

# SMART HEALTH MONITORING AND POSITION TRACKING SYSTEM

Sahil Kumar Swain<sup>1</sup>, Dasari Sri Ram<sup>2</sup>, Bomu Harsha Vardhan<sup>3</sup>, Gattam Mahesh<sup>4</sup>

Dr.Shelaj Khera<sup>5</sup>

<sup>1</sup>Student, School of Electronics and Electrical Engineering, Lovely Professional University, Phagwara, India

<sup>5</sup>Professor, School of Electronics and Electrical Engineering, Lovely Professional University, Phagwara, India

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**Abstract** - The world is growing at a great pace and making a lot of technological advancements. The technological advancements cannot stop the dreadfulness on victims but can minimize the effect and reduce its casualties. We can help the victims by helping in tracking their positions and monitoring their health from any location. A major challenge in medical science is to provide appropriate services to patients in a time of emergency. The proposed system tracks the position of the system and monitors health by measuring body temperature and heartbeat. It has been shown in studies that high blood pressure and hypertension affects a lot of people in the world. This system can be an efficient system to monitor because temperature and heartbeat are considered as the major health matrices. The aim of this project is to make a real-time health monitoring system that will monitor the temperature of the person, the heartbeat of the person, and track the location of the person. In case of any emergencies, the system will send a message (SMS) to the person/patient's doctor or caretaker.

components used are Pulse rate sensor, Temperature sensor (LM35), Gps modem, and GSM module. In a pulse rate sensor or heartbeat sensor, an LED light is used and a LED light sensor is used. The sensor measures the intensity/amount of light that reflects. these variations in the light intensity are converted to a heartbeat. A temperature sensor is used which records the temperature and sends it to the Arduino. The GPS and GSM modules used are interfaced with the Arduino. The GPS module helps in finding the exact location (latitude and longitude) of the person. In Arduino, the data i.e. Temperature and heart rate is compared with the optimal values set and then it is sent to the GSM module. The GSM module sends the processed data to the registered sim number via a short message service (SMS). The processed data can be sent to the doctor or the caretaker of the patient or any family members so that the family members will get the location and track them.

**Key Words:** Arduino, Gps, GSM, Heart Rate, Temperature

## Block Diagram

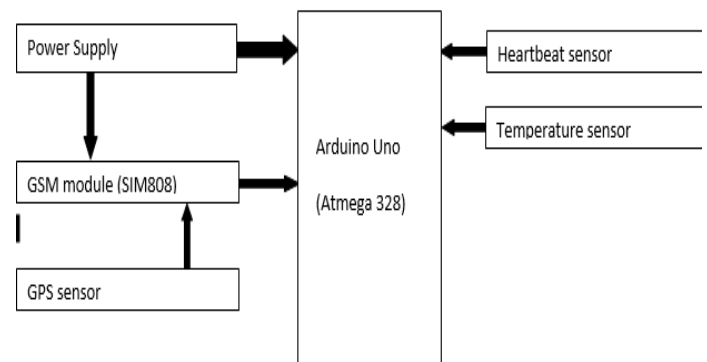
## 1.INTRODUCTION

There has been an increasing demand for the smart city with the advent of globalization. A smart city includes a lot of attributes that manage the cities assets. Among all those attributes smart healthcare is one of the sectors which is highly essential and needs a lot of development.

In his era of advanced technology, people have become lazy. Fat, sugar, obesity, smoking, meats, and lack of eating fruits and vegetables are common in people. Due to all these poor eating habits, blood pressure is common to most people in a common decade. A crucial risk factor for ischemic heart diseases is blood pressure. Besides having medical interventions some smart and innovative solutions should be adopted to diminish its effect.

## 2. PROPOSED WORK

The system uses Arduino Uno as the microcontroller which has atmega328 IC. Besides Arduino UNO, other hardware



### 3. Hardware Requirement



Hardware Component

#### 3.1 ARDUINO

In any system, the main processing unit is the microcontroller and, in this system, the microcontroller is Arduino UNO. It is an open-source microcontroller board supported the ATmega328P microchip. The Arduino board has 14 digital input/output pins and 6 Analog input pins. Out of 14 digital input/output pins 6 pins can be used as PWM output pins. It has a 6 MHz ceramic resonator, USB jack, and power jack. The power can either be given from a laptop via USB or through a power jack. We can code or program our Arduino using Arduino IDE software which uses basic c language.



