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IoT based heart attack detection using the wristband

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ABSTRACT

Internet of Things (IOT) plays a vital role in connecting the surrounding environmental things to the network and made easy to access those un-internet things from any remote location. The human death due to heart attack is increasing day by day. Due to today's human life style, eating habits, irregular daily routines, the heart attack problem is becoming predominant. So here we design a wristband which enables the early detection of heart attack and provide medical facilities as soon as possible. This mainly focus on early detection of heart attack which in turn reduces the human death rate due to heart attack. And also using this device, one can monitor rhythm of heart which also helps to detect heart attack.

Keywords: *IoT, Lilypad Arduino, Pulse sensor, ECG sensor, Panic button.*

1. INTRODUCTION

The proposed system aims at designing an advanced smart band using IOT technology. The device can be communicated to mobile through a Bluetooth device.

Automation is the most frequently spelled term in now a days. The hunger for automation brought many revolutions in the existing technologies. These had a greater importance than any other technologies due to its user-friendly nature. These can be used in our daily life which results continuous health monitoring. Considering the advantages of Bluetooth and Arduino, an advanced wristband system was developed to detect heart attack.

Bluetooth is a packet-based protocol with a master/slave architecture. One master can communicate with up to seven slaves in a Piconet. To use Bluetooth technology, a device must be able to interpret certain Bluetooth profiles, which are definitions of possible applications and specify general behaviours that Bluetooth –enabled devices used to communicate with other Bluetooth devices.

Bluetooth specifications

- 2.45Ghz Frequency
- Asynchronous Speed 2.1 Mbps (max) -160Kbps(Min)
- Power supply :+3.3VDc

The LiliPad Arduino Main Board is an Arduino-programmed microcontroller designed to be easily integrated into e-textiles and wearable proposed systems. The data is collected and send the fetched data over Bluetooth module to mobile application.

2. SYSTEM OVERVIEW

An embedded system is a combination of software and hardware to perform a dedicated task. Here we are using Lilipad Arduino for fetching data from the sensors and share it over to a mobile application using a Bluetooth device.

In this proposed system "IOT Based Heart Attack detection using wristband", fetching the pulse rates using a sensor under some conditions and also when the pulse rate goes abnormal, this information will be passed to the patient's mobile and then from there to the relative people. And also if the person feel uneasy or having any symptoms of heart attack like left arm pain, over sweating, nausea etc., he/she can push a button attached with the wristband to notify the relative people. So he will not be go through a difficult time to get medical facilities. And also ECG monitoring is also available in this device. This is only applicable when the person is idle. For ECG monitoring, a computer system is required. This ECG monitoring is cheap so that people who don't have a good financial support or not able to have a good medical care can make use of this.

3. BLOCK DIAGRAM

In this chapter the block diagram of the proposed system and design aspect of independent modules are considered.

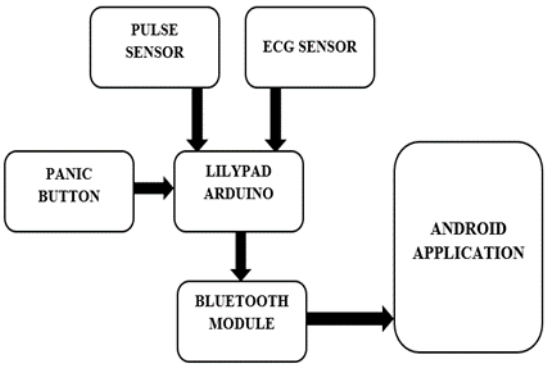

Fig.1. Block diagram of IOT Based Heart Attack Detection using wristband

The main blocks of this proposed system are:

A. LilyPad Arduino

B. Pulse Sensor

C. ECG sensor

D. Android Application

E. Bluetooth device

A. LILYPAD ARDUINO

The Lilypad Arduino main board is an Arduino-programmed Microcontroller designed to be easily integrated into e-textiles and wearable proposed systems. It offers the same functionality you find in other Arduino boards, in a lightweight, round package designed to minimize snagging and profile with wide tabs that can be sewn down and connected with conductive thread.

The LilyPad Arduino consists of an ATmega328 with the Arduino boot loader and a minimum number of external components to keep it as small as possible. This board will run from 2V to 5V and offers large pin-out holes that make it easy to sew and connect.

