NEW HORIZON COLLEGE OF ENGINEERING
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NBA and NAAC with Grade "A"
New Horizon Knowledge Park, Ring Road, Bellandur Post, Bengaluru 560 103

Department of Electrical and Electronics Engineering

19EEL49 Mini Project -II

Report on

ACCIDENT DETECTION AND REPORTING SYSTEM

Submitted by

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Under the Guidance of
Mr. SUNIL S K
Assistant Professor

Dissertation submitted in partial fulfillment of the requirements
For the award of the degree of

BACHELOR OF ENGINEERING in
ELECTRICAL AND ELECTRONICS ENGINEERING

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
"Jnana Sangama", Belgaum – 590018, Karnataka, India

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BONAFIDE CERTIFICATE

This is to certify that the project report entitled, "**Accident detection and reporting system**" is a bonafide record of work of the following candidates who carried out the Mini Project work under my supervision during 2021-2022:

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of New Horizon College of Engineering, Bengaluru of Visvesvaraya Technological University, Belgaum during the odd semester, academic year 2021-22 .

It is certified that all the corrections / suggestions indicated for Internal Assessment have been incorporated in the report deposited in the department library. The project report has been approved as it satisfies the academic requirements in respect of project phase I work prescribed for said Degree.

Signature of the project Guide	**Signature of the Head of the Department**	**Signature of the Principal**
Mr. Sunil S K	Dr. M. Mahesh	Dr. Manjunatha

Semester End Examination held on _____

…….. (Internal Examiner)

…….. (External Examiner)

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Date: 12.08.2022
Place: Bengaluru

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DECLARATION

We **Kamalesh Badola -1NH20EE048, Kushal Naik K -1NH20EE056, Lava Kumar M N -1NH20EE057, Mohammed Aman -1NH21EE407** students of New Horizon College of Engineering hereby declare that, this project work entitled "" is an original and bonafide work carried out at New Horizon College of Engineering in partial fulfillment of Bachelor of Engineering in Electrical and Electronics Engineering of Visveshvaraya Technological University, Belgaum.

We also declare that, to the best of our knowledge and belief, the work reported here in does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion by any student.

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PLAGARISM REPORT

ABSTRACT

We are designing an accident detection and reporting system.

This circuit's function is to detect the accident and report if the accident is detected or not .

The development of technology has sped up and simplified life. The GSM-based accident prevention system was created to lower accident rates and save lives. Accidents can result from a number of circumstances, including poor road conditions, inclement weather, and reckless driving. The vehicle's performance can be observed in this article for the sake of safety. When the car encounters an abnormal circumstance, the technology in this project has the ability to deliver signals. As a result, when an accident happens, the GSM module in the system sends an alarm message to the registered contact number along with the location. To eliminate worry caused by family members who commute everyday in cars, this device assists in keeping track of them.

CONTENTS

LIST OF FIGURES

AIM

The aim of the project is to design and develop an accident detection and reporting system .

OBJECTIVE

Our system's goal is to automatically identify accidents and notify the closest hospital or emergency services of their precise location. Within a few seconds of an accident, this system sends the medical rescue team the essential information.

CHAPTER 1
INTRODUCTION

Accident rates can rise quickly in the modern world. The use of vehicles like automobiles and motorcycles may grow as a result of employment, and as a result, accidents caused by excessive speed may occur. Due to the lack of advanced procedures and the danger posed by excessive speed, the rate of accidents cannot be reduced. This paper presents an ideal solution to lower the accident rate in the nation.

The automatic warning system for car accidents is launched; its primary goal is to control the accidents by using wireless communication methods to deliver a message to the registered mobile. When an accident happens in a city, the registered cellphone is quickly notified through GSM module.

The brain of the system, Arduino, assists in sending messages to various system components. When an accident happens, the vibration sensor will be engaged, and the GSM module will transmit the information to the registered number. The position of the accident scene can be found with the use of a GPS device. The suggested system uses GSM and GPS modules to determine whether an accident has happened and alerts registered cell phones and the closest medical clinics of the location of the event. It is possible to send the position through a tracking system to cover the local geographic coordinates. A motion sensor, which is a significant part in the system, can detect the accident.

