Acute Myocardial Infarction Monitoring Based on Internet of Things: IoT

[1]Shilpa N, [2]Nethra Nagesh, [3]Sowmya L, [4]Harshdeep Kaur

Abstract

As we are quite aware of acute myocardial infarction (heart attack), it is dangerous at the first attempt itself. This can be detected if we go for regular medication. As it is not possible, we have an alternative for early detection of heart attack that monitors the rate of heart beat using sensors and then transfers the data to the servers using Internet of Things

Key Words: Acute Myocardial Infarction, Heart Attack, Heart beat sensor, Heart attack detection, Internet of Things (IoT).

INTRODUCTION

Acute myocardial infarction is generally termed as Heart Attack in layman's term. The main reasons for the cause are life style, food habits, age factors or being physically inactive and many more. To overcome with the issue of heart attack, it should be detected in the early stages. The system which we are developing detects the pulse rate, temperature regularly with the help of sensors which are connected to microcontroller that reads the pulse rate and transmit it through internet. Doctor can set the threshold for all the parameters. If the parameters cross the threshold, the system sends the notification through WiFi..

We are in the era where there is an explosive growth of electronic devices that can be communicated wirelessly has become a fundamental tool of daily life. The next generation of connected world is Internet of Things (IoT) which connects devices, sensors, appliances and even vehicles and many other things. With the help of IoT, we can connect anything and access it from anywhere and anytime. The aim of IoT is to extend the benefit of Internet with remote control ability, data sharing, constant connectivity and so on. Using an embedded sensor which is always on and collecting data, all the devices would be tied to local and global networks.

The term IoT was 1st introduced by Kevin Ashton in 1999 who dreamt of a system where every physical object is connected using internet via sensors. The IoT technology can provide a large amount of data about human, objects, time and space. While combining the current Internet technology and IoT provides a large amount of space and innovative service based on low-cost sensors and wireless communication. IPv6 and Cloud computing promote the development of integration of Internet and IoT. It is providing more possibilities of data collecting, data processing, port management and other new services. Every object which connects to IoT requires a unique address or identification with IPv6. There are so many people in the world whose health may suffer because they do not have proper access to hospitals and health monitoring.
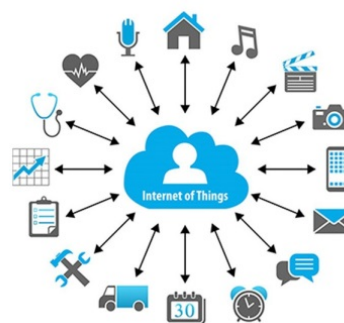

Figure:1: Internet of Things

The Internet of things (IoT) is the internetworking of physical devices, vehicles, buildings and other items-embedded with electronics, software, sensors, and network connectivity that enables these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "*the infrastructure of the information society.*" The IoT allows objects to be sensed and controlled remotely across existing network infrastructure. It gives us the opportunity to connect the physical world with the computer based systems.

PROPOSED SYSTEMS

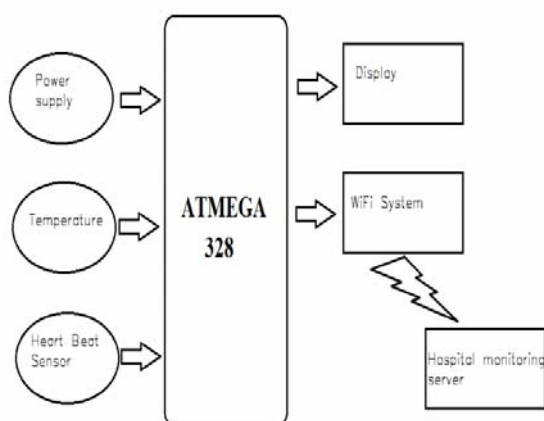The following block diagram is the architecture and flow chart of the project.

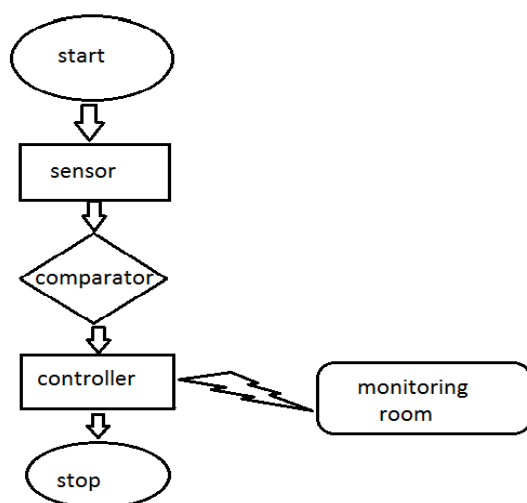**Figure:2.1: Block diagram of proposed system**

Figure :2.2:Flow chart of proposed system

WORKING METHODOLOGY

In this system uses two circuits.

1. Transmitting circuit

2. Receiver circuit

The system makes use of heart beat sensor to find out the current heart beat level and display it on the LCD screen. The transmitting circuit includes AVR family microcontroller interfaced to LCD screen and this transmitting circuit is powered by 12V transformer. Similarly, the receiving circuit includes AVR family microcontroller and RF receiver and also has a 12V transformer. The receiver circuit also includes LED light and a buzzer which are used to alert the person supervising the heartbeat rate of the patient and turns on the LED light and buzzer as soon as the heartbeat level of the patient does not fall within the normal heart beat level set. Now we make this system universal for all the hospital rooms. Operator can seat in single place and able to monitor all the patients.

