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## SECURE COMMUNICATION SYSTEM FOR PATIENT CARE USING BLUETOOTH AND THINGSPEAK

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### ABSTRACT

The Project is titled as "Patient Monitoring System using ThingSpeak and IFTTT". In the present days health has been the one of the main factor for every people .when coming to health the basic needs will be heart beat and body temperature which can be used to diagnose various health problems , so by using the basic concepts and problems we have come up with the project called Patient Monitoring system. In this project we digitally sense the heart rate and body temperature using pulse sensor, Temperature etc., In this project mainly Pulse Sensor, Temperature Sensor, Wifi module and Arduino are used. Arduino is used in this project because by using the different inputs from various sensors it can produce output accordingly. Arduino programming is used in this project. Body Temperature is the main parameter for diagnosing health conditions. LM35 is used to monitor body temperature. Pulse sensor is used for sensing heartbeat. This project is mainly done by Arduino. This product will be help full to all people. At last the result will displayed in the LCD display. We can easily monitor our body temperature and heartbeat. Outcome is very efficient and is of lesser costs. Doctors can easily get access to the patient data. Quality of health care can be provided. We also introduced a new feature of seeing live results using a open source internet of thing application called Thing speak. Thing speak provides us immediate visualizations of data that will be posted by our devices to the Thing speak. The results that will be displayed in the LCD can also be seen in the Thing speak. With this add on feature doctors has a ability to see the patient conditions from anywhere.

**Keywords:** Arduino; HeartRate; BodyTemperature; HealthMonitoringSystem; TemperatureSensor.

### I. INTRODUCTION

This Project mainly discuss about the IOT platform, Electronics Communication and Computer science. And mainly Arduino plays the major part in this project because by receiving the inputs from the sensors it produces the output using lights and other actuators. Arduino programming is used to get the input from the sensor like pulse sensor which is used to sense heart beat and using Arduino this data is displayed in LCD display. so, Arduino plays the major role in this Project.

Internet of Things is the fastest growing technology. IoT is about to find application everywhere and in everything. Medical Electronics is also going to advance with the application of Internet of Things. So, the IoT platform Thing speak is used. Thing speak is one of the best tool for IoT Projects. Using this platform we can monitor our data and control the system in internet using channels etc.

**In this pandemic situation**, Doctor can't observe a patient's heart rate per minute and body temperature all the time. So, we decided to implement this project to make the work easier for hospital management. Temperature and the heart rate are the major parameters measured by the doctors for very patient. These parameters are directly uploaded in the Thing speak cloud. So, doctors can easily access the data of the patients and helps in better treatment. The critical situations can be easily handled using this continuous observation.

This device can be used in first aid kids also as it measures the basic parameters like temperature and heart rate. For OLD age people this device can be used in regular check-ups, like if the heart rate is lower, then it is an indication for bradycardia and if it is higher, then it is an indication for tachycardia.

In this project ESP8266 Wi-Fi modem, LM-35 Temperature Sensor, Pulse sensor is connected with Arduino Uno and Transmitted data to LCD Display and to the Thing speak cloud. With this simple yet effective device, health status of a critically ill patient can be constantly monitored.

## II. METHODOLOGY

By referring all the open-source platforms, we proposed a tool called Thing speak which is easier to use, safe in terms of security and has a variety of options. In Thing speak we can store and also retrieve the data which helps to keep the record of patient and will be available whenever required. We can use visualizations to compare the data and also can monitor the heart beat and pulse separately and can import and export the data individually or combined.

Coming to the implementation part, the whole project can be classified into three IoT architecture layers. The Physical layer, The Network Layer and The Application Layer.

**Physical layer** – Sensing part of the setup.

Sensing of the physical parameters using sensors and the setup comes under the physical Layer. here, the Temperature sensor and the pressure sensor senses the parameters temperature and pressure accordingly from the source (Patient's body). After sensing the physical quantities sensors process them to the transducers for transduction i.e., converting the signals into electrical inputs.

After converting them into the electrical form, they are given as inputs to the Arduino through two different input pins. The analysis will be done according to the code loaded in the Arduino and then the output is given to LCD and Wi-fi module ESP2866.

**Network Layer** – Transferring Data from device to ThingSpeak.

Connection and communication between the device and the IoT platform used falls under the Network layer. Here, we use Wi-fi module to establish the connection and communication between the device and Thing Speak for data analysis.

Communication will be established within module and cloud platform by using suitable module commands (ESP2866 commands) ,to start the data transfer , to repeat the process , to end the transfer and to send the data.

**Application Layer** – Display the Temperature and BPM.

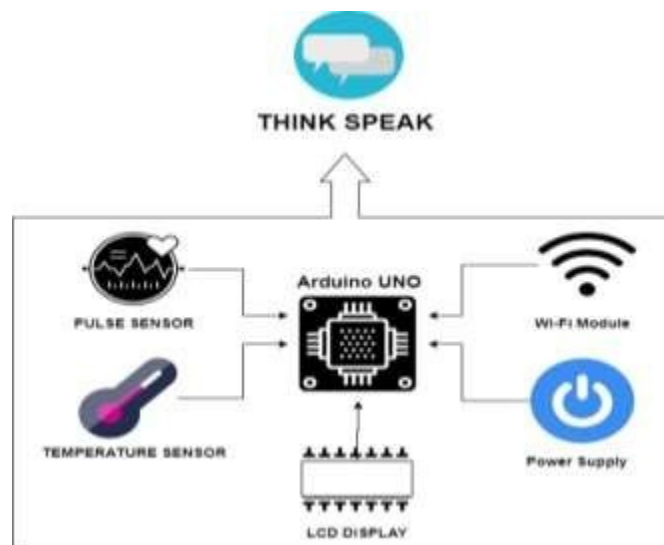
After performing the analysis , Display of the results come under the Application layer i.e., the performance of the device and monitoring data. Here , the device can be used in two situations.

