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ARDUINO BASED HEART BEAT MONITORING SYSTEM

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Abstract
The heart rate monitoring system was created utilizing Arduino and IOT technology with the aim of sensing the patient's heartbeat in order to track both regular checkups and the risk of a heart attack. To ensure that our health is in top shape, body health monitoring is crucial to us. The heart rate (HR) is a crucial characteristic of the device under consideration. In this project, we outline the development of a portable, low-cost heart rate monitoring device based on Bluetooth technology. The heart rate module, Android app, and Wi-Fi module are just a few of the various components that make up the overall system. In this project, we used an Arduino to design a heart rate monitor system.

Keywords: Heart Beat Sensor, Temperature Sensor, Wi-Fi ESP8266 Module, Arduino and Internet of Things.

I. Introduction

The mortality rate has risen in recent years as a result of heart attacks occurring in people. Hence, heart rate analysis is crucial to lowering global mortality. Real-time sensors are used to monitor the heartbeat, such as a heartbeat sensor that is fixed to the human chest and checks the rhythm every second. The detected data is sent to the controller, and if there is any variation in the data, an alert signal is sent to a medical professional. The heart rate can vary depending on a person's age, with a regular adult having 72 bpm, an elderly person having 90 bpm, and a kid having 120 bpm. This is a mechanism for monitoring your health.

II. Literature Review

People now have difficulty taking frequent temperature and heart rate readings. People must use thermometers to test their body temperatures, which takes time, and we must visit a clinic or hospital to check our heart rates. We are beginning to develop our "Arduino-Based Heart Beat Monitoring System" by examining various papers and existing methodologies. The following papers were reviewed for literature:

[1] "Wireless Patient Health Monitoring System" by Manisha Shelar:

In this project, we have designed a Heart Rate Monitor System using an Arduino, Heart beat Sensor. You can find the Principle of Heart beat Sensor; working of the Heart beat Sensor and Arduino based Heart beat Monitoring System using a practical heart beat Sensor

[2] "A Wireless Heartbeat and Temperature Monitoring System for Remote Patients" by C. K. Das:

The body temperature increases significantly when children are exposed to the environment and have heart attacks, causing people's hearts to beat at a dangerous rate at the wrong moment. Thus, the importance of this device evaluated through lecturers, parents and students' perspectives was 90% respectively.

[3] "Internet of Things Applications, Challenges and Related Future Technologies" by Zeinab Kamal

This study is to introduce developing a new system that monitors heart beat rate and also body temperature at the same time via mobile phone. The heartbeat sensor was initially designed to measure the internal temperature and heartbeat rate of the human body, which is highly related to heat stroke and heart attack access.

[4] "Heartbeat and Temperature Monitoring System for remote patients using Arduino" by Vikram Singh

In this project we describe the design of a low-cost heart rate monitoring device from fingertips based on the Bluetooth technology. This study will outline the creation of a new technology that uses a mobile phone to simultaneously monitor body temperature and heart rate. The heartbeat sensor's original purpose was to gauge the body's internal temperature and heartbeat rate, two factors that are closely associated with heat stroke and heart attacks.

III. Methodology

This project will gauge temperature and heart rate parameters and display the data on the Thinkspeak.com application. It becomes an Internet of Things (IOT)-based heartbeat monitoring system, allowing users to check their health online from anywhere.