The sensor shines a light lobe (a small very bright LED) through the ear and measures the light that gets transmitted to the Light Dependent Resistor amplified signal gets inverted and filtered, in the Circuit. In order to calculate the heart rate based on the blood flow to the fingertip, a heart- rate sensor is assembled with the help of LM358 OP-AMP for monitoring the heartbeat pulses. When System powered On IR Tx starts emitting Light with 100% intensity towards blood cells. Light reflect back to Rx with '' 100% - x '' from it.

This 'x' value is our Heart beat rate. All data will send directly to server room so in case of any emergency fast action can be perform. A Heartbeat sensor is a monitoring device that allows one to measure his or her heart rate in real time or record the heart rate for later study. It provides a simple way to study the heart function. When the sensor is working, the beat LED flashes in units on with each heartbeat. This digital output can be connected to the microcontroller directly to measure the Beats

per Minute (BPM) rate. Temperature sensor is analogue quantity with the range 0-135 degree. All the data can be detected by sensor and give display which is LCD of 16*2. Simultaneously we these data goes on server and display on control room. We make this system universal for all the hospital rooms. Operator can seat in single place and able to monitor all the patients.

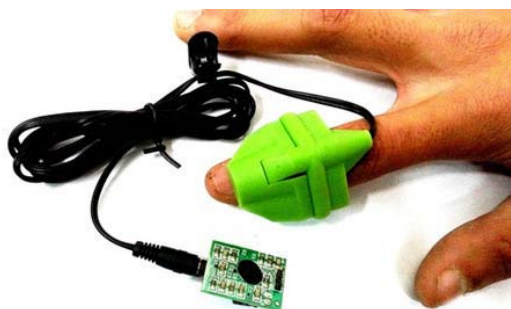## COMPONENTS REQUIRED

Heart Beat Sensor

Figure:4.1: Heart Beat Sensor

Heart beat sensor measures the pulse rate of the heart and is displayed in the digital form. Heart rate is detected by led lights. The normal heart beat range is 78 bpm. This gives the rate directly in the form of digital signal.
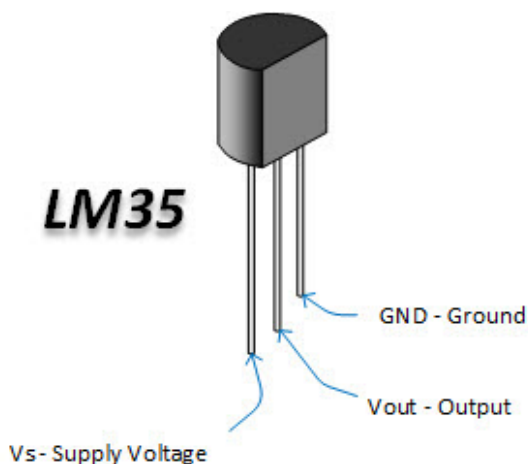
Temperature sensor

Figure:4.2: Temperature sensor

LM35 sensor is used to measure the temperature of human body. The LM35-series devices are precision integrated-circuit temperature sensors, with an output voltage linearly proportional to the centigrade temperature.

Pressure Sensor

Figure:4.3: Pressure sensor

The pressure sensor is used to measure the systolic and the diastolic pressure level using the device. It is measured in millimeter (mmHg). Blood pressure changes from minute to minute.
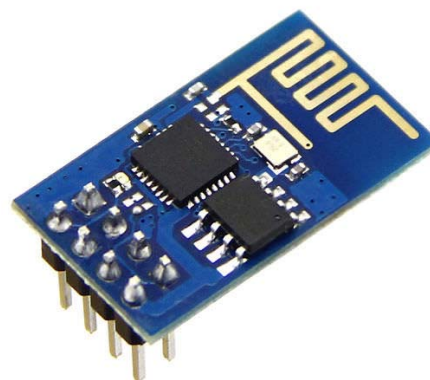
WiFi module

Figure:4.4: WiFi module

The ESP8266 WiFi Module is a self- contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.
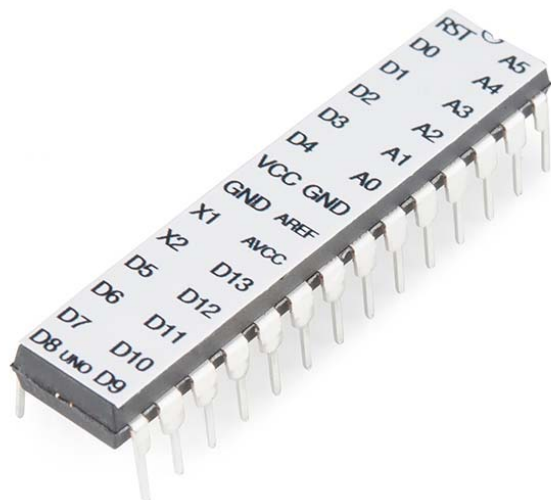
Atmega 328

Figure:4.5: Atmega 328

Atmega 328 is an eight (8) bit micro-controller. It can handle the data sized of up to eight (8) bits. It is an AVR based micro-controller. Its built in internal memory is around 32KB. It operates ranging from 3.3V to 5V. It has an ability tostore the data evenwhen the electrical supply is removedfrom its biasing terminals.

ADVANTAGES

i) The system is portable.

ii) The risk of heart attack can be minimized as you can check it in home.

iii) It is easily affordable.

iv) Both temperature and heart beat can be monitored by single device.

v) All Patients are monitored by single person from the server room.

vi) This system also helps for Hospital monitoring.

CONCLUSION

There is an increase risk in heart attacks. With the help of this system even the heart rate of a person sitting at home can be detected. All the patients of the hospital can be monitored by a single person from the server room. This system helps in measuring the body temperature, heart beat, pulses of the of the person. If this technology is developed then we can detect heart blockage by our project.

REFERENCES

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Author's Profile

Department of Electronics and Communication Engineering, T. John Institute of Technology, Bangalore, India