IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
PP 50-54

Heart Attack Early Prediction Using IOT

Shweta Gajbhiye*1, Bharati Vyas*2, Anshika Janbandhu*3, Shrushti Shrikhande*4,Komal Nagpure*5,Mrunali Agashe*6

*[1]*Shweta Gajbhiye, Priyadarshini J. L. College of Engineering, Nagpur, India*
*[2] *Bharati Vyas,Priyadarshini J. L. College of Engineering, Nagpur, India*
*[3]*Anshika Janbandhu,Priyadarshini J. L. College of Engineering,Nagpur, India*
*[4]*Komal Nagpure,Priyadarshini J. L. College of Engineering, Nagpur, India*
[5],Shrushti Shrikhande ,Priyadarshini J. L. College of Engineering, Nagpur, India
*[6]*Mrunali Agashe,Priyadarshini J. L. College of Engineering, Nagpur, India*

Abstract:*Thepredictionofheartdiseasessurvivabilityhasbeenchallengingresearchformanyresearches.Todayhealthcareserviceshavecomealongwaytoprovideapatientsandprovidesmedicalcareofthepatients and protect them from various diseases. Heart attack early prediction system used the technique to diagnosis the heart diseases. Heart attack Early Prediction System is implemented on the android application.Firstly pulsesensorsense theheartrateandox imeterchecksthеoxygenlevelofthepatient. Implementation is done through this application by using the threshold range. The USB is connected with microcontroller picks up the sensor data and send it to the network through Wi-Fi and hence it is displayed on the LCD screen and is send notification to the mobile phone. The android phone has been containing an application which detects the heart beat and oxygen level according to the received data respectively and if abnormalities are found regarding heart attack message will be send to the smart phoneapplication. .*

Keywords: *Heart attack, IoT (Internet of things), Heart Disease prediction, Oximeter, Heart rate sensor, AndroidApp*

I. Introduction

As per the WHO report it is estimated that over 20 million deaths all over the world occur due to cardio vascular disorder. The fatal consequence occurs due to delay in providing medical assistance. The severity increases due to deployment of resources for early detection and treatment. IoT could play a vital role in such cases.

The Internet of Things (IoT) is inter communication of embedded devices using networking technologies. The IoT will be one of the important trends in future, can affect the networking, business and communication. IoT typically expected to propose the advanced high bandwidth connectivity of embedded devices, systems and services which goes beyond machine-to-machine (M2M) context. The advanced connectivity of devices aide in automation is possible in nearly all field.

In the medical field, nowadays patient take actively part in collecting and reviewing their reports. In this digitized world, various wireless communication standards have allowed the sensor to develop from traditional forms i.e. require active patient participation to passive form i.e. require no need for patient participation.In this paper, we present a remote monitoring and sensing system of the human body which consists of pulse and oxygen. The parametersthat are used for sensing and observing will send the data through wireless sensors. Adding a web based observing helps to keep track of the regular health status of a patient. The sensing data will be transmitted continuously and will be used to inform patient to any unseen problem to undergo possible diagnosis.

In this system, the analog sensors measure the heartrate.Ananalogtodigitalconverterconverts the sensed analog data into corresponding digital data. We use ESP32 NodeMCU microcontroller forcontrollingtheentiredevice.Thisdigitaldata is transmitted over a Wi-Fi module of NodeMCU. The heart of patients suffering from fatal heart failures is monitored continuously. The control system accepts and processes the monitored signal. The processed signal isthenfed into alert system as an precaution or detection of heart failure to the patients. If at any given point of time the heart rate crosses the critical mark, the controllers ends a notification signal to the android app. This notification will be received by the user, which will help in alerting the concerned person'scaretakers.

In the existing system prediction using traditional disease risk model usually involves a machine learning algorithm and a learning algorithm by the use of training data with labels to train themodel.
In this set patients can classified either higher risk or lower risk. Lower accuracy more time consuming. The

heart attack early predictions system has more accuracy and display the output or the Notification on the android Application to the Receiving side to the doctor through the threshold value to check the heart beat and the oxygen level. Lower budget and Have time consuming and better than other existing solution for the patient prospective.

3.1. System Architecture

The general architecture of IoT applications can be divided into two-part: the sensing layer, and the application part. This kind of architecture is clear and flexible enough for our monitoring system, thus we design the system architecture based on that general model. Figure 1 shows the architecture of the IoT-based monitoring system for heart diseases patients.