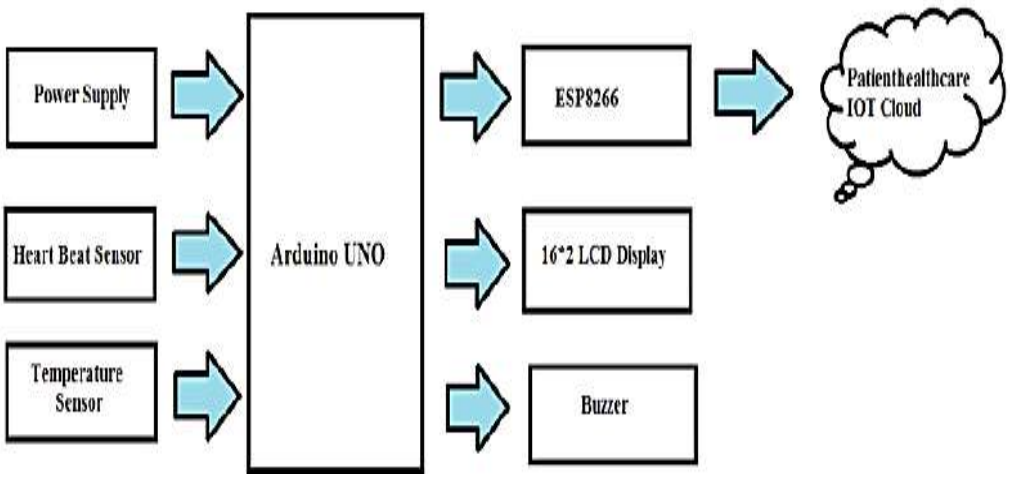

Figure 1: Block Diagram

IV. Working

The heartbeat sensor is used in this system along with an Arduino Uno and Wi-Fi ESP8266 module. It is worn on the finger to measure the heart rate and transmit that information to a mobile application. Early diagnosis of the condition is essential to avoiding further consequences. The heart rate can be seen in three situations:

1) Low Pulse Rate: When the heart rate per BPM (beats per minute) is between 40 and 60, a low pulse rate is indicated. The patient needs the assistance of the doctor because the low pulse rate could cause medical concerns (for example, low blood pressure).

2) Normal Pulse Rate: This shows that the patient has a normal range of pulse rate without any complications, with values between >60 and 100.

3) High Pulse Rate: The patient has a high pulse range that could lead to heart-related disorders (such as high blood pressure), as seen by their high pulse rate, which is between 100 and 150. The thing-speak.com app, a mobile-based application, uses a Wi-Fi module to display the aforementioned readings.

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V. Flowchart

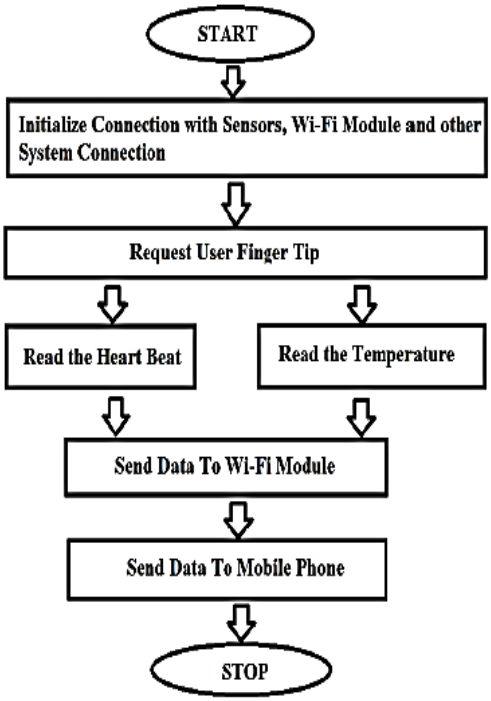

Figure 2: Flow Chart

VI. Result

The heart beat sensor is connected to the body. The cardiac sensor measures changes in blood volume and can detect the heartbeat. Arduino to heartbeats per minute conversion the data will be sent to Thingspeak via communication between the ESP8266 and the Arduino. The Arduino-connected LCD will also display the outcome (BPM and temperature) after Thingspeak receives the code.

