

NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL



PROJECT TITLE: CAR ACCIDENT DETECTOR AND INFORMER

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ACKNOWLEDGEMENT

First of all, I would like to thank my parents for being with me and providing me with all the resources I required for building up this project. I express my special thanks to my professor Mrs V Rama, who always gave me guidance and helped me to know about the subject. It was her vision and motivation that led me to do this project. I had made this project from my heart and shown utmost sincerity to complete it while gaining knowledge about numerous new things that I don't think would be possible in this online semester. This project is not just limited to marks for me, it's my hard work and sheer interest in understanding new and possible technologies. I am very thankful to all those people who helped and guided me to make such a project.

Thank You
Siddharth Katiyar

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CAR ACCIDENT DETECTOR AND INFORMER

Changes call for innovation,
and
Innovation leads to progress.

Siddharth Deep Katiyar
192275

Abstract


A mechanism for the automation of accident detection and notifying the hospitals, police stations and relatives about the accident data.

The proposed device is for an accident notification system (A.N.S). This product could be used in vehicles to get the data of accident and further notifying police station and hospitals.

Goal

 Reduce the no. of deaths in accident cases by informing hospitals at the earliest.

 Track data of the car.

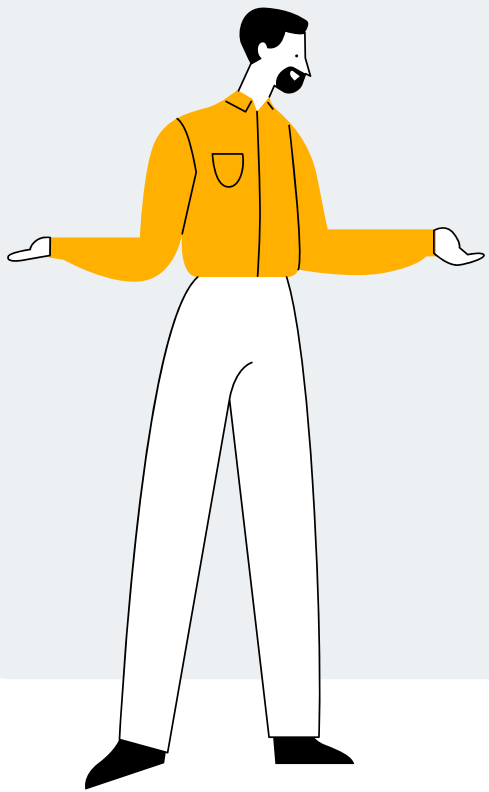
 Solve various road accident cases and find the culprit by providing details of car location to the police station.