CHAPTER 2
PROBLEM STATEMENT

In an emergency, every single second counts in terms of preserving human life. The percentage of the population using automobiles is rising. Accidents are on the rise as a result of the heavy traffic. This results in a loss of life since the ambulance takes longer to get to the accident scene or from there to the hospital. As soon as possible, the accident sufferer must be sent to the hospital. Every time an accident occurs, the investigating unit must be notified. In order to reduce the amount of time needed for the investigation, it is also advantageous to inform the inquiry department.

CHAPTER 3

3.1 COMPONENTS REQUIRED

- LCD DISPLAY
- ARDUINO UNO R3
- GSM MODULE
- GPS MODULE
- ACCELEROMETER
- BATTERY- 12V
- CONNECTING WIRES

3.2 COMPONENTS DESCRIPTION

1. LCD DISPLAY

Fig no.1.1

A visual data representation called an LCD (Liquid Crystal Display) largely uses liquid crystals to function. LCDs were a tremendous improvement over the technologies they superseded, like light-emitting diode (LED) and gas-plasma displays. Displays made possible by LCD technology are far thinner than those made possible by cathode ray tube (CRT) technology.

A display is made up of millions of pixels. A display's pixel count is frequently used to indicate its quality; a 4K display, for instance, has 3840 x 2160 or 4096 x 2160 pixels. Red, blue, and green subpixels make up each pixel (often referred to as RGB). When the colour combinations of a pixel's subpixels change, a new colour can be produced. When all of the pixels on a display work together, it may produce millions of different colours.

2. GSM MODULE

Fig no.1.2

A device that connects to a network utilizing GSM mobile phone technology is referred to as a GSM modem, sometimes known as a GSM module. GSM modems are used by mobile phones and other devices that connect to mobile phone networks. To connect to the network and identify their device, they require SIM cards.

It was created to specify the protocols for second-generation (2G) digital cellular networks used by mobile phones. With a market share of over 90% and operations in 219 countries and territories, it is now the industry standard for mobile communications.

3. GPS MODULE

Fig no.1.3

GPS receivers are frequently used in cell phones, fleet management programmes, and military applications for tracking or detecting locations. The Global Positioning System (GPS) is a satellite-based system that uses satellites and ground control stations to calculate and estimate its position on Earth. System of Navigation using Time and Ranging (NAVSTAR) Another name for GPS is GPS.

No matter where it is, a GPS receiver determines its precise location by employing a constellation of satellites and ground stations. These GPS satellites use radio frequency to transmit information to the receiver (1.1 to 1.5 GHz). Using the data it receives, a ground station or GPS module may determine its location and time.

4. ARDUINO UNO R3

Fig no.1.4

The Arduino UNO is a microcontroller board that makes use of the ATmega328P microcontroller. There are 14 virtual enter/output pins (six of which may be used as PWM outputs), six analogue inputs, a 16 MHz ceramic resonator, a USB connection, a energy jack, an ICSP header, and a reset button at the board. It comes with the whole thing you'll need to get began with the microcontroller ,certainly plug it into a pc with a USB cable or electricity it with an AC-to-DC adapter or battery. You can test together with your UNO without worry of making a mistake; in the worst-case scenario, you can update the chip for some dollars and start over.

5. BUZZER

Fig no.1.5

Although buzzers and analogous circuits are no longer desirable or necessary due to advances in technology, they can still be useful in some circumstances. Examples of contemporary applications include the following: Novelty applications, judging panels, educational goals, and announcer panels.

6. ACCELEROMETER

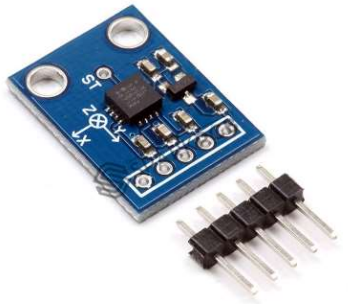

Fig no.1.6

An electromechanical sensor is used by an accelerometer to measure either static or dynamic acceleration. The constant force, such as friction or gravity, operating on a body is known as static acceleration. These factors are largely predictable and uniform. For instance, the gravitational acceleration is relatively constant over the entire world, remaining at 9.8m/s.