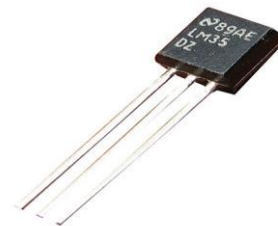
#### 3.2 Heartrate Sensor

Heartbeat sensor work on the principle of Photoplethysmograph. This principle states that a change in the volume of blood in an organ is calculated by the intensity of light passing through the organs. To measure the heart rate number of pulses per minute is counted. From one side of the finger, light is passed and from the other side, the received intensity of light is measured using LDR. There is an

increase in blood cells during the pumping of the heart. The increased blood cells absorb more light due to which the light intensity received on LDR is decreased. Due to the less intensity of light received in LDR the resistance of LDR increases. The signal sent by the LDR is very less which the microcontroller cannot read so a signal conditioning circuit which amplifies the signal. Here an op-amp (IC 741) is used. This output signal of the op-amp can easily be read by the microcontroller inputs. The heartbeats sensor sends the pulse for each pulse by programming the microcontroller in the desired way. The pulse received in a minute gives the heart rate in beats per minute (bpm). The dataset have been included from reference [6].

#### 3.3 Temperature Sensor

A temperature sensor is an electronic device that records the temperature and converts it to electronic data. The temperature sensor used is LM35 which detects the patient's temperature. LM35 gives output in voltage. The output voltage of LM35 is linearly proportional to centigrade temperature.



#### 3.4 GSM SENSOR



GSM stands for Global System for mobile communication. The GSM module uses a sim card of subscribed mobile operator to operate. This operates in the region of the subscribed area. The use of a sim card is to send a short message service (SMS) to the doctor or caretaker. The GSM module can be connected to the computer through USB, serial communication, or Bluetooth. GSM uses AT commands to start its communication. AT stands for Attention. In this

project, we use the GSM module instead of the Bluetooth module or WIFI module (ESP 8266) because the Wi-Fi module and Bluetooth module works in hotspot areas or for nearby devices. It fails to communicate in loop line areas whereas the GSM module can send the message even in loop areas.

### 3.5 GPS SENSOR

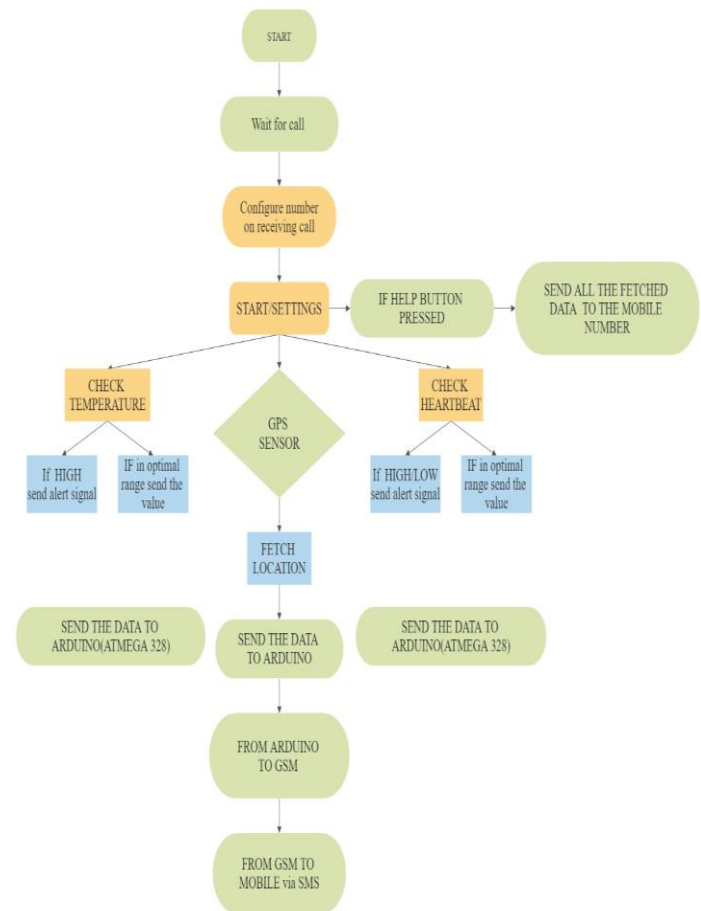
GPS stands for Global positioning system. There is 24 to 30 satellite placed in the orbit by U.S department of Defense. This network of satellites is known as the global navigation satellite system (GNSS). This network of satellites responds to the signals sent by the GPS device which send microwave signals. To receive the signal the GPS receiver requires a clear line of sight from 4 GPS satellites. It gives us the latitude and longitude of the location. The problem with GPS satellite is that it is subjected to poor satellite conditions.