Case(i): For instant Display of the Temperature rate and BPM.

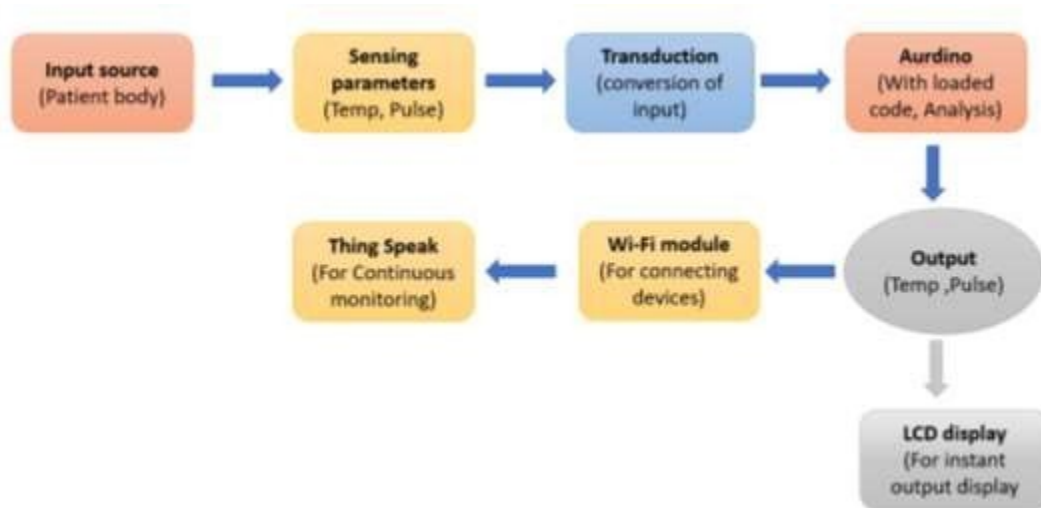
Case(ii): For continuous monitoring of temperature and BPM in critical conditions from any place.

To detect the body heat and BPM instantly we use LCD. In case of continuous monitoring Thing Speak platform is used, as it is a cloud platform one can access it anytime from anywhere (user friendly too). It can display the information graphically and also in many other forms (user defined).

## III. MODELING AND ANALYSIS

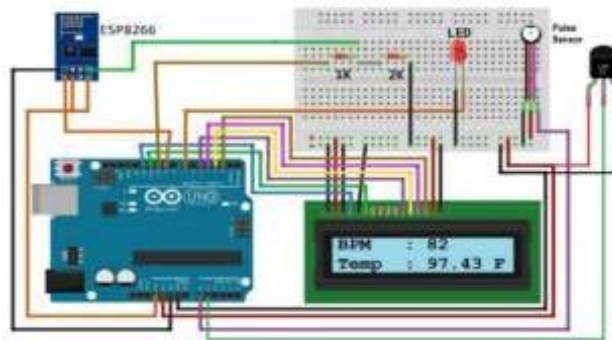


**Figure(a):** Block diagram.



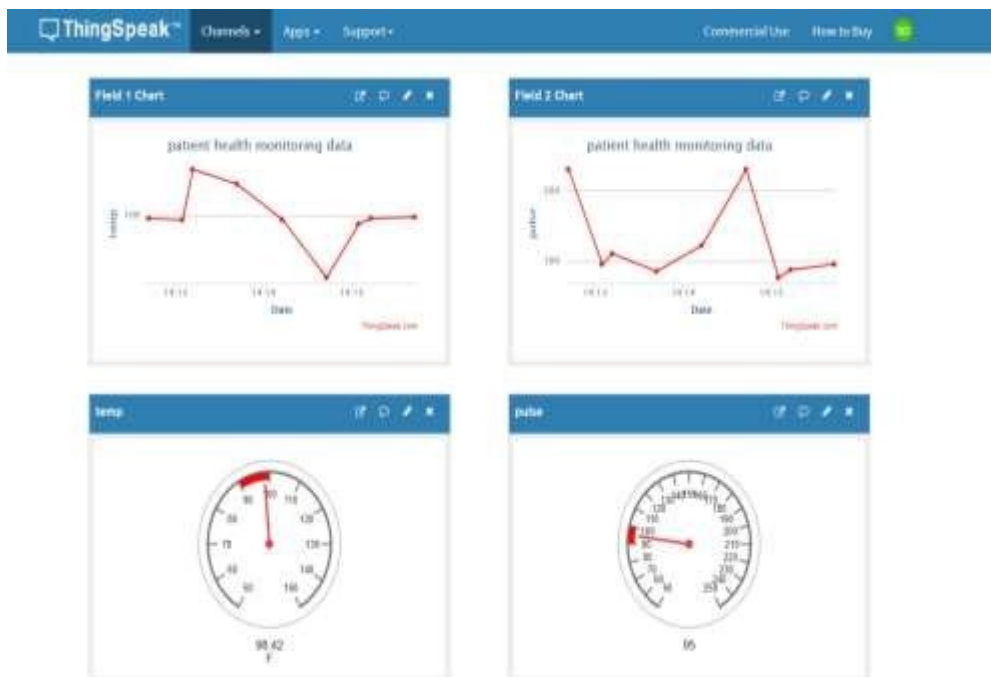
**Figure(b):**Flow of the process.

➤ **Arduino and hardware connections:**



**Figure(c)**

**IV. RESULTS AND DISCUSSION**



**Figure(d):**Output visualized in ThingSpeak



<https://zenodo.org/records/14630799>

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