The best illustration of dynamic acceleration forces that are non-uniform is vibration or shock. An excellent illustration of dynamic acceleration is an automobile accident. In contrast to its prior state, the acceleration shift in this instance is abrupt. The idea behind accelerometers is that they can measure acceleration by turning it into electrical impulses or other observable characteristics.

7. RECHARGEABLE BATTERY 12V

Fig no.1.7

In contrast to a disposable or primary battery, which is supplied fully charged and is thrown away after use, a rechargeable battery, storage battery, or secondary cell is an electrical battery that can be charged, discharged into a load, and recharged numerous times. One maybe more electrochemical cells make up its structure. Although they initially cost much more disposable batteries, rechargeable batteries offer a far lower total cost of ownership and have less of an impact on the environment because they can be recharged again for less expense.

8. CONNECTING WIRES

Fig no.1.8

Electrical wire is a spine of our general public. There is wire in houses to turn on lights, heat the oven, and even chat on the telephone. Wire is utilized to permit current to move starting with one spot then onto the next. deeply. An electrical separator is a material whose inside electric charges don't stream openly and, in this way, doesn't direct an electric flow. Protection exists since contacting an uncovered wire could permit current to course through an individual's body (terrible) or into another wire unexpectedly.

CHAPTER 4

4.1 CONSTRUCTION

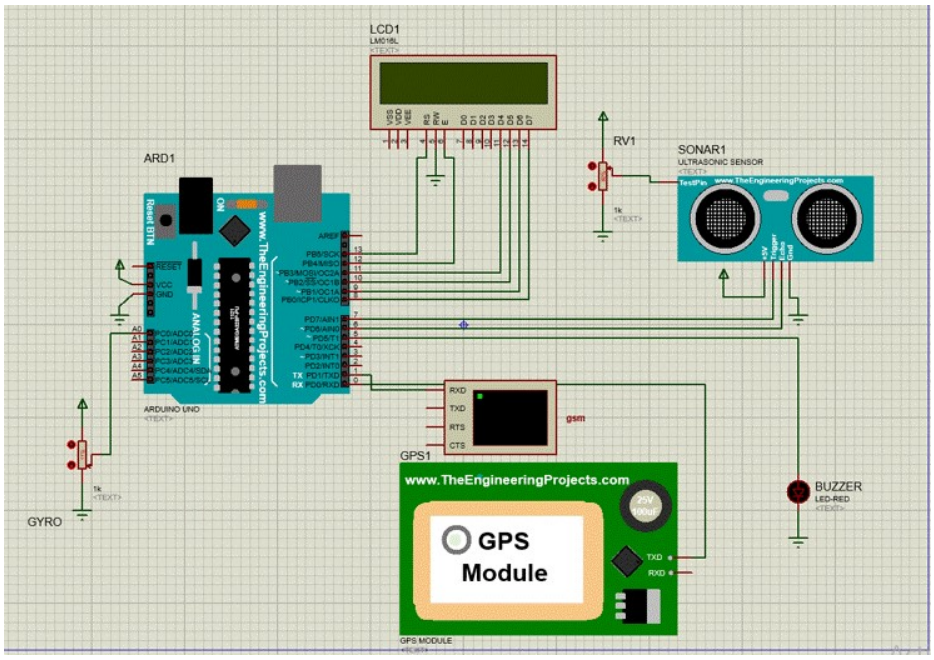

Fig no.1.9

The A0, A1, and A2 pins of the Arduino controller are connected to the three pins on the accelerometer metre sensor, x, y, and z. The GND of the ultrasonic sensor is wired to the power supply board's zero-voltage pin. The 7th and 6th positions are used to link the trigger and echo pins.

