

# Heart Attack Detection System using IoT

Chaithra, Amrutha C T, Rajesh N K  
 Department of Information Science and Engineering  
 Mangalore Institute of Technology and Engineering  
 Mangalore, India

**Abstract**— These days various people are misplacing their life inferable from heart assault and deficiency of restorative thoughtfulness regarding persistent at right stage. Subsequently, in this venture we are actualizing pulse observing and heart assault acknowledgment framework utilizing IoT. The patient will convey equipment having sensors with android application. The heartbeat sensor will permit checking heart beat readings and transmit them over the web. Thought depends on the checking of the patient that is finished by the specialist persistently without really visiting the patient. In this paper, IoT is turning into a noteworthy stage for some administrations and applications. The pulse of the patient can be checked by the specialist or by the gatekeeper without really visiting the patient. The framework is executed utilizing Arduino MCU8266, Temperature sensor, Electrocardiography ECG sensor.

**Keywords**— *IoT, Arduino MCU8266, Temperature sensor, ECG sensor.*

## I. INTRODUCTION

In the new time of correspondence and innovation, the hazardous development of electronic gadgets, advanced cells and tablets which can be imparted physically or remotely has turned into the crucial device of everyday life. The up and coming age of associated world is Internet of Things (IoT) which interfaces gadgets, sensors, apparatuses, vehicles and other "things". The things or items may incorporate the tag, cell phones, sensors, actuators and substantially more. With the assistance of IoT, we associate anything, access from anyplace and whenever, productively get to any administration and data about any article[1].

The point of IoT is to expand the advantages of Internet with remote control capacity, information sharing, steady availability, etc. Utilizing an inserted sensor which is dependably on and gathering information, every one of the gadgets would be attached to neighborhood and worldwide systems. Presently a-days medical issues like cardiovascular disappointment, lung disappointments and heart related infections are emerging step by step at a high rate. Because of these issues time to time wellbeing checking is exceptionally fundamental<sup>1</sup>. A cutting edge idea is wellbeing observing of a patient remotely. It is a noteworthy advancement in restorative field. Wellbeing experts have built up a splendid and cheap wellbeing checking framework or giving progressively open to living to the general population experiencing different ailments utilizing driving innovations like remote interchanges, wearable and compact remote wellbeing observing gadget. As visits of specialists to the patients continually are diminished as the data with respect to patient's wellbeing legitimately reaches to specialist's screen from anyplace the patient lives. Likewise, in light of this specialists can spare numerous lives by conferring them a speedy and profitable [2][3].

### A. The Arduino Node MCU

Arduino is an open-source gadgets stage dependent on simple to utilize equipment and programming. Arduino sheets can peruse contributions from various sensors and divert the yield to the referenced yield pins. The Arduino Uno is a microcontroller board dependent on the EPS8266(data sheet). It has 14 advanced Input Output pins(of which 6 can be utilized as PWM yields) , 6analog data sources, a 16 MHz artistic resonator, a USB association, a power jack, an ICSP header and a reset catch. It contains everything expected to help the microcontroller; essentially associated it to a PC with a USB link or power it with an AC to DC connector or battery to begin. Its an open source physical stage dependent on a straightforward microcontroller board, and a improvement condition for composing programming for the board.

### B. Electrocardiography ECG sensor

An electrocardiogram records the electrical signal in the heart. It's a common test used to detect heart problem and monitor heart's status in many situation. ECG is an indication of the patient's heart health by recording the electrical activity to be read by specialized doctors which able to extract vital signs from it. Hence, HR can be calculated from ECG.

### C. Blynk App

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things. There are three major components in the platform:

Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide.

Blynk Server -responsible for all the communications between the Smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.

Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outgoing commands.

## II. LITERATURE REVIEW

A literature survey shows the various analysis and research made in the field of interest and results already published, taking into account the various parameters of the project and the extend of the project. It includes researches made by the various analysts -their methodology and the conclusion they have arrived at. As the amount of elderly people and chronic diseases patients grow rapidly, drawbacks of traditional healthcare service are increasingly prominent. The Internet of

Things (IoT) is intercommunication of embedded devices using networking technologies [4]. Elderly people need to make regular visit to the doctor for their health signs test results. Observing on regular basis of essential signs is compulsory as they are main signs of well-being of one’s individual health. These vital signs include, Pulse rate and Body temperature. The goal is to develop a low power, more reliable, non-intrusive, are the essential signs monitor which gather information on the body and send the parameters through wireless technology. The introduced Human-Wellbeing checking/watching system includes patients, Human-Wellbeing observing units, cloud for information maintenance and secure. With the assistance of some equipment units, different sensors and gadgets with web association. The system functionality is divided into major three modules; they are: 1)Sensing module 2)The Main module and 3)Interaction module<sup>7</sup>.

