HEART DISEASE PREDICTION SYSTEM

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ABSTRACT - The aim of this project is to implement the heart disease prediction application. Many people all over the world like nearly 60% of the world's population are now-a-days suffering from heart disease. Heart Disease Prediction system is an android application which helps the users for the easy prediction, prevention and curing of the disease. An android application gets the disease name as the output based on the data provided by the user or patient. Android application is also used to get the preventive measures like nearby doctor details, hospitals details and location for hospitals. Proposed system consists of an intelligent system which works on the machine learning algorithms like KNN. The data entered by the user is compared with some existing standard datasets to get probability. KNN used to find the probability.
KEYWORDS - Users, KNN, Probability.

I.INTRODUCTION

Now-a-days people all over the world live luxurious life people work like machine in order to earn lot of money and fame. In their schedule of their busy life people forget to care about their health. Because of this, there is change in the food which they consume, their lifestyle changes. Due to pressure and stress in their life, it leads to blood pressure, diabetes and various other diseases at young age only. All these reasons leads to the attack of heart diseases. Heart is the most important organ of the human body, if it gets affected then it leads to the effects of the other organs in the body. Since the diagnosis of the heart disease is a challenging task, which can offer automated prediction about the heart condition of patient so that further treatment can be made more effective.

The heart is one of the main organs of the human body. It pumps blood through blood vessels of the circulatory system. The circulatory system is extremely important because it takes care about activities like transportation of blood, oxygen and other materials to the different organs of the body. Heart plays the most crucial role in circulatory system. If the heart does not function properly then it will lead to serious health conditions sometimes even to death. The diagnosis of the heart disease based on signs, symptoms and physical examination of the patient. There are several factors that increase the risk of heart disease, such as smoking habit, body cholesterol level, family history of heart disease, obesity, high blood pressure and lack of physical exercise. The existing system does not manage correctly the clinical details. Existing system leads to failure in case of any inconsistencies and missing of data. The current automated system is used to identify the key patterns or features from the medical data using the classifier model. Attributes that are more relevant to heart disease diagnosis can be observed. This will help the medical practitioners to understand the root causes of disease in depth. Patients need to wait for the report to get from hospitals. It is a long time consuming process in which the doctor needs to prepare a report about the conditions of the patient and need to give proper treatment. People now-a-days face problems to find proper treatment for their respective diseases. It also causes financial problems when people visit hospitals for small health issues. People need to wait long time and their performance is low.

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Heart disease prediction is an android-based machine learning application, trained by dataset. The user inputs its specific medical details to get the prediction of heart disease for that user. The algorithm will calculate the probability of presence of heart disease. The result will be displayed on the webpage itself. Thus, minimizing the cost and time required to predict the disease. The system is implemented using KNN algorithm. The algorithm will be trained using the dataset. Some steps will be taken for optimizing the algorithms thereby improving the accuracy. These steps include cleansing the dataset and data pre processing. The main application is a android application which accepts the various parameters from the user as input and computes.

II.METHODOLOGY

Any project is basically divided into many groups for easy understanding and coding. This paper consists of four which the application runs on. They are namely-
1. User registration
2. Questionnaires
3. Checking the probability
4. Generating the report

USER REGISTRATION
Logging in, (or logging on or signing in or signing on), is the process by which an individual gains access to a computer system by identifying and authenticating themselves. The user credentials are typically some form of "username" and a matching "password", and these credentials themselves are sometimes referred to as a login.

QUESTIONNAIRES
Here the user feed the values in the application form, he/she fills up each and every details in the form. All these details gets saved in the server and details and from that we can extract the features of the disease. The entered details are matched with the datasets which are saved in the database.

CHECK FOR THE DISEASE SYMPTOMS
After matching the details with the datasets it checks for the disease symptoms. One feature may match with different disease. So, it's necessary to check each and every matched details in order to predict the correct disease.