II. Implementation

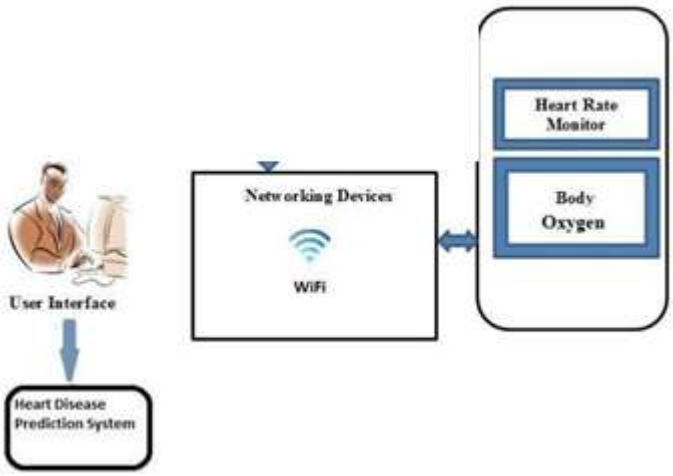

Figure 1. System Architecture Components of system

1) MAX30100 Pulse Oximeter and Heart-Rate SensorIC

The MAX30100 is an integrated pulse oximetry and heartrate monitor sensor solution. It combines two LEDs, a photo detector, optimized optics, and low-noise analog signal processing to detect pulse oximeter and heart- rate signals. The MAX30100 operates from 1.8V and 3.3V power supplies and can be powered down through software with negligible standby current, permitting the powersupplytoremainconnectedatalltimes.

2) Heartbeat Sensor: Heart beat sensor is designed to give digital output of heat beat when a finger is placed inside it. This digital output can be connected to Arduino directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger eachpulse.

Wi-Fi Module (ESP8266): ESP8266 offers a self standing Wi-Fi networking withTCP/ protocol stack which can give Wi-Fi connection to any microcontroller.ESP8266whenconnectedon-boardithasstorageandprocessingcapabilitieshencecanbeeasilyconnectedtothesensorsbasedontheapplication.

1)Electric Buzzer: Buzzer is an electronic device used to produce sound. In the project the buzzer is used to alert the caretaker during extreme condition. This sound indicates that the patient health is in risk.

III. Result

Flow of diagram

The flow of diagram consists of various sensor like oximeter Wi-Fi module. The flow of diagram system is controlled Arduino UnoR3 microcontroller. If the detected heartrate goes above the normal range its ends the control signal to the microcontroller. The microcontroller then takes the necessary action like send the notification other are taker of the subject.

Step for Flow of diagram

Step1:Initialize system i.e.sensors,Wi- Fimodule and microcontroller

Step2: Collect data from various parameters through sensor i.e. oximeter.

Step3:Take out put from various sensors in ADC

Step4:Check the threshold of heartrate. Step5:If heart rate greater than threshold send signal. Step6:Send Notification to caretaker

IV. Output Snapshot

Fig5.2working of the heart beat sensor

Fig 5.3 Alert message display on smart phone

Fig5.4 working of heart rate and oxygen

Fig5.5 working of oxygen level

Heart Attack Early Prediction System could contains Arduino board and a WiFimodule. The HeartBeatsensorcanbeginpredictthe heartrate readings. If the Heart beat range will be above 120bpm then the patient will be in the danger stage. If the oxygen level will be below 80bpm then again the patient will be considered in the dangerous stage. Through Wi-Fi module it will transmit the information over web. The framework will begin monitoring the heart rate of patient and instantly the heart rate goes above or beneath as far as possible the framework will send notification on the smartphone.

V. Conclusion

In this Systm, an IoT-based heart attack monitoring system for pervasive healthcare service. This system monitors the patients' vascularstatisticssuchasPulseRateandOxygen continuously. It also implements a prototype to present an overview of the system. To integrate the Data Stream Management System (DSMS) technologies into the system to enrich its functions, such as continuous query, windowing, aggregation and so on. Afterwards, data stream mining and context awareness technologies are also considered to provide more powerful pervasive healthcare services like early warning and real- time knowledge support topatients.

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