The Pulse Sensor and Temperature Sensor of sensing module should extract the accurate readings and should be able to send the data to the Arduino. The Wi-Fi module which is also a part of the sensing module must send the values to the server without any delay and without any data loss. The Server must store all the data sent by the Wi-Fi module and display the same on the Web Server. Developed a system that measures and detect Human-Heartbeat and body temperature of the patient, sends the data to user or server end by using microcontroller with reasonable cost and great effect. Use two different sensors and these are mainly under the control of microcontroller. For Human-Heartbeat measurement use fingertip, it’s in bpm (beats per minute). These calculated rates will have stored in server by transferring through Wi-Fi module via internet. liquid crystal display (LCD) has been used to display the calculated human-heart beat rate. To measure the human body temperature, use LM35 sensor, the measured data is given to transmitter module, it interns transfer these data to server through wireless system due to this notice avoided use of wires. Finally, the stored data in server will be displayed for further analysis by physician or specialist to provide better aid [1][5].

Heart attacks stand as a leading cause of deaths since years. Most of the times, patients are late to reach the emergency room during heart attacks since detection takes time.

**TOP 10 CAUSES OF DEATH**

	% of total deaths	% change 2005 to 2015
Heart attack/failure	16	+17
Lung disease (COPD)	10	+4
Stroke/brain hemorrhage	8	+7
Bronchitis/Pneumonia	5	-23
Diarrheal diseases	5	-32
Tuberculosis	5	-31
Diabetes	3	+35
Chronic kidney disease	3	+21
Preterm birth	3	-40
Road injuries	3	-3

■ Communicable  
■ Non-communicable  
■ Injuries

Fig. 1. Top 10 causes of death in 2015, a survey conducted by Times of India[6].

Fig. 1 Represents the results of a survey conducted by the Times of India and its quite clear that Heart attack or heart failure is the reason behind 16% human deaths from 2005 to

2015. Thereby there is a need for a robust system to detect heart attacks so that necessary action could be taken.

**III. PROPOSED SYSTEM**

In nowadays we have an expanded number of heart infections including danger of heart attack. Our proposed framework utilizes sensors that permit recognizing pulse of the individual utilizing heart beat detecting regardless of whether the individual is at home. The sensor is then interface to a microcontroller that permits checking heart rate reading and transmitting them over web. The client may set the high just as low dimensions of heart beat limit. Subsequent to setting these limits, the framework begin checking and when quiet heart beat goes over a specific constrains, the framework sends a alert to the controller which the specialist just as the concerned clients. Likewise the framework alert for the lower heart beats. At whatever point the client signs on for observing, the framework likewise show the heart beat rays of the patient. Therefore concerned ones may screen pulse too get a caution of heart rate to the patient promptly from anyplace and the person can be saved on time.

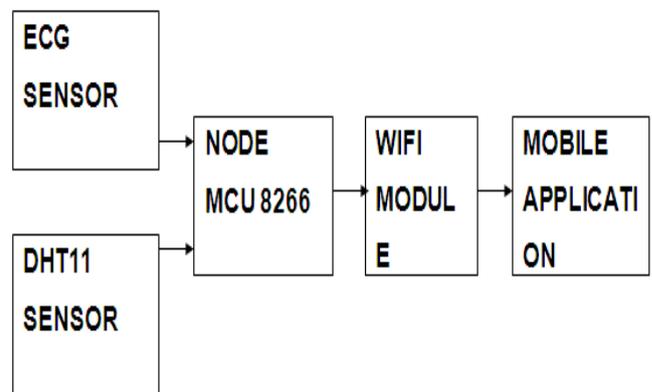


Fig. 2. Work Flow Diagram for the proposed system  
 Fig. 2 represents the work flow diagram for the proposed system. The ECG sensor and DHT11 sensor senses data and sends it to the NODE MCU 8266. Using the WiFi Module, the data is transmitted to the mobile application.

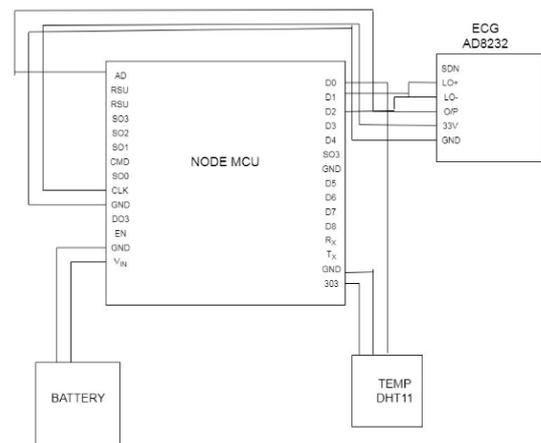


Fig. 3. Controller Circuit for the proposed system

Fig. 3 represents the controller circuit for the proposed system. The interconnection between various modules of the system are represented in the figure.