The ultrasonic sensor has VCC, GND, trigger, echo, and we also have ADX, which has VCC, GND, and three inputs (X, Y, Z). Both of these devices operate on a 5V DC supply. Digital ports (0–13), Analog ports (A–A5), and Power ports are the three main ports on the Arduino Uno. We can supply power to the Arduino controller as well as remove power using power ports.

GSM operates on a 12V supply that is connected to a sim card for message transmission, and LCD also operates on a 5V DC supply with VCC, GND, and Data pins (D0-D7).

4.2 WORKING

A 12V transformer receives a 230V power source, which is then converted into 12V-1 Amps. The power supply board converts the 12V-1 Amps into three different DC voltages, 12V, 5V, and 0V. because various voltage values are required for each component.

In the project, a buzzer is utilized to signal when an accident has happened. The accelerometer sensor, which operates in real-time, serves as the circuitry's input. Depending on the position, the accelerometer sensor is utilized to identify accidents. When it notices an accident or change in position, it sends this information to the Arduino controller, which interprets it and displays the results on the LCD screen.

The distance of the obstacles is determined by the ultrasonic sensor, and it is set at D=10. The GPS tracker device also operates in real-time, so as soon as the accelerometer picks up any movement or mishap, the GPS begins recording the location of the specific spot (i.e., latitude and longitude). Now, the GPS tracker transmits data to the Arduino controller's reception pin through the transmitter pin.

The data is immediately transferred to the GSM module after being received by the Arduino controller. Once the GSM module has received the data or information, the data is then communicated through a wireless data link to other devices in the network. The GSM module has a sim card attached so it can connect to the network and deliver messages.

Until the owner receives the notice, this automatic cycle continues.

4.3 PROGRAM CODE

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

SoftwareSerial gpsSerial(2,3);

LiquidCrystal lcd(4, 5, 6, 7, 8,9);
const int relay_Pin = A2;
const int buzzer_Pin = A3;
const int ir_Sensor = 10;
const int alcohol_Sensor = 11;
const int vibration_Sensor = 12;
const int red_led = A0;
const int green_led = A1;
const int switch_pin = 13;

TinyGPS gps;
long lat,lon;
bool ir_status = LOW;
bool alcohol_Status = LOW;
bool vibration_Status = LOW;
bool switch_status = LOW;
bool vibration_status = LOW;
void setup() {
  Serial.begin(9600);
  pinMode(relay_Pin, OUTPUT);
  pinMode(buzzer_Pin, OUTPUT);
  pinMode(ir_Sensor, INPUT);
  pinMode(alcohol_Sensor, INPUT);
```

```
  pinMode(vibration_Sensor, INPUT);
  pinMode(red_led, OUTPUT);
  pinMode(green_led, OUTPUT);
  gpsSerial.begin(9600);
  lcd.begin(16, 2);
  lcd.print("ACCIDENT ");
  lcd.setCursor(0,2);
  lcd.print("DETECTION SYSTEM");
  delay(2000);
  digitalWrite(relay_Pin, LOW);
  digitalWrite(red_led, LOW);
  digitalWrite(green_led, LOW);
  digitalWrite(buzzer_Pin, LOW);
}
void loop() {
  char car_start = LOW;
  ir_status = digitalRead(ir_Sensor);
  delay(100);
  if(ir_status == LOW)
  {
    digitalWrite(buzzer_Pin, LOW);
    delay(200);
    lcd.clear();
    lcd.print("Seat Belt");
    lcd.setCursor(3,2);
    lcd.print("Detected");
    delay(1000);
    alcohol_Status = digitalRead(alcohol_Sensor);
    delay(100);
    if(alcohol_Status == HIGH)
    {
      digitalWrite(buzzer_Pin, LOW);
```

```
delay(200);
lcd.clear();
lcd.print("Alcohol not");
lcd.setCursor(3,2);
lcd.print("Detected");
delay(500);
digitalWrite(buzzer_Pin, LOW);
digitalWrite(red_led, LOW);
digitalWrite(green_led, HIGH);
delay(200);
while(1)
{
 vibration_status = digitalRead(vibration_Sensor);
 delay(100);
 if(vibration_status == HIGH)
 {
      digitalWrite(relay_Pin, LOW);
      delay(100);
      while(1)
      {
       locationfind();
      }

