GUJARAT TECHNOLOGICAL UNIVERSITY

VISHWAKARMA GOVERNMENT ENGINEERING COLLEGE AHMEDABAD

REPORT

ACCIDENT DETECTION AND RESCUE SYSTEM

Under subject of

Design Engineering – 2A (3150001) B.E. Semester – 5

Electronics & Communication Engineering

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INTRODUCTION

The advancement in the field of automobiles and use of vehicles is highly increasing day by day which leads to over traffic and also cause accidents. People's life is under high risk and danger. This situation prevails, just because the injured person did not get efficient emergency medical treatment on time. In our country, many people lose their life in an accident just because of late or improper communication to medicalteam. We are in the process of solving this issue by proposing an efficient solution and to reduce the loss of lives as much as possible. In our project, our system helps us to detect accidents automatically in significantly minimum time and transfer the fundamental information to the emergency medical team within a few seconds covering the geographical coordinates of accident location, the time and the angle where the vehicle had met with an accident. This alert message is sent to the rescue team (ambulance) and the registered mobile number within short period. This real time application can save many valuable lives. The message consisting of an alert message such as **"ACCIDENT DETECTED"** and coordinates of spot of accident is sent through the GSM module to the registered mobile number and to the rescue team.The basic idea is to locate the vehicle by receiving the real time position of the vehicle through GPS and send the information through GSM module through SMS service.
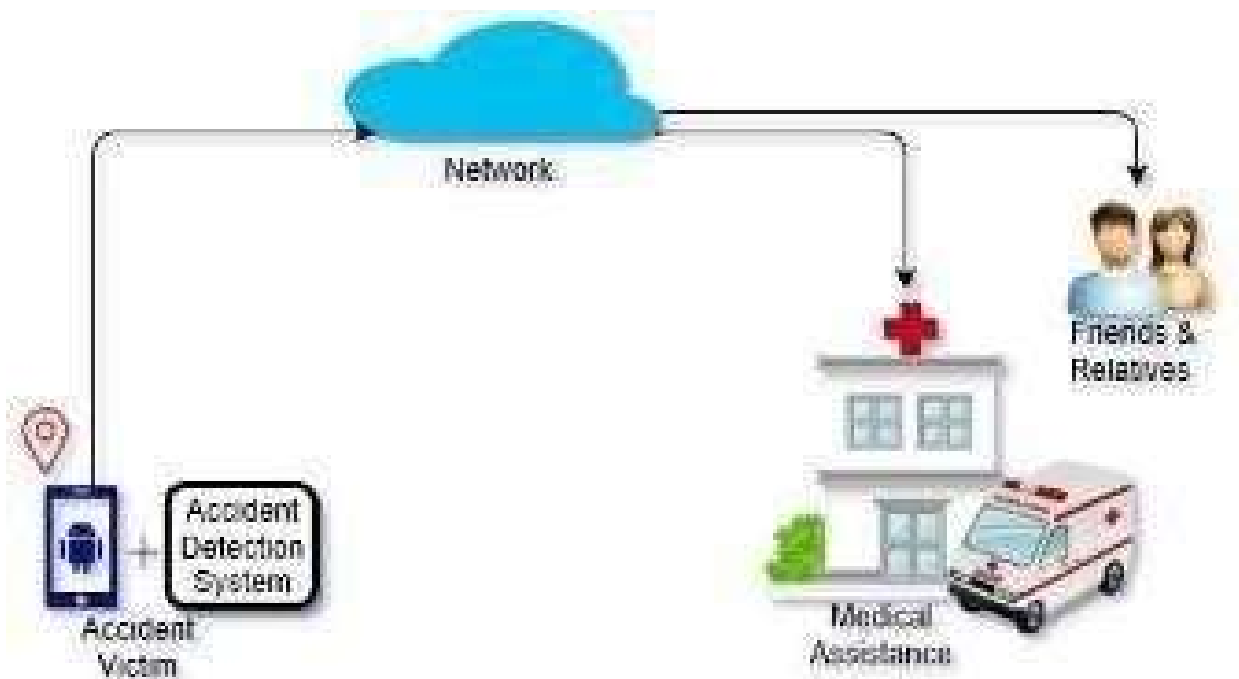
BLOCK DIAGRAM
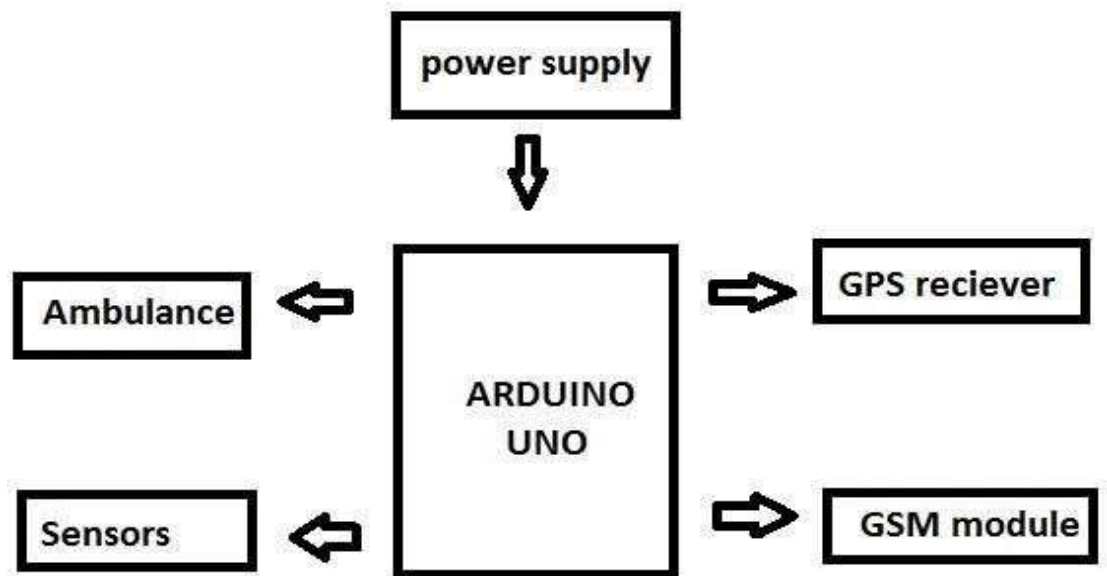
WORKING