LilyPad is a wearable e-textile technology developed by Leah Buechly and cooperatively designed by Leah and SparkFun.

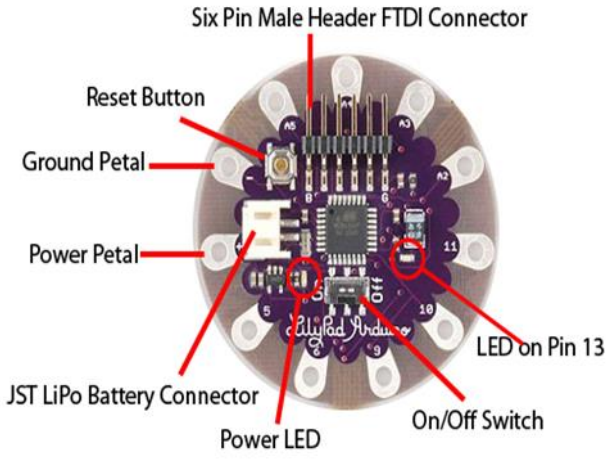

Fig.2. LilyPad Arduino

B. PULSE SENSOR

Heart rate data can be really useful whether you're designing an exercise routine, studying your activity or anxiety levels or just want your shirt to blink with your heart beat. The problem is that heart rate can be difficult to measure. But a Pulse sensor can solve that problem.

The pulse sensor is a plug-and-play heart-rate sensor for Arduino. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart-rate data into their proposed systems. It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings. Also, it sips power with just 4mA current draw at 5V so it's great for mobile applications.

Simply clip the pulse Sensor to your wrist and plug it to your 3 or 5 volt Arduino and you are ready to read your heart rate. The 24" cable on the pulse sensor is terminated with standard male headers so there is no soldering required.

Fig.3.Pulse sensor

C. ECG SENSOR

The Electrocardiogram sensor allows you to assess the electrical and muscular functions of the heart. The electrical waves can be measured at selectively placed electrodes on the skin. Electrodes on different sides of the heart measure the activity of different parts of the heart muscle. ECG electrodes are typically wet sensors, requiring the use of conductive gel to increase conductivity between skin and electrodes. This module having three sensor pads, one is to be plotted on right arm and another one on right leg and another one on left arm.

Fig 4: ECG monitor sensor module

D. BLUETOOTH DEVICE

The Arduino Bluetooth is a microcontroller board originally was based on the ATmega168, but now is supplied with the 328P and the Bluegiga WT11 Bluetooth module. It supports wireless serial communication over Bluetooth .It contains everything needed to support the microcontroller and can be programmed wirelessly over the Bluetooth connection. The Arduino Bluetooth can be powered via the V+ and GND screw terminals. The board contains a DC-DC convector that allows it to be powered with as little as 2.5V, a maximum of 12V. Higher voltages or reversed polarity in the power supply can damage or destroy the board. The protection for reverse polarity connection is only on the screw terminal. The ATmega328P has 32KB of flash memory for storing code. It has 1KB of SRAM and 512 bytes of EEPROM. The Bluegiga WT11 module on the Arduino Bluetooth provides Bluetooth

communication with computers, phone and other Bluetooth devices. The WT11 communicates with the ATmega328P. The Arduino software includes a serial monitor which allows simple textual data to be send to and from the Arduino board over this Bluetooth connection. The board can also reprogrammed using this same wireless connection. The maximum length and width of the Bluetooth are approximately 3.2 and 2.1 inches respectively. Three screw holes allow the board to be attached to a surface or case. Note that the distance between digital pins 7 and 8 is 160mil, not an even multiple of the 100mil spacing of other pins.

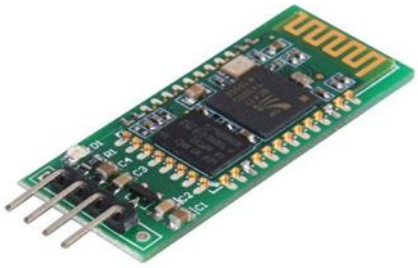

Fig.4. Bluetooth module

E. ARDUINO 1.8.5

The open-source Arduinon Software (IDE) makes it easy to write code and upload it to the board. It runs in windows, Mac OS X and Linux. The environment is written in java and based on processing and other open-source software. This software can be used with any Arduino board.