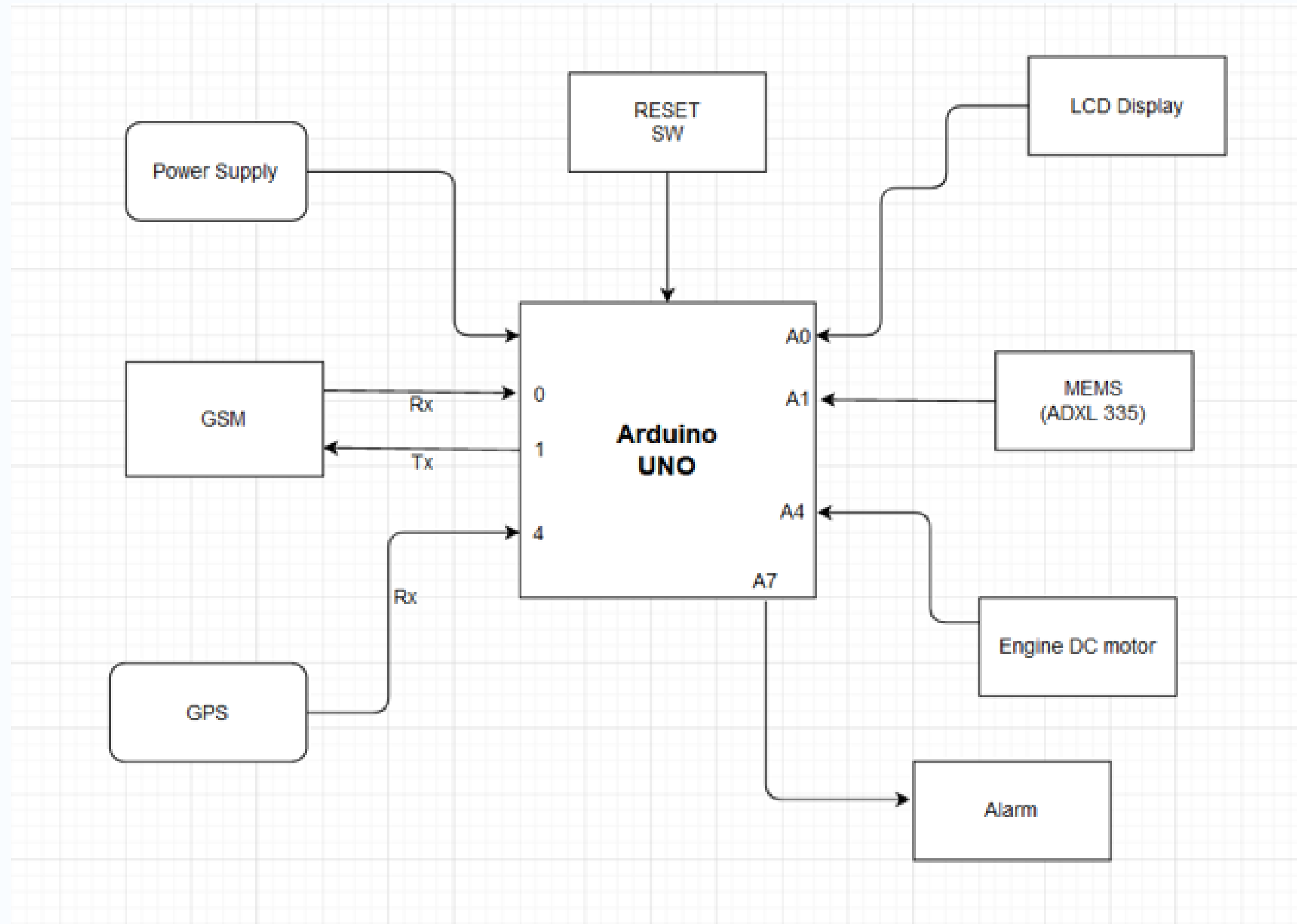
Problem Statements

- 1 No notification system in the car to notify about the accident.
- 2 Car tracking not available.
- 3 No Emergency system to notify about injured.
- 4 No system to notify damage percentage of the car.
- 5 No system to find lost and stolen cars.

SOLUTION

- 1 Instant Notification to Hospital in case of an accident.
- 2 Instant medical support to the injured person.
- 3 Instant information to the driver family.
- 4 Sound alarm information to locals present in the area.
- 5 Information regarding the car movement and history of car movement.
- 6 Instant notification to the police station and hence easy finding the reason of the accident.



