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# Intelligent Wireless Emergency Alert System for Patient Health Monitoring

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**ABSTRACT:** Health monitoring through body sensors is a critical and vital technology in health care domain that fall in to the class of delay sensitive wireless sensor networks. The monitoring system plays a significant role in diagnosing various symptoms of the patients in a non-invasive manner. Our project is a working model which measures the parameters like body temperature, heart beat rate and oxygen level in the blood. An Arduino board is used to analyze the data from these sensors and can be transmitted to an IoT platform “Thing Speak” and this data can be saved. By doing this one can analyze the one’s health condition without physical presence. Also all the process parameters within an interval selectable by the user are recorded online. Our project can be improvised , by incorporating blood pressure monitoring system, dental sensors and annunciation system, thereby making it useful in hospitals as a very efficient and dedicated patient care system.

**KEYWORDS:** health monitoring system, Arduino, IoT, Diagnosing.

## I. INTRODUCTION

Since the emerge of the wireless technology , it has been growing rapidly in recent years for the need of upholding various sectors. In these recent years IoT have grabbed the more importance in various field. Medical domain is one of recent trend to provide better healthcare. So, having a smart system observed that consumes power, cost and increase efficiency. Here, we are proposing a system which continuously monitor the health condition of the patient by measuring different parameters like temperature, heart rate and oxygen level in the blood. By observing these values we can decide the health condition of the patient. This contribution towards the society will be very worthy and essential. Because people can detect the abnormal practice of the body be forgetting into any serious disease at home itself. According to the survey conducted in 2019-20 , our country has just one doctor for every 1456 people. Statistics reveal that every minute a human is his/her life across the globe. More close in our country, everyday many lives are affected by heart attacks and more importantly because the patients did not get timely and proper help.

## II. RELATED WORK

In order to design this health monitoring system, we require several components to gather the information of the patient and to transfer the data to the thing Speak cloud using an wi-fi module which is ESP8266. Generally we see various instruments or devices to measure the health parameters like temperature, heart rate and blood pressure alone. By using this proposed health monitoring system one can check different parameters at their home itself. And many rural areas are having lack of medical equipment and doctors to check their health condition before being attacked by the disease. So this system mainly useful in rural areas and in hospitals. Here, all sensors are connected to the arduino board using bread board. Finally, the health condition will be monitored regularly.

## III. PROPOSED ALGORITHM

### A. Design Considerations:

- Arduino Uno with analog pins, digital pins and reset pin
- Temperature Sensor-LM35
- Pulse Sensor
- Pulse Oximeter-MAX30100
- Wi-Fi Module-ESP8266

B. Description of the Proposed Algorithm:

To design and develop a reliable, energy efficient patient monitoring system, that is able to send parameters of patient in real time. It enables the doctors to monitor patient’s health parameters (temperature, heartbeat, position) in real time. Here the parameters of patient are measured continuously (temperature, heartbeat) and wirelessly transmitted using WIFI Module. This project provides a solution for enhancing the reliability and flexibility by improving the performance and power management of the patient monitoring system. Continuous monitoring of health parameters of the patient is being achieved by wireless transmission of sensors output through WIFI module. Different sensors are connected to the patient’s body at appropriate positions to collect real time data about his health. Accordingly, the information about the patient is updated in the database on doctors PC.

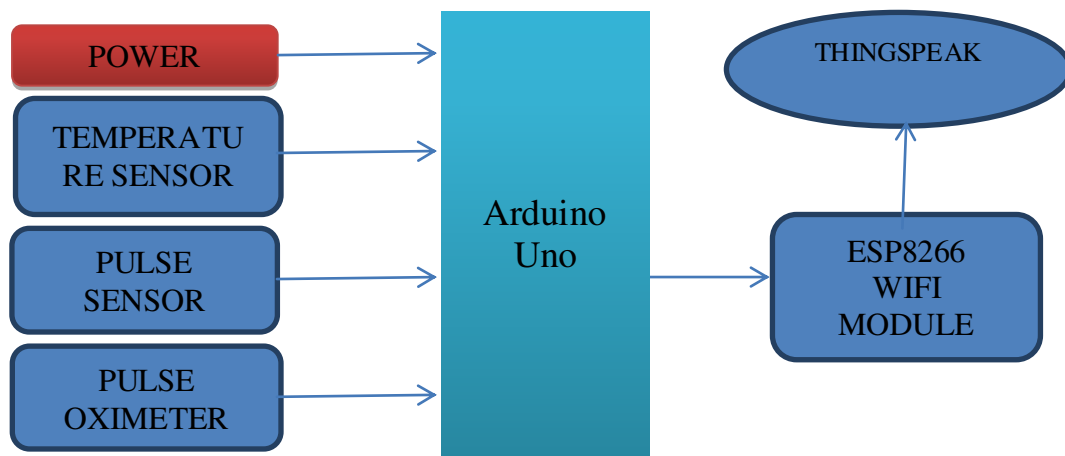
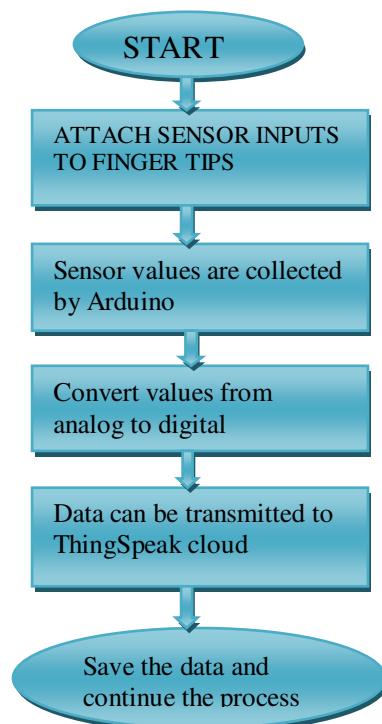


