bar shows the accuracy of diseases processed using CNN.

Response Time Analysis:

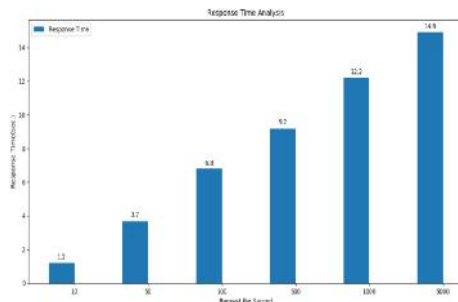


Fig 4: Response Time Analysis

In the above chart x axis shows request per second and y axis shows response time in seconds. Result analysis for response time is very important to show that our system can handle multiple requests at a time.

VII. CONCLUSION AND FUTURE WORK

The appointment booking system is a web-based system that allows patients to book and manage their own appointment with ease. Patients can be reminded quick view of their appointment at the Home page. This system can help reduce the number of missed medical appointments and patients may not show up for their appointment. It can also alert patients when urgent needs arise or in case of a situation that can lead to the absence of the service provider. The International Journal of Patients can also track and monitor their own assessment record.

Research has been conducted to use a support vector machine and multilinear regression algorithm to predict diseases. The purpose of this research was to provide medical diagnosis information based on symptoms to normal people, fresher doctors, medical students, and anyone who wants to know about a set of symptoms and associated illnesses. The accuracy of the disease prediction system has been found to be up to 87% for some diseases and up to 95%. However, obtaining a large amount of data sets related to diseases and their symptoms requires multiple years to collect and train the system. The system can be used by Ph.D. scholars to do further research,

VIII. DECLARATION

Conflicts of Interest

No conflict of interest in this manuscript

Authors Contributions

Divyabharathi, Amarnath was involved in data collection, data analysis & manuscript writing. Author, Bharani, Gokul, Dharanidharan was involved in conceptualization, data validation, and critical review of manuscripts.

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