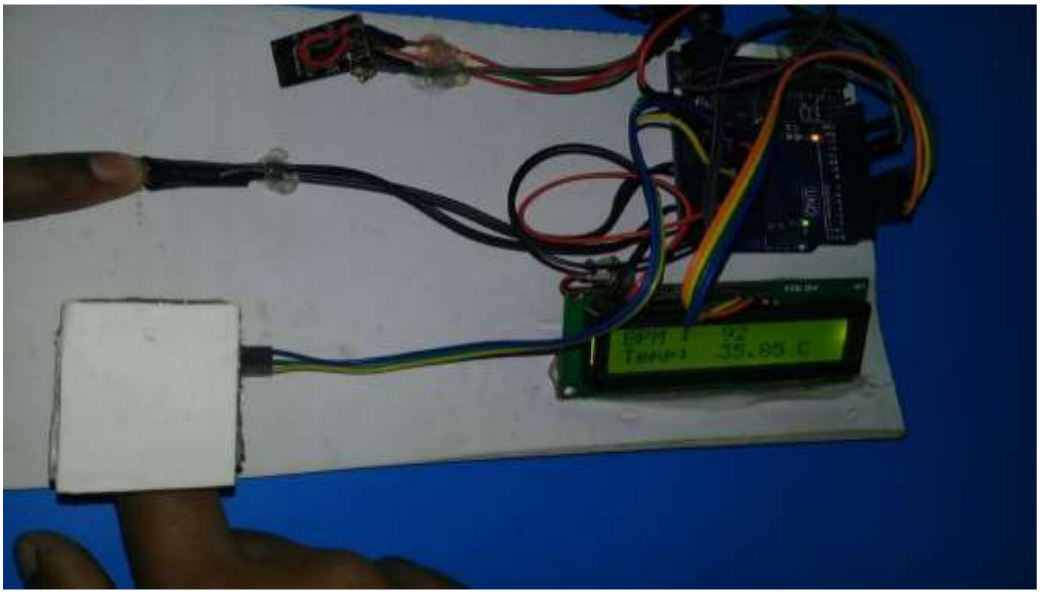

Figure 3: Setup of Proposed System and result on the LCD display

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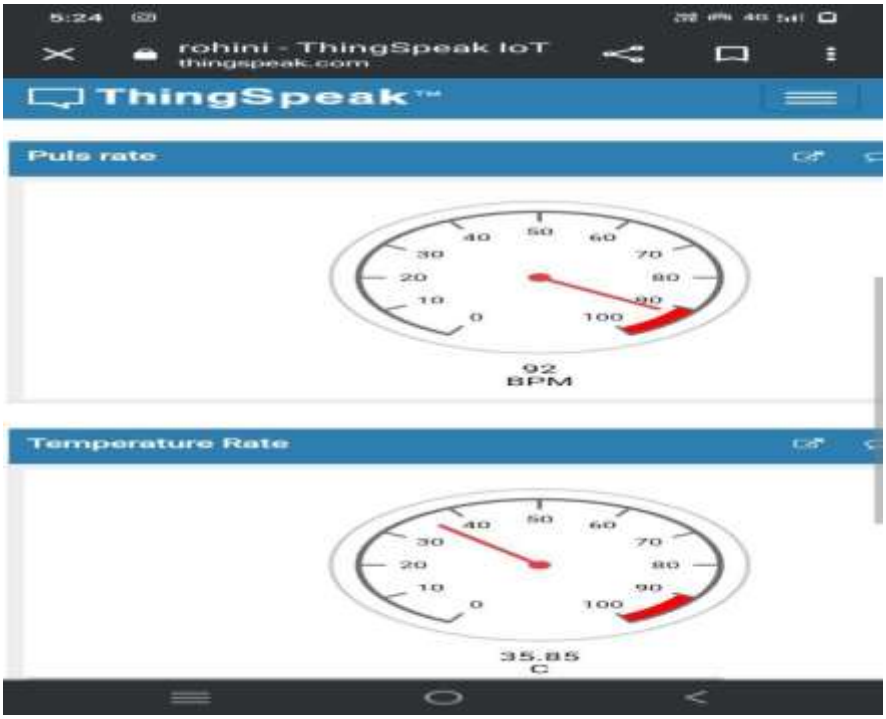

Figure 4: Result on Thingspeak IOT

VII. Discussion

In this monitoring system, based on the rate of our heart beat, our heart condition is divided into 3 levels such as low heart rate level, normal heart rate level, high heart rate level. It is found that the heart beat is high after a workout, low during depression and normal when sleeping. The result is that it can measure the heart rate of a person. One of the vital parameters for this device under consideration is the heart rate. The Heart rate Monitoring System is developed using Arduino and IOT technology with the objective of detecting the heartbeat of the patient in order to monitor the risk of heart attack and also the regular checkup.

VIII. Conclusion

Hospitals frequently utilize heart rate monitors, and any that did were speaking in Thingspeak. The body is connected to the heartbeat sensor. The cardiac sensor measures changes in blood volume and can detect the heartbeat. Arduino to heartbeats per minute conversion the data will be sent to Thingspeak via communication between the ESP8266 and the Arduino. The Arduino-connected LCD will also display the outcome (BPM and temperature) after Thingspeak receives the code.

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