GENERATE REPORT
A report is being generated based on the matched symptoms. It predicts the disease and send it to user mobile application, and finally add some tips/suggestions to the user like nearby hospital details and it notifies patient by sending a message alert to patient mobile number.
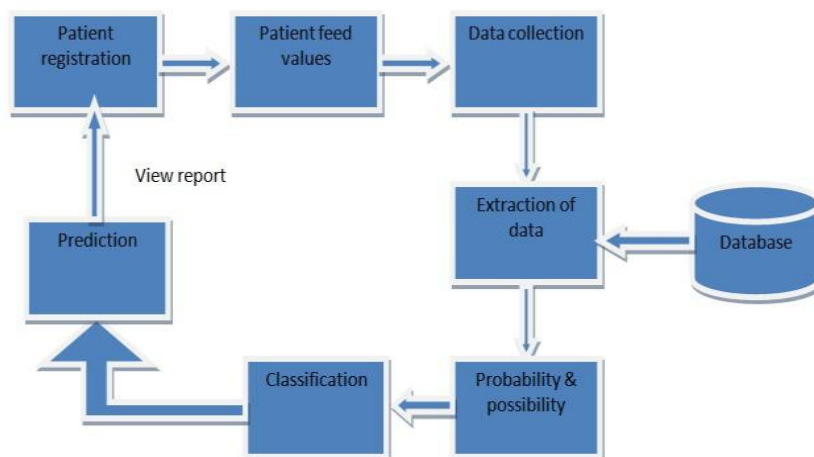
III.SYSTEM ARCHITECTURE

Figure 1: System Architecture

Initially the patient registers by providing certain parameters. That registered data is collected in a database by using machine learning techniques like data collection techniques and when he went to check about his health condition the collected values or data that has been stored in the database is been extracted by using some feature extraction techniques. When data is extracted, it under goes certain processes and therefore finally a disease is predicted and a report is generated. This is the overview of the heart disease prediction system using machine learning techniques.

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DATAFLOW DIAGRAMS

The entire working or the flow of the data can be divided into three groups for better understanding. They are- 1. DFD-L0 2. DFD-L1 3. DFD-L2
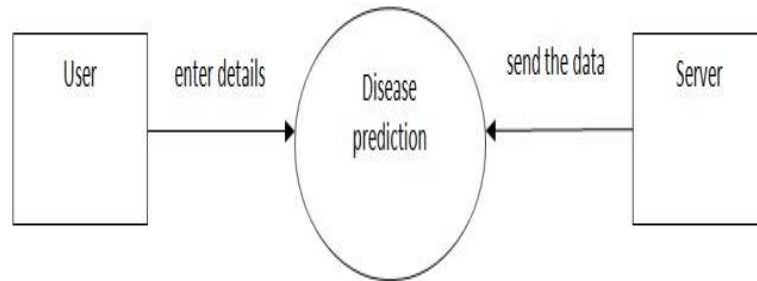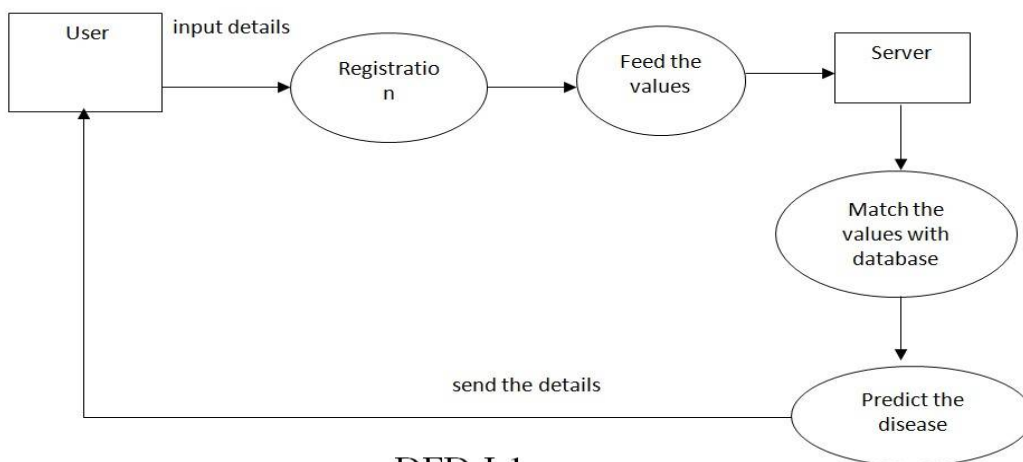

Figure 2: DFD-L0

This is the initial idea for the flow of the data. The data has to be flown from user to server and from server to the user for the prediction of the disease by entering details and sending the data. Communication is done between user and the server.