To overcome the existing problem, we will implement a new system in which there is automatic detection of the accident. An impact sensor is fitted in every vehicle and when an accident occurs, signals from the impact sensor are sent to the microcontroller. The signal is transferred from microcontroller to the central unit using IoT platform. The GPS module provides the latitude and longitude coordinates of victim vehicle which are sent to the control using IoT platform. The central unit sends the location coordinates to the nearest ambulance and is instructed to pick up the victim. The central unit will be placed in a police station or a hospital that receives the signals from vehicle unit. It sends an alert message to the ambulance that is nearer to the location of the accident. The ambulance is also equipped with a GPS receiver for tracking of the accident location. This helps ambulance to reach the location in time and save the victim

COMPONENTS

(1) ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller. Simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.


(2) GSM MODULE

Here a GSM mobile hand set is used. GSM networks are originally from the most popular standard for mobile phones in the world, GSM differs from its predecessors in that both signaling and speech channels are digital, and thus is considered a second generation (2G) mobile phone system. GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity.

(3) GPS MODULE

The Global Positioning System (GPS) is a U.S. space-based global navigation satellite system. It provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth. GPS is made up of three parts: between 24 and 32 satellites orbiting the Earth, four control and monitoring stations on earth, and the GPS receivers owned by users. GPS satellites broadcast signals from space that are used by GPS receivers to provide three dimensional location (latitude, longitude, and altitude) plus the time.
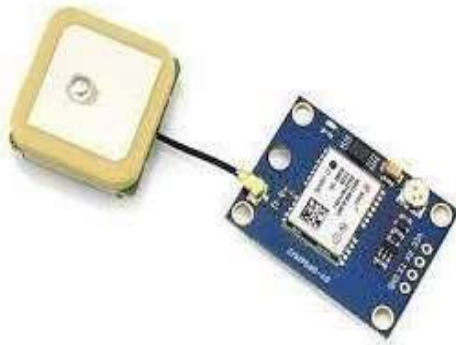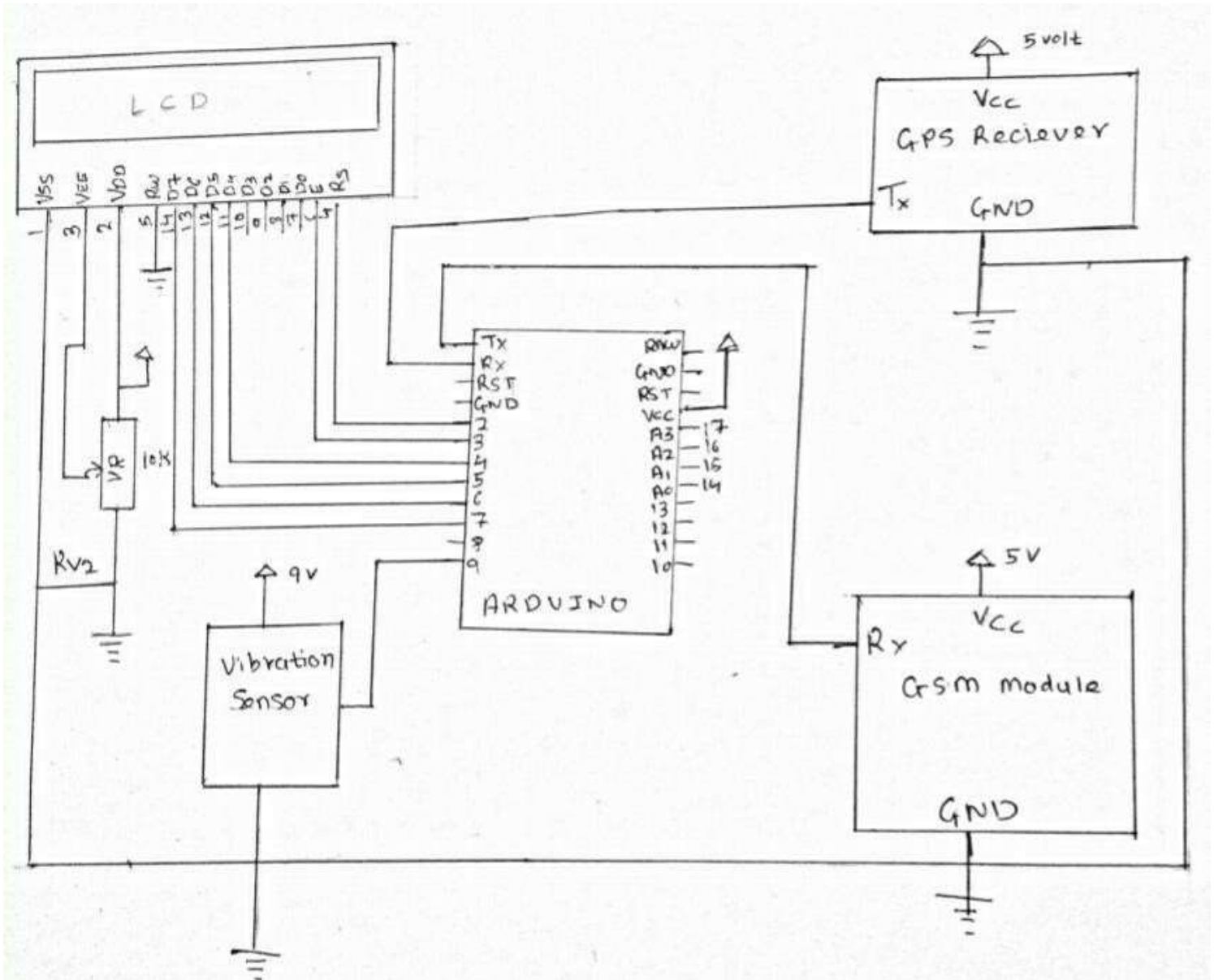