 }
  if(car_start == LOW)
  {
    lcd.clear();
    lcd.print("Press the switch");
    delay(100);

  }
  switch_status = digitalRead(switch_pin);
```

```
        delay(100);
       if(switch_status ==  HIGH)
       {
          digitalWrite(relay_Pin, HIGH);
          delay(100);
          lcd.clear();
          lcd.print("Vehicle start");
          delay(500);
          car_start = HIGH;
       }
     }

  }
  else
  {
     digitalWrite(buzzer_Pin, HIGH);
     delay(200);
     lcd.clear();
     lcd.print("Alcohol");
     lcd.setCursor(3,2);
     lcd.print("Detected");
     digitalWrite(buzzer_Pin, HIGH);
     digitalWrite(red_led, HIGH);
     digitalWrite(green_led, LOW);
     delay(500);
  }
}
else
{

      lcd.clear();
  lcd.print("Seat Belt");
```

```
    lcd.setCursor(3,2);
    lcd.print("not Detected");
    digitalWrite(buzzer_Pin, HIGH);
    digitalWrite(red_led, HIGH);
    digitalWrite(green_led, LOW);
    delay(1000);
  }
}



void locationfind()
{
   while(gpsSerial.available())
   { // check for gps data
  if(gps.encode(gpsSerial.read())){ // encode gps data
    gps.get_position(&lat,&lon); // get latitude and longitud  gps.get_position(&lat,
&lon); // get latitude and longitude
      //Serial.print("Position: ");
      //Serial.print((lat * 0.000001), 6);
      //Serial.print(",");
      //Serial.println((lon * 0.000001), 6);
      SendMessage();
  }
 }
}


void SendMessage()
{
  gpsSerial.println("AT+CMGF=1");    //Sets the GSM Module in Text Mode
  delay(1000);  // Delay of 1000 milli seconds or 1 second
  gpsSerial.println("AT+CMGS=\"+91*****\"\r"); // Replace x with mobile number
  delay(1000);
```