DFD-L1

Figure 3: DFD-L1

This is the process or the idea where the data has been used to predict the disease by following several steps like registration (for new users), Feed the values(entering and storing values), Server(to store them), match the values(Finding probability) and finally predict the disease (Final result). The registered users can login to their
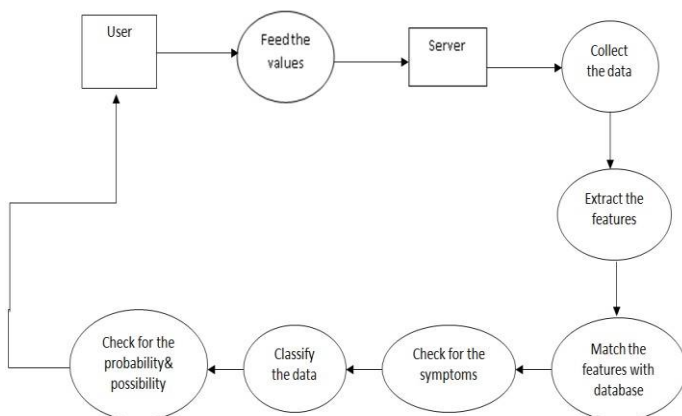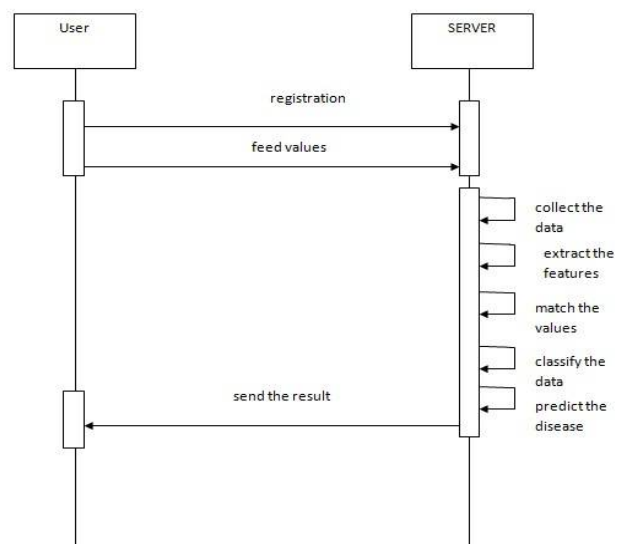

Figure 4: DFD-L2

SEQUENCE DIAGRAM

The data which is flown from user to the server, there it undergoes matching for data from the user(input) and the data which is stored. Here after Finding probability between them by comparing the values and then generating the report.

account and can enter the values that is data and then can store them in the database with the help of the server and then extract those values and find probability and then generate the report as similar to the newly registered users.
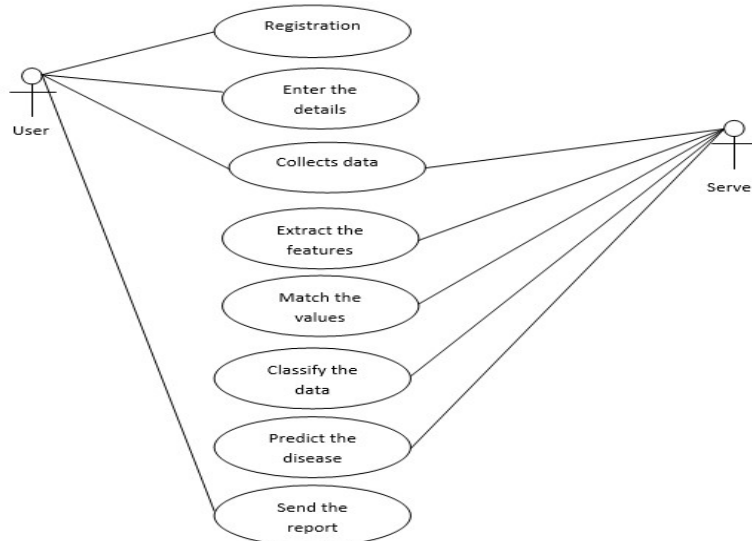
USECASE DIAGRAM