(4) VIBRATION SENSOR

Vibration sensor is also called piezoelectric sensor. This sensor uses piezoelectric effects while measuring changes within acceleration, pressure, temperature, force and strain by changing in an electric charge.
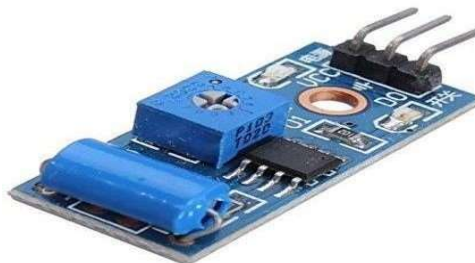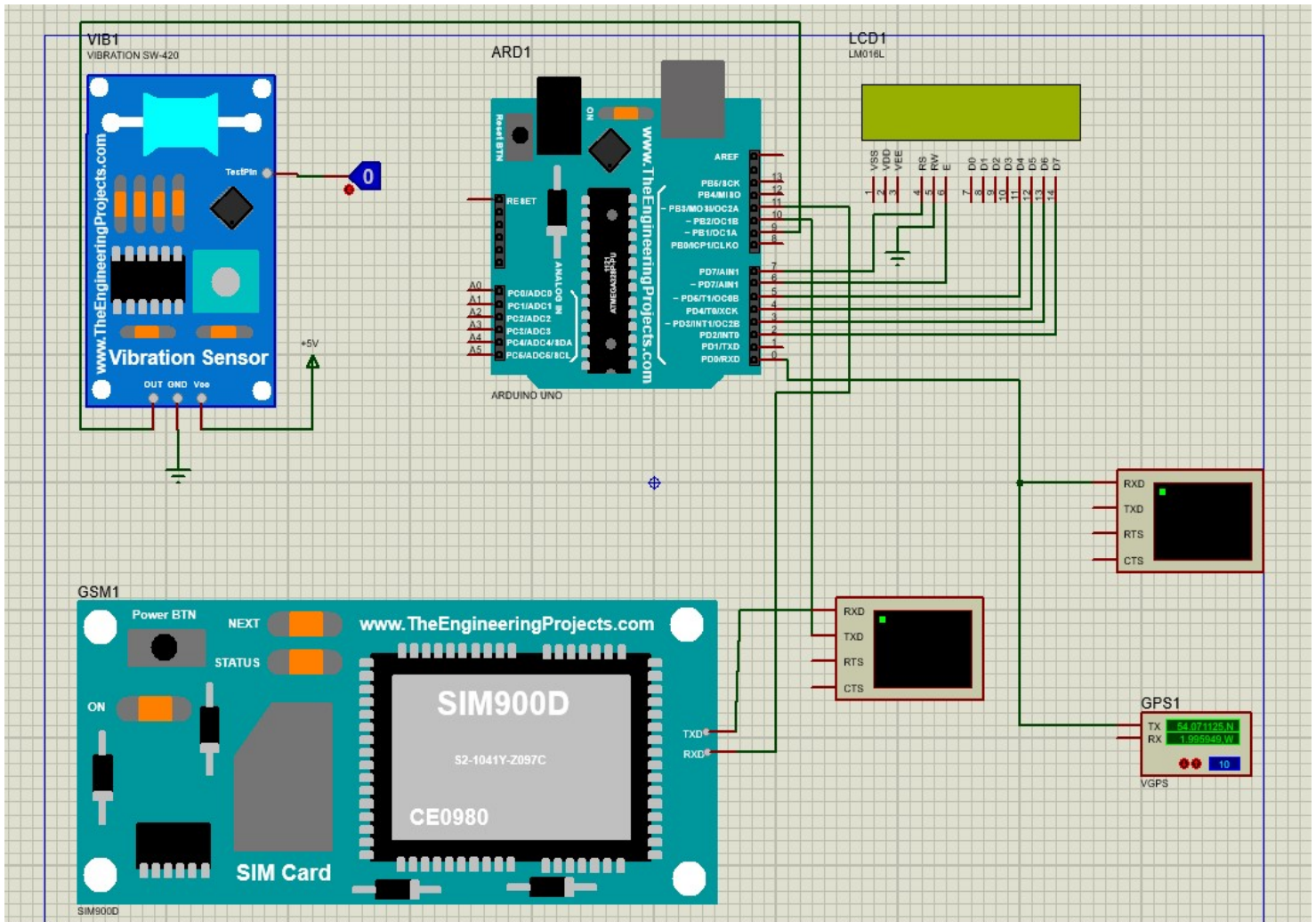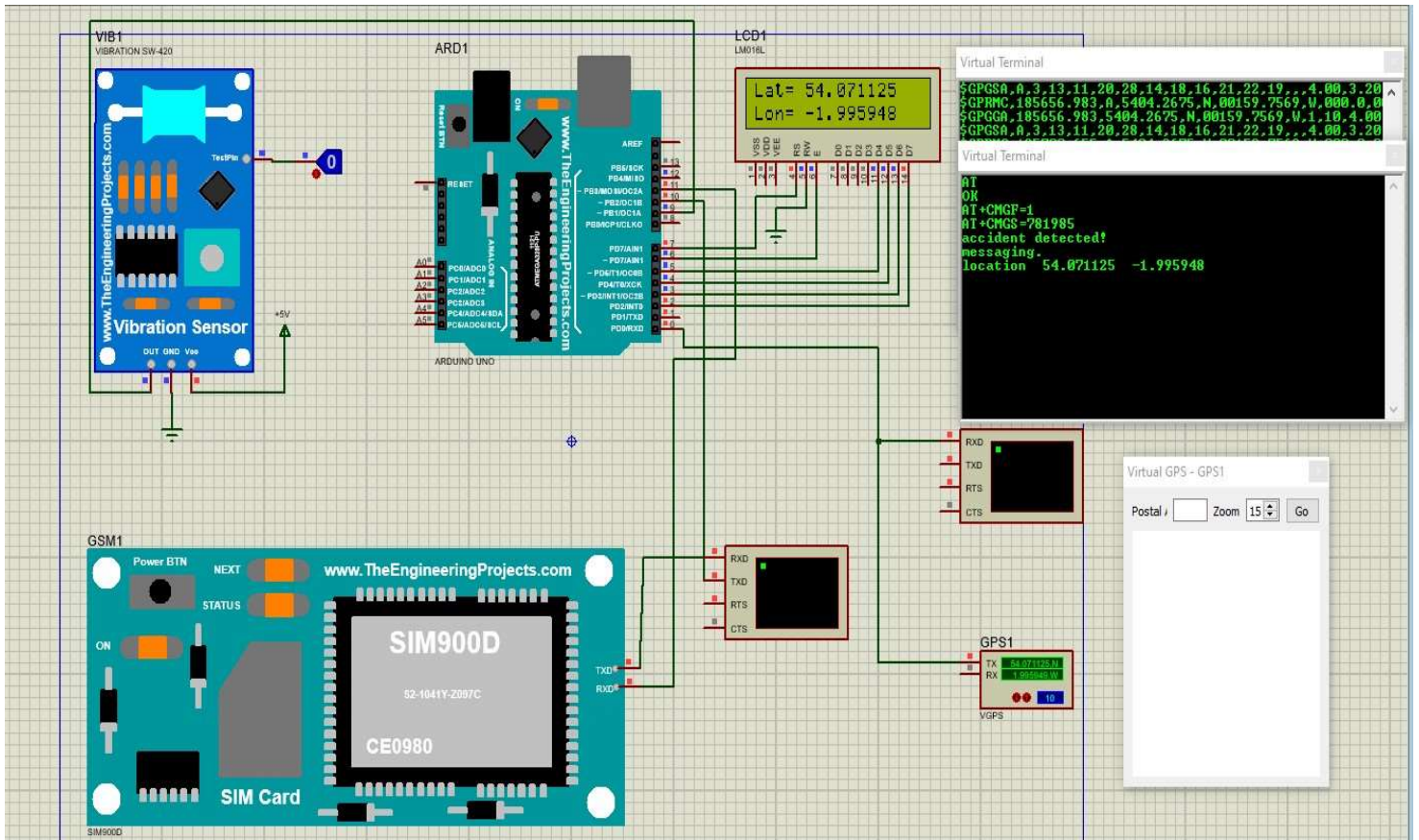
CIRCUIT DIAGRAM