Fig.5. Arduino IDE

4. SOFTWARE DESCRIPTION

The proposed system is implemented using the following software's:

- ARDUINO 1.8.5: for designing and setup the circuit
- Android studio: for developing an android application

5. WORKING PRINCIPLE

Our proposed system "IOT based heart attack detection using wrist band" is mainly intended to the early detection of heart attack and notify when it happens.

The controlling device of the whole system is Arduino microcontroller. Bluetooth module and pulse sensors are interfaced to the Lilypad Arduino. Pulse sensors are fed as an input to the Arduino. The Arduino processes this data and transmits over Bluetooth, which will be received from mobile. In achieving the task the controller is loaded with a program written using Embedded 'C' language.

The pulse sensor will collect the pulse rates, whenever the pulse rate goes its extreme (min or max) level and this will be communicated to mobile through Bluetooth module. There are chances of having heart attack while the person is exercising or doing any other works. So in this case we are providing a panic button which will helps the patient to push when he/she feel uneasy. The pulse rates will be continuously send to an android application which is installed on the patient's mobile phone. We can add doctor's number, or relative people of the patient's number to the emergency contact list of the application. This list will be useful when the patient have heart attack. That is, when the patient having heart attack, an alert message will be generated and this message will be send to the people in the emergency contact list as a push message.

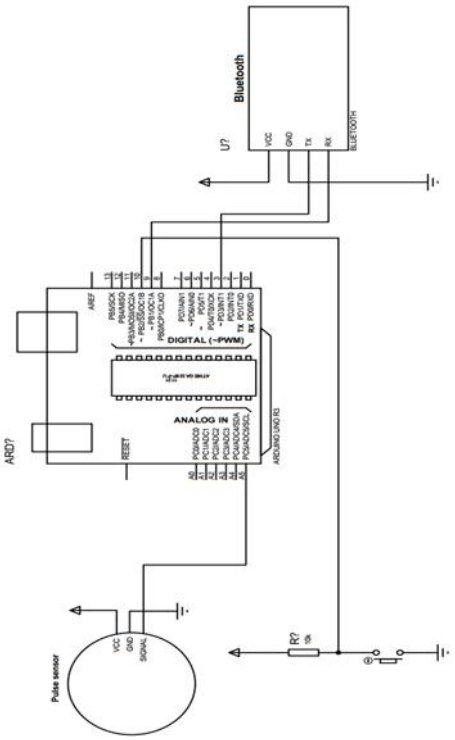

Fig.6.Schematic Diagram

Also, it is possible to monitor patient's heart rhythm or ECG rate using this device. For that, the device should be connected to a computer system. The sensor will read ECG readings from left arm, right arm &right leg. This readings will be continuously shown on the system. When the readings goeas narrow lined,it means the heart beat goes its abnormal state and needed medical care to the patient.

6. RESULTS

The proposed system "IOT based heart attack detection using wristband" was designed such that the patient will get immediate medical facilities after having heart attack and also when he needed immediate medical care. So that human death rate due to heart attack can be reduced. This is achieved using Bluetooth communication.

7. CONCLUSION

In this system with the help of IOT, heart attack can be detected and life can be saved. This proposed system helps the patients by tracking their heart anomalies by notifying with an alert message to mobile phones of the saved contacts by the user or patient. And also continuous heart rate monitoring or ECG monitoring is available so that even poor people will also get medical care and ECG monitoring.

8. REFERENCES

[1] M.Manisha, Neerja and Venmuri sindhura, IOT on Heart Attack detection and Heart rate Monitoring, International Journal for Innovation in Engineering and Technology, Aug 2016.
[2] Yashasavi Yadav and Manasa Gowda, Heart rate monitoring and Heat attack detection Using wearable Device, International Journal for technical research and Application, June 2016
[3] Shivam Patel and Yogesh Chouhan, Heart attack detection and medical attention using Motion sensing Device Kinect, International journal for scientific research and publications, January 2014.
[4] Bandana Malic and Ajith Kumar Pathro, heart rate monitoring using Finger Tip Through Arduino and processing software, International journal for science, Engineering and technology, January 2016