Figure 5: Use case diagram

The steps from registering the user i.e., beginning step to the final generating of the report can all be explained easily by using or easily be represented by using use case diagram where actors are used as users. Users register by using certain parameters and then they login to their accounts and enter their health conditions and values which were to be stored in the database i.e., data collection is taken into consideration i.e., the data from the users need to be collected in the database. Whenever it's needed the data is to be extracted and then it need to be match with the values and check for the disease and predict the disease and finally a report need to be generated. The same as discussed above is also described by using the sequence diagram.

IV.IMPLEMENTATION

Algorithm used:

K-nearest neighbor classifier (KNN) KNN classification has two stages:
1) Find the k number of instances in the dataset that is closest to instance S.
2) These k number of instances then vote to determine the class of instance S
3) The Accuracy of KNN depends on distance metric and K value. Various ways of measuring the distance between two instances are cosine, Euclidian distance. To evaluate the new unknown sample, KNN computes its K nearest neighbors and assign a class by majority voting.

Method it follows:
1. User Registration (Patient)   Providing details like: i. User name
ii. Email Id
iii. Phone Number
iv. Password
2. Login (Patient)
    Providing details like: i. Email Id   ii. Password   Options available like:
i. Feed the values
ii. Check heart disease In this page a new user can register by giving or filling or a. Check the report providing proper credentials like name, email, phone number, iii. Nearby hospitals password and etc., A user is registered when he fills all these iv. Notifying message details. v. Logout

V.RESULTS

In this page the user who is already registered will login by entering proper credentials like email id and password. If the details entered by the users seem to be correct then it is logged in other case it won't login. In this page we have two cases, one for registration for a new user   and the other one login for the existing user. In this page the user enters the values or the data regarding about his health condition. All the data that entered by the user is stored in the database and then it will check the probability.
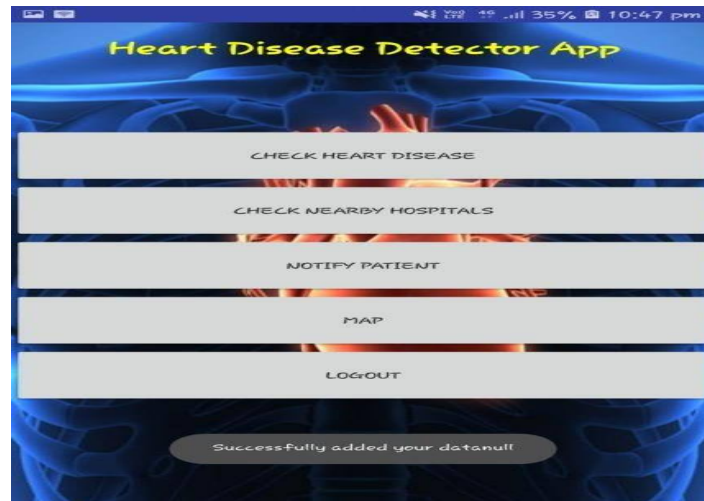
Figure 5.1 Home Page