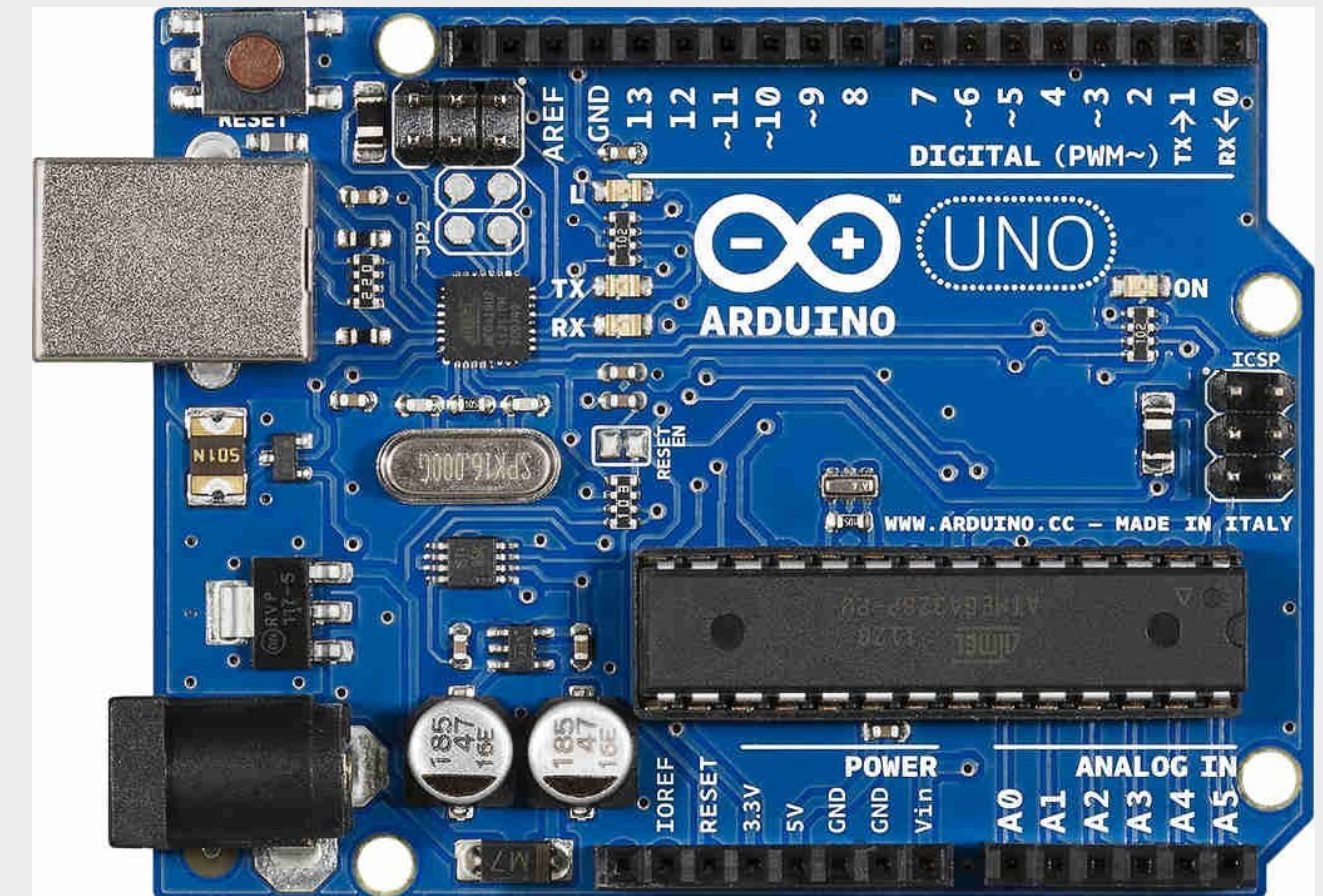


BASIC DIAGRAM OF THE MODEL

Components Used

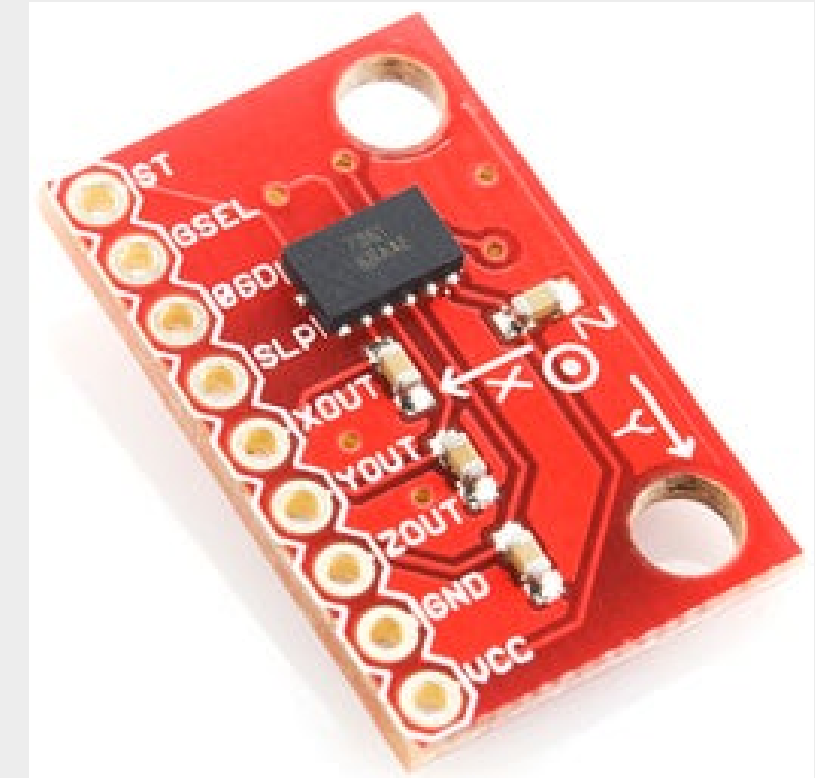
1 Power supply with the processor

2 ARDUINO UNO



Components Used

3 Accelerometer dice



4 GSM with Processor as input and output.



Components Used

- 5 GPS with the processor as input and output and device tracker.

