Health Care Analysis and Monitoring System

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Abstract— *Iot is used to connect various devices through internet. Besides that it is mostly used in medical sector for providing better results to Patients and assists doctors along with patients. In this paper, the proposed system deals with variety of sensors and connects with website through network that monitor health conditions of various people by performing analysis of their previous data . It is mainly used in rural areas where there are no specific hospital's except primary health care center's. So, people can get to know their health by using this wearable devices which are placed at health center's and connect through internet to share their health information .These devices grasps blood pressure and heart rate of patient. Then the collected information along with other necessary data is analyzed by various algorithms and used for predicting any chronic diseases such as heart attacks in preliminary stage that is used to take better precautions.*

Keywords— **pulse-sensor, blood pressure, analysis, Arduino, SVM**

1. INTRODUCTION

Internet of things connects many devices such as laptop's, pc's along with apps and sensor's for transformation of data. So, now-a-days there were many medical devices with sensor's in ICU's but there was some instances where doctor's could not be alerted in emergency conditions. In addition to this it was difficult to share medical information with distant specialists. There were some of the devices which provide solution to these problems but not to the accurate point.

This paper illustrates health monitoring system of patients through Arduino. Arduino is a single-Board which acts as an microcontroller. In this, the system monitors and collects heart-rate sensor and blood pressure. Then the collected data gets stored and processed for analysis. Furthermore, the data which gets stored can be accessed by various doctor's for better results. Here we can update the available data sets frequently such that we can easily point various diseases.

The aim in this system can be summarized as:

- To collect data related to pulse and bp from patient in real-time.
- To perform analysis and predict any disorder or diseases at initial stages using algorithms.

2. LITERATURE SURVEY

This contains various researcher's works on health care by different techniques where we can get an idea on our system. The work done can be shown as:

Barger [1] implements smart house where it facilitates sensor technology to patients and track their moments. It mainly focuses on behavioral patterns of the patient.

Almotri [2] he introduces mobile health where it collects real time health data from patients and it stores on network. Furtherly, it is used in diagnosing the patients.

Dviwedi [3] provides electronic patient record system which consists of multi layer health care system. This mainly provides security for patient's data.

Gupta [4] develops intel galeleo board which collects health information from various patients and stores in cloud .From there it is easy to access data both for doctor's and patients.

Xu et al [5] explored a model which utilizes iot to store health information publicly in a server so that it can be accessed from everywhere easily.

3. METHODOLOGY

In the first phase, we collect unprocessed information from various sensor's that include heart–rate sensor, blood presure and stored on server. Here, we make use of Arduino-Uno board which reads values from sensor's and update to server. Moreover, it has both analog and digital pins but we only make use of 3 analog pins to get continuous data of pulse rate and 2 digital pins for blood-pressure

In the second phase, we will provide power supply to Arduino where it process the data and sends information to user interface. Besides that we also enter some information regarding patients as this data also plays an vital role in predicting diseases.
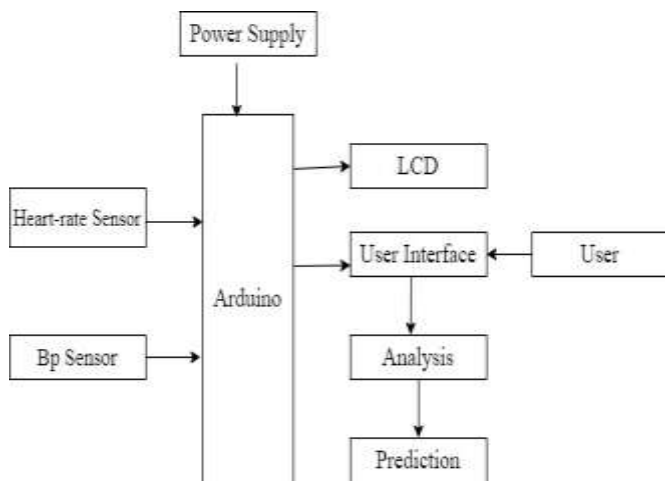

Figure 1 System Architecture

In addition to this , Arduino sends data to Lcd there we can able to see sensor values

Finally, this stage includes prediction of heart disease that follows a strategy.

Predicting Phase

Here,we take fourteen attributes as our dataset.This data set then undergone through preprocessing, splitting data, classification and finally predicting.

Preprocessing.

Here, we have to process some data variables which are of categorical type and contains null values.

Splitting data

In this, we split our datasets as 80% and 20% inorder to get training as well as testing data.

Classfication and prediction

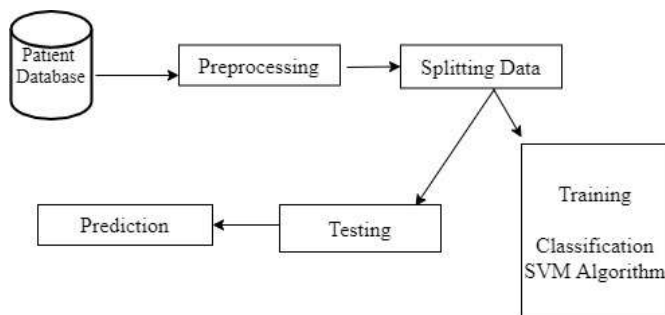In this we use training data to build models.To train data we use SVM algorithm as it provides better prediction rate.

Figure 2 Prediction Procedure

SVM Algorithm

Support Vector Machines was firstly implemented by Vapnik and Cortous.It is a strong linear Classifier Which is used to reduce Classification error. This Algorithm mostly processes on huge data sets. Initially in this algorithm we plot each datasets on the plane and a hyperlane seperates this datasets.

Support vector is the diatance between two data sets near the plane.The distance between these sets are called as margin.As the distance increases, efficiency of hyperplane also increase.

This algorithm makes use of k- fold method to train the data. K-fold cross validation includes all the attributes divided in k folds. Then this will test the data based on one of the folds.

4. RESULTS

Blood pressure and heart rate can be seen in lcd as it is sent through arduino when taken from patients

Figure 3 LCD display

Figure 4 Values

The patients can enter their data into this website through network and this can be mainly used in rural area's.Moreover this can also accessed by specalists as to view their data .
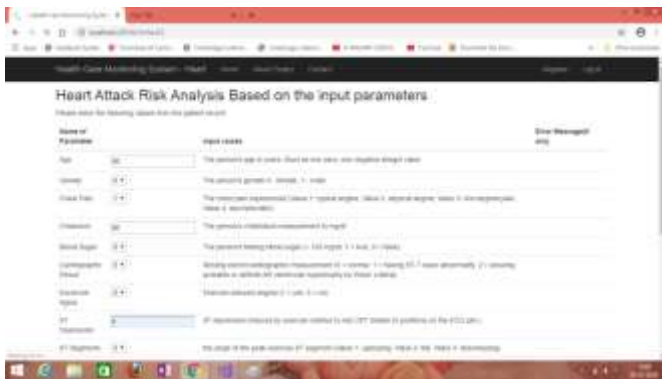
Figure 5 Webpage

The Prediction can be seen as:

Figure 6 Heart Attack Prediction

5. CONCLUSION

In this paper, we proposed a prototype which continuously monitors health conditions and predicts chronic disorders if any for patients.This can be implemented in hospitals and primary health center's where people can connect through network. In addition to this , it can also plays an vital role in emergency departments in hospitals by continuous monitoring

6. FUTURE WORK

For future development it can be enhanced by considering large no of datasets. Also these data sets can be able to predict more no of diseases along with heart attack. In addition to this, these datasets should also be updated continuously .

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