#### IV. RESULTS AND DISCUSSIONS

The results are to illustrate that all the modules are operating correctly without any data loss and each sub-module in all modules are performing their function. The ECG Sensor and Temperature Sensor of sensing module should extract the accurate readings and should be able to send the data to the Arduino. The Wi-Fi module which is also a part of the sensing module must send the values to the server without any delay and without any data loss. The sensors which are connected to the patient will continuously sense the temperature and heart rate. It is connected to the node MCU8266 in which a WiFi module is inbuilt. It will receive the data from the sensors and any fluctuations in the received data will be sent through mail for the specified person. The receiver will get the alert message. The continuous ECG pattern and temperature of the patient is live displayed in the application.

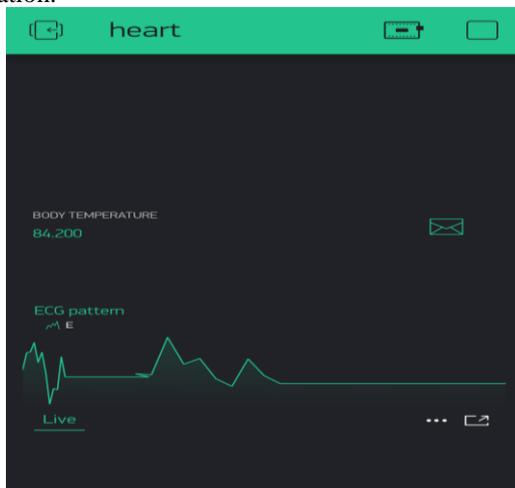


Fig.3 ECG Wave form and temperature reading.

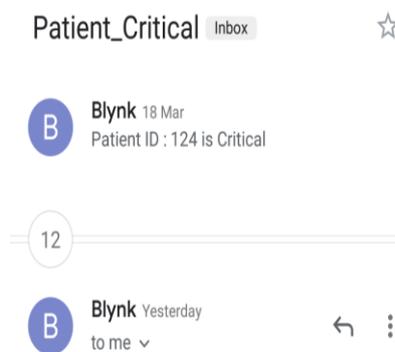


Fig.4 Email alert message after irregularity.

#### V. CONCLUSION

Nowadays we have an increased risk of heart attacks. This system which helps to detect heart rate of person using heart beat sensing even if person is at home. This system which helps to measure body temperature, heartbeat of person. The heart beat sensor which is interfaced with microcontroller senses the heartbeat of person and transmits them over internet using Wi-Fi module. System allows setting limits of beat. After setting these limits person can start monitoring the heart beat and whenever the person's heart beat goes above certain set point they can get an alert on high heart beat and also about chances of heart attack. Also the system alerts for lower heartbeat. A pulse sensor which considered as an infrared sensor that has a response to variations in light intensity instead was used. The key objective of developing this project with the help of Android Open Source platform is to immediately alert Medical Emergency and the patient's emergency contacts about the health condition of patient. We are developing prototype of this application using the continuous monitoring of parameters to detect and predict the heart attack and generate an alarm. The message will be sent to the doctor when body temperature and heart rate exceeds or goes below specified threshold level. This objective is met with measuring the heart rate and body temperature. It is helpful where continuous monitoring is required under critical condition. In addition it is very usable device due to its portability which means the patients can carry it with him therefore no need to stay at hospitals because the Heart Rate Monitor is applicable almost everywhere. Along with the Heart Rate Monitor, we developed an Android Application that allows both doctors and patients to interact with each other.

#### REFERENCES

- [1] Heart Attack Detection and Heart Rate Monitoring Using IoT 2017 By Nikunj Patel, Princekumar Patel, Nehal Patel J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68-73.
- [2] Heart Beat Sensing and Heart Attack Detection using Internet of Things: IoT 2017 By Aboobacker sidheeqe, Arith Kumar, Bala murugan .R, Deepak K C, K Sathish.
- [3] IoT based Heart Attack Detection, Heart Rate and Temperature Monitor by Gowrishankar S, Prachita M. Y, Arvind Prakash. International Journal of Computer Applications (0975 – 8887) Volume 170 – No.5, July 2017.
- [4] IoT based Heart Attack Detection, Heart Rate and Temperature Monitor 2017 By Gowrishankar S., PhD Professor Department of CSEB.M.S.
- [5] Heart Rate Monitoring System Using Finger Tip through IOT 2017 By Varun Goel, Sharad Srivastava, Dharmendra Pandit, Dhirendra Tripathi, Pankaj Goel.
- [6] "What's killing Indians", The Times of India, October 19, 2016- <https://timesofindia.indiatimes.com/india/Whats-killing-Indians/articleshow/54930853.cms>