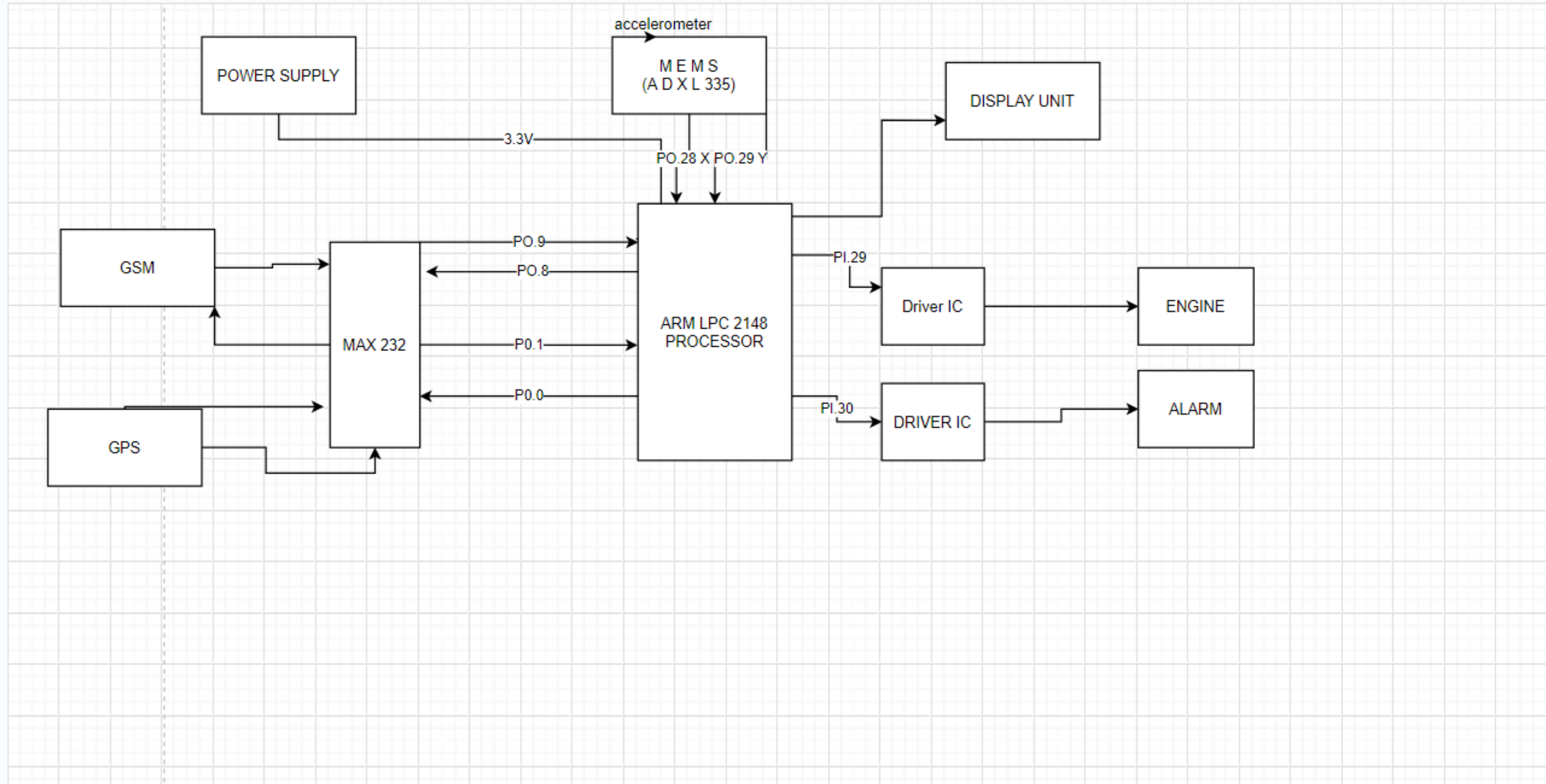


- 6 Display unit for output from the processor.