### SIM808

SIM808 module is a Quad-Band GSM/GPRS module combining GPS technology for satellite navigation. The GPRS and GPS integrated in a LLC package will help in saving time and cost of customers. This help customer's/users to develop GPS enabled applications.

### 4. RESULT

First we need to call to the registered number, after calling we will get a message to the dialed number that number is configured. Then we need to press start button on the hardware for the hardware to start its working. After few seconds we will get value of temperature and heartrate as displayed in figure 7. Then the data of figure 7 and figure 9 will be sent to the dialed number with a google map link having the current location of hardware. The message received to the configured number is shown in figure 11.



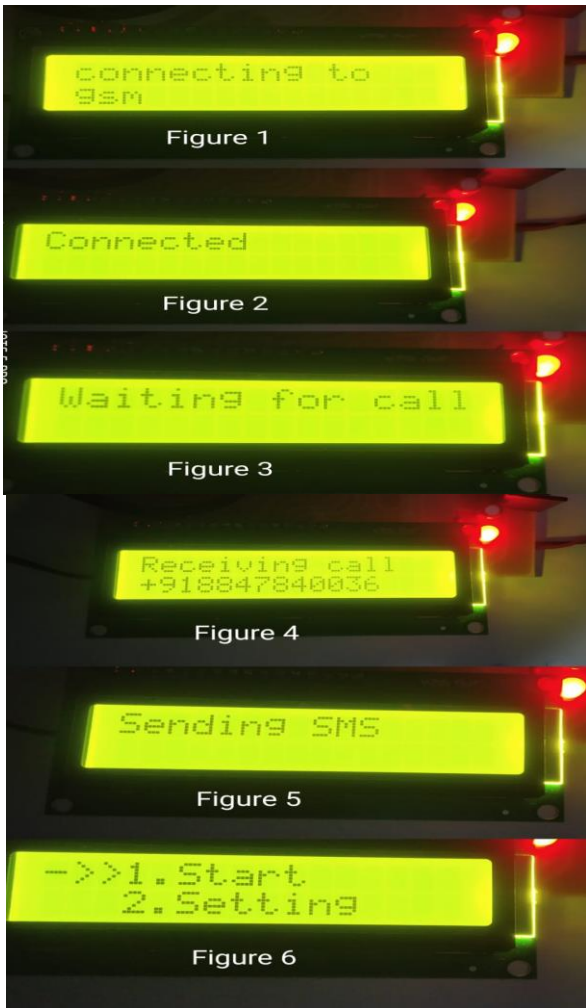


Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6



Figure 7

Figure 8

Figure 9

Figure 10 . FLOW CHART

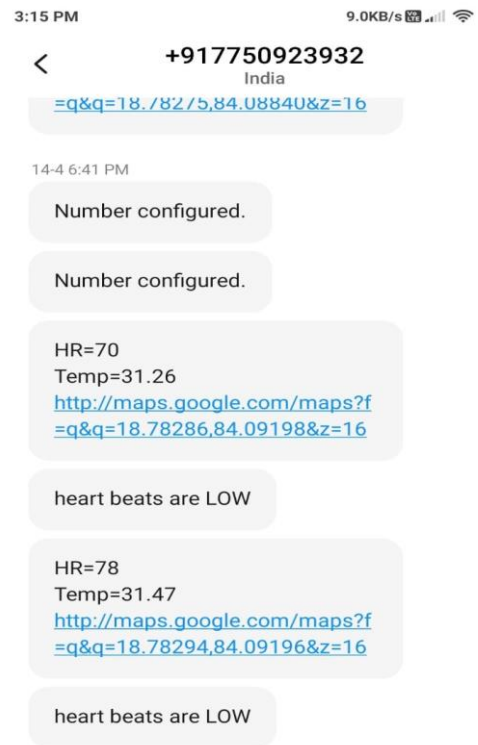


Figure 11

## 5. CONCLUSION

The main aim of this project is to provide a better life to people by smart technique. This project tracks' people's health condition and people's location and heart rate is the main health matrices. This system can be used in various fields such as Soldier health monitoring and position tracking, It can be used for children, for women position tracking system, and health monitoring. Sensors used in this project are lightweight and small in size and will consume less power.

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