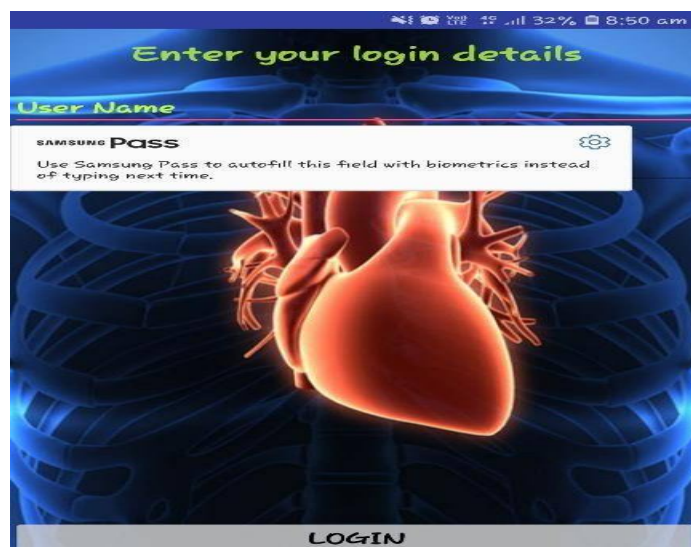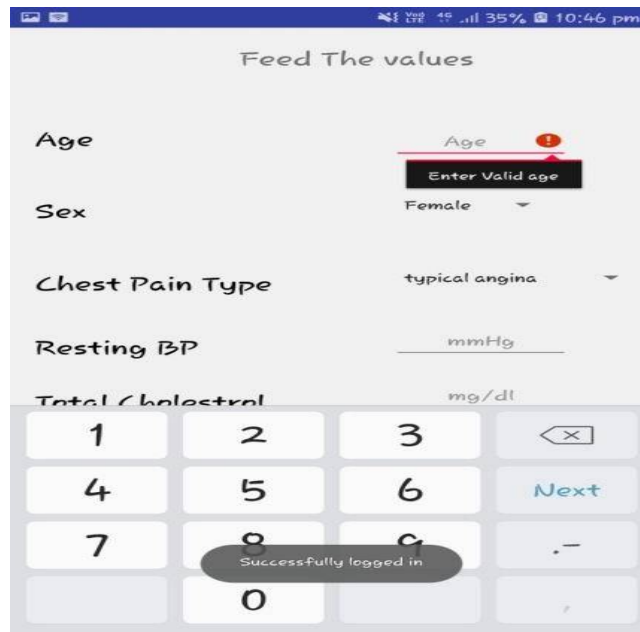Figure 5.2 Register Page

Figure 5.3 Login page
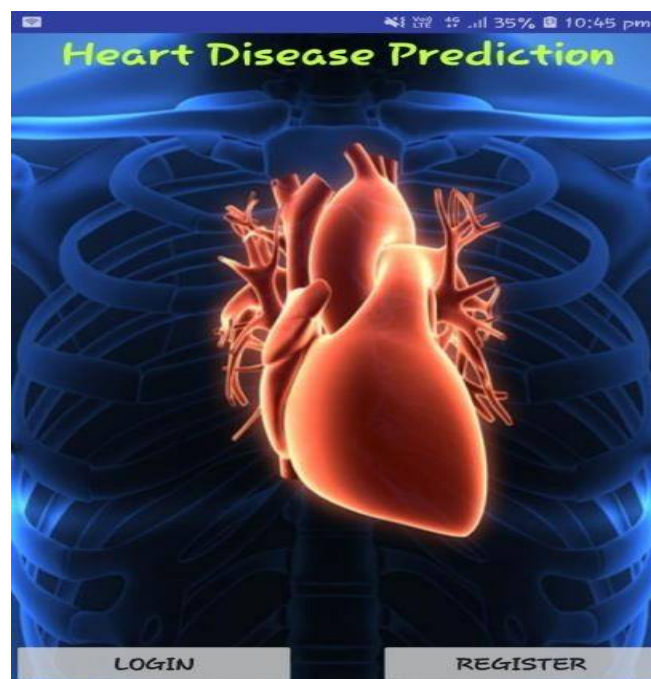
Figure 5.4 Feeding the values

Figure 5.5 Final Page

In this page we have many options like generation of final report, check nearby hospitals, notify patients and show nearby hospital details. This is the final page once it done user logouts from the application.

VI.CONCLUSION

It is concluded that system will works well and thus it will fulfill the end user's requirement. The system is tested and errors are accurately removed. Heart Disease is one of the leading causes of death worldwide and the early prediction of heart disease is important. The project aims on predicting the heart disease by using the KNN Algorithm with the help of android application. The probability of disease is found by using certain datasets and the input given by the user, it also gives the nearby hospital details and notices the patient about the disease by using messaging application.

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