```
  gpsSerial.println("Accident Detected please find location below");// The SMS text you
want to send
  gpsSerial.println("lattitude:");// The SMS text you want to send
  gpsSerial.println((lat * 0.000001), 6);// The SMS text you want to send
  gpsSerial.println("longitude:");// The SMS text you want to send
  gpsSerial.println((lon * 0.000001), 6);
  delay(100);
  gpsSerial.println((char)26);// ASCII code of CTRL+Z
  delay(1000);
}
```

4.4 BLOCK DIAGRAM

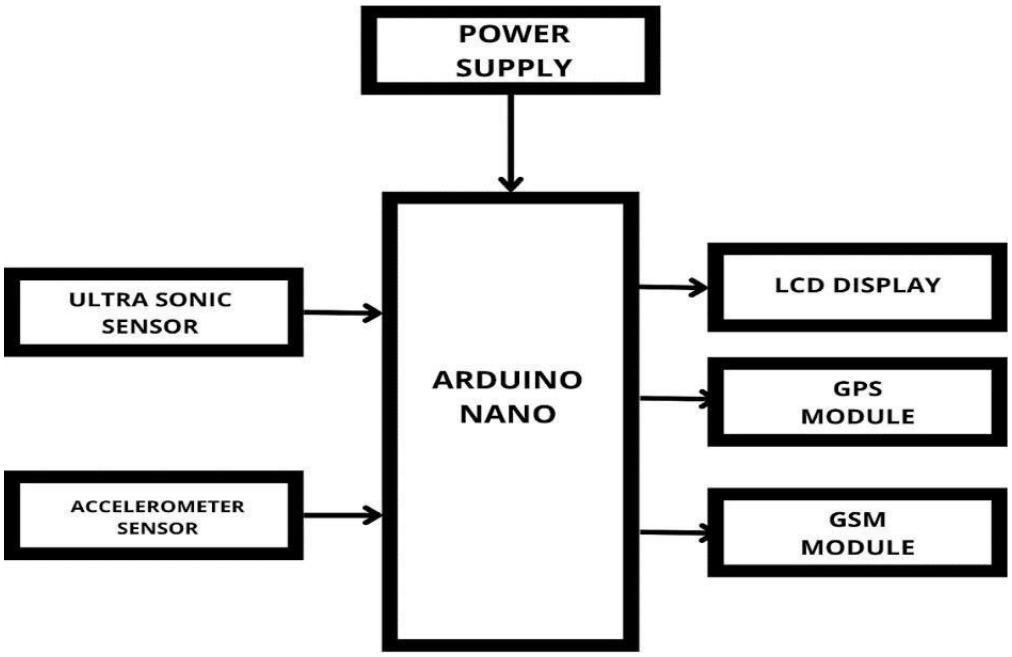

Fig no.1.10

4.5 HARDWARE PICTURE

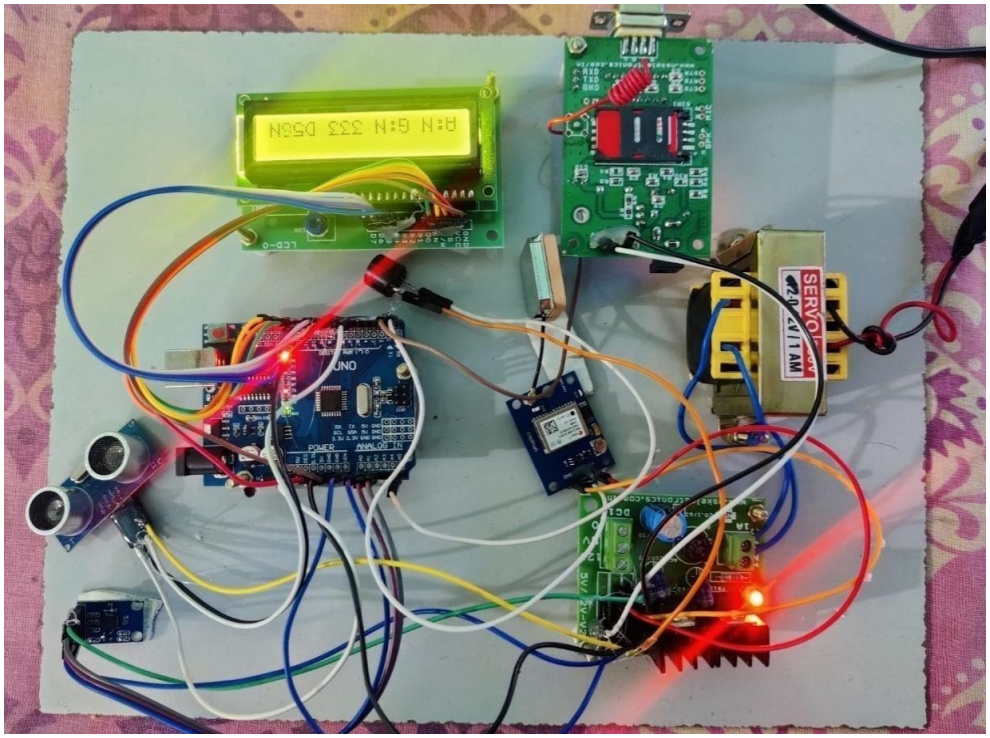

Fig no.1.11

CHAPTER 5
RESULT

This mechanism ensures that the accident victim will receive prompt aid. The outcomes provide the precise locations of the incident. illustrates how the alert message is shown. The message includes whether the accident is detected or not and sends the exact location in the form of latitude and longitude where the accident is happened to the emergency contact given.

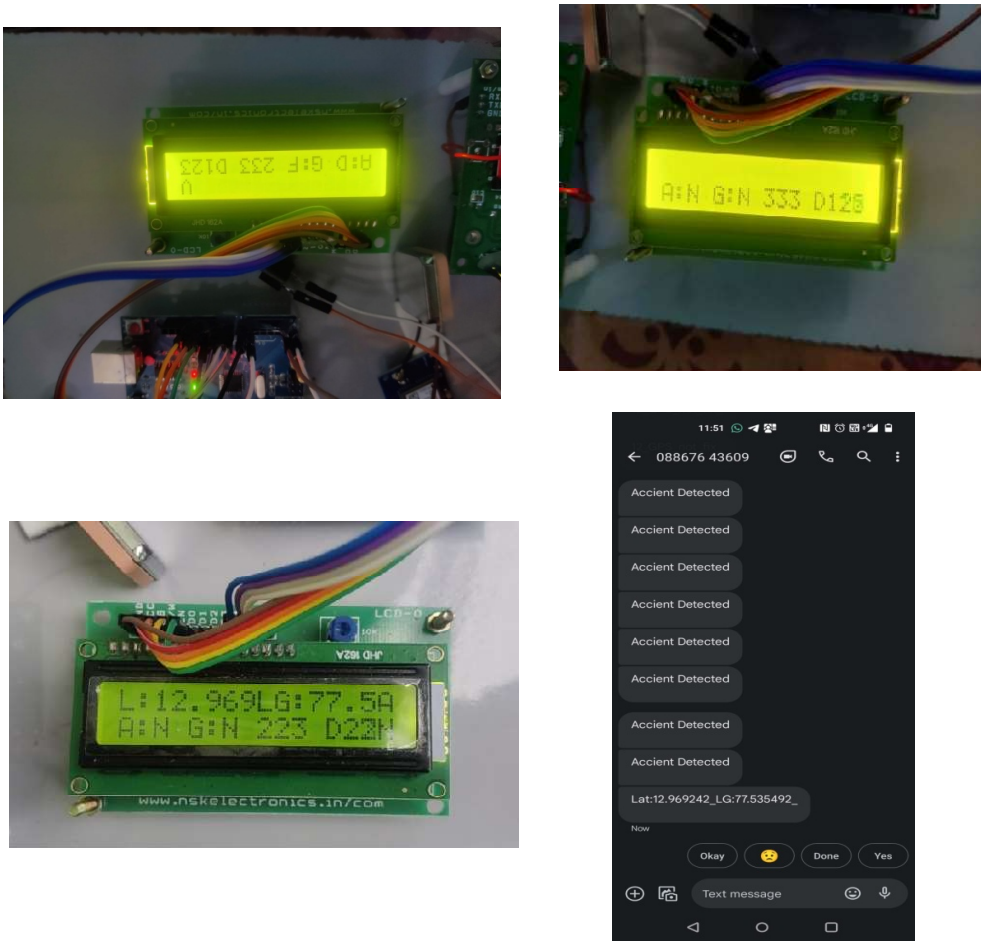

Fig 1.12

CHAPTER 6
ADVANTAGES

- It is an emergency assistance system.
- It keeps an eye on all dangers and threats.
- The local police stations and hospitals receive alert messages.
- The system is reasonably priced.
- This system is adaptable to all types of vehicles.
- This technology can be used for a social cause because the alarm message about the accident is automatically issued.
- There is no manual work required.

CHAPTER 7
DISADVANTAGES / LIMITATIONS

- They are pricey.
- The location cannot be reached on a broken phone.
- In the event of a serious injury, the victim must confirm the aid required, which is impractical.
- When the crash happens, there is no GPS signal.
- Cell phone signal too weak to transfer accident information.
- Only close family members and the vehicle's owner are notified as part of the current alert system projects; emergency stations are left out.

CHAPTER 8
APPLICATIONS

- The system's primary objective is to notify the local emergency services about the event in order to deliver rapid medical care.
- The application can measure the tilt of the car using an accelerometer, a sensor found in mobile devices.
- As a result, the system will decide whether to notify the admin (the car's owner or family members), and it will do so using a mobile app.
- Emergency medical services will be informed in exact detail of the accident's location by the system.

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