PROTOTYPE

(Created in Proteus)

SIMULATION

CODE

```
#include <TinyGPS.h> #include <LiquidCrystal.h> #include <SoftwareSerial.h>


SoftwareSerial mySerial(10, 11); //SIM800L Tx & Rx is connected to Arduino #10 & #11 const String
PHONE = "781985";
int vs = 9;
LiquidCrystal lcd(7, 6, 5, 4, 3, 2);
TinyGPS gps; //Creates a new instance of the TinyGPS object

void setup()
{

//Begin serial communication with Arduino and Arduino IDE (Serial Monitor) pinMode(vs, INPUT);

//Begin serial communication with Arduino and SIM800L Serial.begin(9600);
mySerial.begin(9600); lcd.begin(16, 2); lcd.setCursor(3,0); lcd.print("Project by");
lcd.setCursor(2,1); lcd.print("Navanshu"); delay(1000); lcd.clear();
}
void loop()
{
bool newData = false; unsigned long chars;
unsigned short sentences, failed; int vibration = digitalRead(vs);

// For one second we parse GPS data and report some key values for (unsigned long start = millis();
millis() - start < 1000;)
{
while (Serial.available())
{
char c = Serial.read();
//Serial.print(c);


if (gps.encode(c)) newData = true;
}
}

if(vibration == HIGH) {
if (newData)      //If newData is true
{
float flat, flon; unsigned long age;
```

```
gps.f_get_position(&flat, &flon, &age);

int lat=(flat == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flat, 6); int lon=(flon ==
TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flon, 6); lcd.clear();

lcd.setCursor(0,0); lcd.print("Accident ");

lcd.setCursor(0,1); lcd.print("Detected ");

delay(1000); lcd.clear();

lcd.setCursor(0,0); lcd.print("Getting ");

lcd.setCursor(0,1); lcd.print("Location ");

delay(1000); lcd.clear();

delay(1000);
mySerial.println("AT"); //Once the handshake test is successful, it will back to OK updateSerial();
mySerial.println("AT+CMGF=1"); // Configuring TEXT mode updateSerial();
mySerial.println("AT+CMGS="+PHONE);//change ZZ with country code and xxxxxxxxxxx with phone number
to sms updateSerial();
mySerial.println("accident detected!"); mySerial.println("messaging."); mySerial.print("location"
);//text content


mySerial.print(" " );
mySerial.print( flat == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flat, 6); mySerial.print(" " );
mySerial.print( flon == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flon, 6); updateSerial();
mySerial.write(26); lcd.setCursor(0,0); lcd.print("Lat= ");
lcd.print(flat == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flat, 6); lcd.setCursor(0,1);
lcd.print("Lon= ");
lcd.print(flon == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flon, 6);

}
}

Serial.println(failed); if (chars == 0)
Serial.println("** No characters received from GPS: check wiring **");
}

void updateSerial()
{
delay(500);
while (mySerial.available())
{
```

```
mySerial.write(mySerial.read());//Forward what Serial received to Software Serial Port
}
delay(500); while(mySerial.available())
{
mySerial.write(mySerial.read());//Forward what Software Serial received to Serial Port
}
}
```

<u>CONCLUSION</u>

The proposed system deals with the accident alerting and detection. Arduino is the heart of the system which helps in transferring the message to different devices in the system. Vibration sensor will be activated when the accident occurs and the information is transferred to the registered number through GSM module. Using GPS the location can be sent through tracking system to cover the geographical coordinates over the area. The accident can be detected by a vibration sensor which is used as major module in the system.