Patient Health Monitor (Heartbeat and Body Temperature Monitoring)

In this project which has used Heartbeat sensor module to detect Heartbeat and LM 35 temperature sensor to detect Body temperature, when it happens the blood concentration in body changes. The results are shown on the LCD screen. And, there is included one buzzers to produces a verifiable result which has a dangerous heart rate such as the fast rate or slow and high body temperature with two difference tones.

Finger Heart Rate Sensor Module, 16x2 Character LCD Screen, 3 Pushbutton switches, 2 Resistors (1k and 2k),2 buzzers (passive)

Heart rate and body temperature human are very important parameters of the human body. Doctors use various medical devices like thermometer to check body temperature, blood pressure monitor BP and EKG to check for heartbeat monitoring. In this project is built a heart rate and body temperature monitoring system, using LM 35 temperature sensor, Arduino and Finger Heart Rate Sensor Module, that counts heartbeats in a minute and temperature in Fahrenheit. The system starts measure the heartbeat once the finger is placed on the sensor. Working of this project is quite easy but a little calculation for calculating heart rate is required. There are several methods for calculating heart rate, but here it has been read only pulses. The IoT platform used in this project is “ThingSpeak”. “ThingSpeak” is an open-source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. This IoT device could read the pulse rate and measure the surrounding temperature. It continuously monitors the pulse rate and surrounding temperature and updates them to an IoT platform. Another advantage of these systems is that they can monitor health conditions in real time and all the time. People use HMSs in hospitals, for home care, and to track the vitals of athletes (heart rate, blood pressure, and body temperature). All this data can be processed by various sensors integrated into the systems

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The Arduino Sketch running over the device implements the various functionalities of the project like reading sensor data, converting them into strings, passing them to the IoT platform, and displaying measured pulse rate and temperature on character LCD. The Patient Health Monitoring System with IOT using ESP-01S Wi-Fi Serial Module & Arduino. Pulse Sensor and LM35 Temperature Sensors measure BPM & Environmental Temperature respectively. The Arduino processes the code and displays it to 16\*2 LCD Display. And, there is included one buzzer to produces a verifiable result which has a dangerous heart rate such as the fast rate or slow and high body temperature with two difference tones. ESP8266 Wi-Fi module connects to Wi-Fi and sends the data to IoT device server. The IoT server used here is Thingspeak. Finally, the data can be monitored from any part of the world by logging into the Thingspeak channel.

The **Pulse Sensor** is a plug-and-play heart-rate sensor for Arduino. The essence is an integrated optical amplifying circuit and noise eliminating circuit sensor. Clip the Pulse Sensor to the earlobe or fingertip and plug it into the Arduino, it can be ready to read heart rate. Also, it has an Arduino demo code that makes it easy to use. There is also a LED in the centre of this sensor module which helps in detecting the heartbeat. Below the LED, there is a noise elimination circuitry that is supposed to keep away the noise from affecting the readings.

The **LM35 series** are precision integrated-circuit temperature devices with an output voltage linearly proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°Cover a full −55°C to 150°C temperature range.

The **ESP-01S Wi-Fi Serial Module** is a very user-friendly and low-cost device to provide internet connectivity to the projects. The module can work both as an Access point (can create hotspot) and as a station (can connect to Wi-Fi), hence it can easily fetch data and upload it to the internet making the Internet of Things as easy as possible. It can also fetch data from the internet using API’s hence the project could access any information that is available on the internet, thus making it smarter. Another exciting feature of this module is that it can be programmed using the Arduino IDE which makes it a lot more user friendly.

LED illuminates objects ,even places Automotive Lighting; Dimming of lights.