Figure.1. Block Diagram

C. Working of the Proposed System :

The below flowchart explains how our proposed system is working and how the health parameters are collected by the arduino.



#### IV. PSEUDO CODE

- Step-1** : All these sensors are connected to the human body.
- Step-2**: The sensors measures the corresponding values.
- Step-3** : The parameters values are collected by the arduino.
- Step-4** : Arduino converts analog data into the digital data.
- Step-5**: The digital output can be seen in the serial monitor.
- Step-6**: The data can be transferred to the thingspeak cloud.
- Step-7**: The analog data can be viewed at thingspeak.
- Step-8**: The process continues to take the parameters values.

#### V. SIMULATION RESULTS

It is mandatory to check the BPM, Temperature, Oxygen values. Because any abnormality in the patients health condition might cause fatal harm to the person. The following result fig 5.4 shows BPM graph that varies time to time even when BPM are increased or decreased. Heart rate range should be in between 60-200 bpm, and it is different based on patient condition.



Figure.2. Pulse rate monitorGraph



Figure.3. Temperature Graph

The result of fig.3. shows the temperature graph. The temperature should be in the range 70-110 F.

The result of fig.4 is the serial monitor output of the sensors. We can see the output of the sensors in the serial monitor.

```

-----|
*** Heart-Beat Happened *** BPM: 142
Spo2 level:98
Temperature:81.22
AT+CIPSTART=4,"TCP","184.106.153.149",80
AT+CIPSEND=4,67
GET /update?api_key=JAX3JQ62TMGRJ0PE&field1=81.22&field2=118.00

-----|
*** Heart-Beat Happened *** BPM: 233
Spo2 level:98
Temperature:91.77
AT+CIPSTART=4,"TCP","184.106.153.149",80
AT+CIPSEND=4,67
GET /update?api_key=JAX3JQ62TMGRJ0PE&field1=91.77&field2=236.00

-----|
*** Heart-Beat Happened *** BPM: 184
Spo2 level:98
Temperature:84.73
AT+CIPSTART=4,"TCP","184.106.153.149",80
AT+CIPSEND=4,67
GET /update?api_key=JAX3JQ62TMGRJ0PE&field1=84.73&field2=237.00

-----|
*** Heart-Beat Happened *** BPM: 223
Spo2 level:98
Temperature:80.34
AT+CIPSTART=4,"TCP","184.106.153.149",80
AT+CIPSEND=4,67
GET /update?api_key=JAX3JQ62TMGRJ0PE&field1=80.34&field2=222.00

```

Figure. 4. Serial Monitor Output

## VI. CONCLUSION AND FUTURE WORK

This research focused on creating a system that can help people in caring for or create a health monitoring system by using a hardware module that is easily found in the market with a relatively affordable price. This system is made for health management systems using the Arduino Uno microcontroller and sensors as well as using web technologies as the interface is responsive. The Arduino Microcontroller Uno combined with various sensor-related sensors such as pulse sensor, temperature sensor, pulse oximeter and wifi module as well as the supporting tools to create the monitoring system. Thing speak platform in this system serves as a place to store server/web interface, the settings of the supporting tools (heart rate, temperature, oxygen level), and the data obtained by the sensor-sensor after it is processed by a microcontroller. With faster broadband speeds, better analytics, technological improvements and more competitors in space, the future of IoT has a greater opportunity to make a positive impact on the healthcare industry.

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