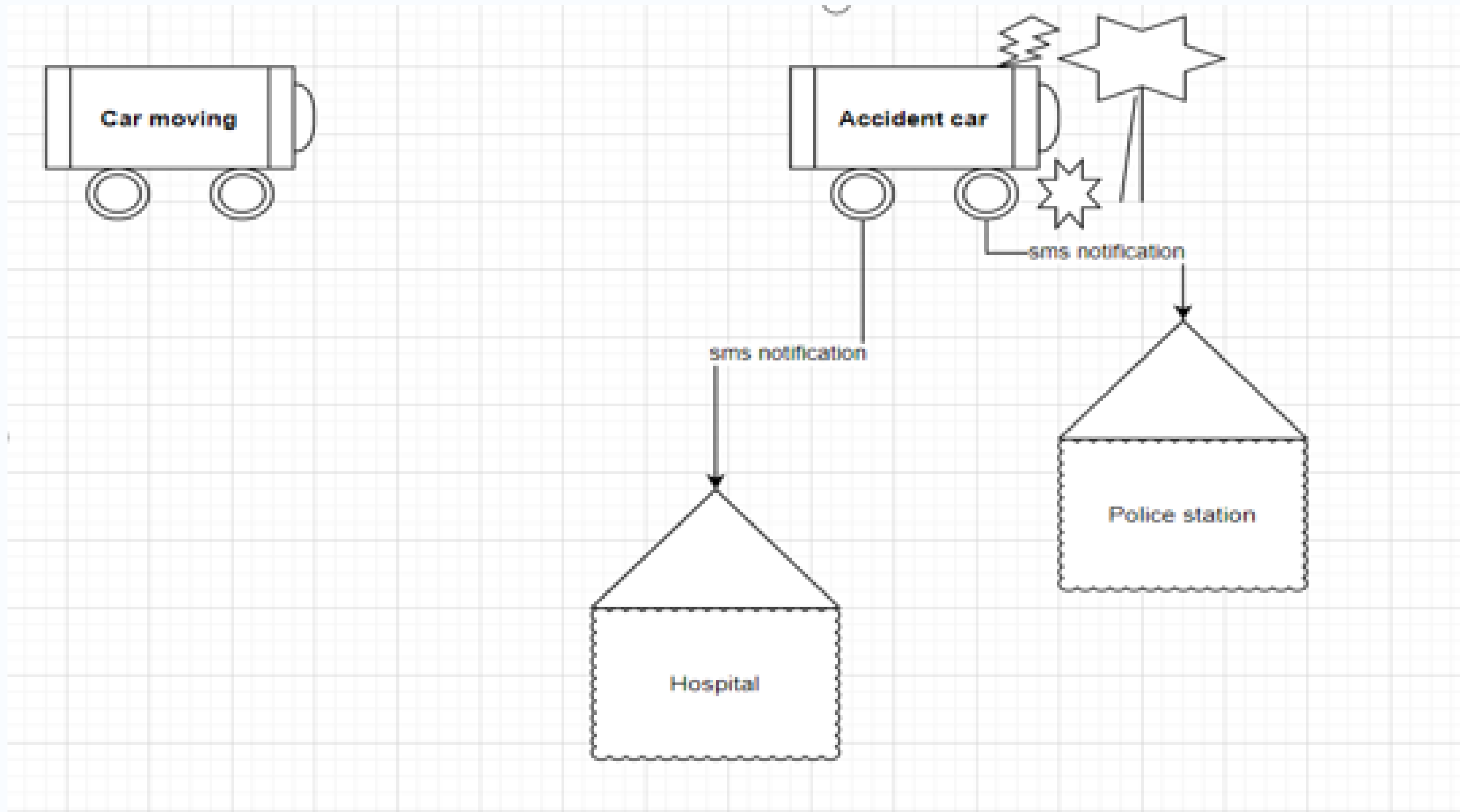
Components Used

7 Alarm Module

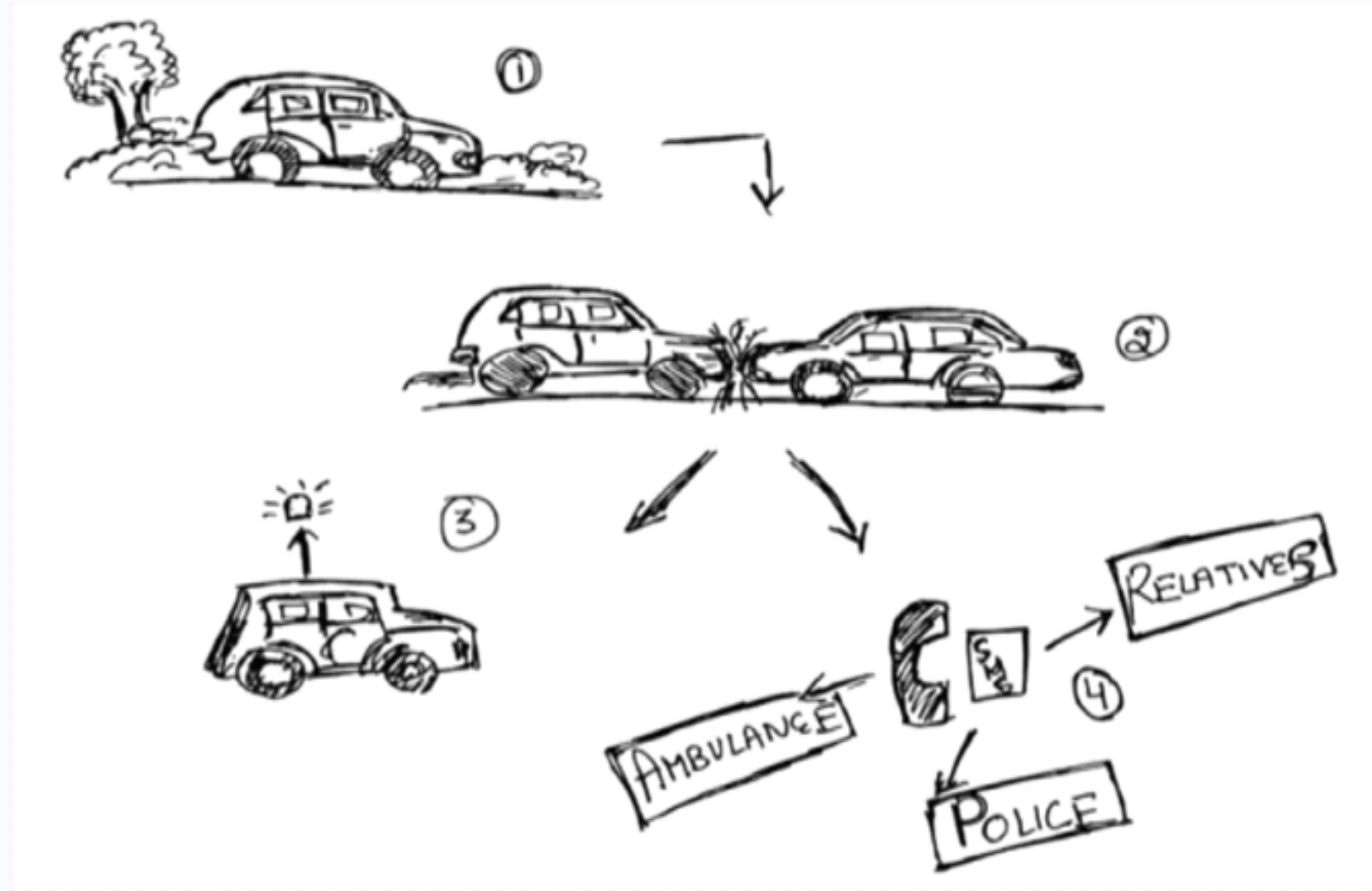




CIRCUIT DIAGRAM



BASIC WORKING



At the second point, the moving car has had an accident with another car.

The sudden change in acceleration will alert the accelerometer which will further trigger the alarm system to notify the nearby people who can provide first aid to the injured.

Then the GPS module will get activated and will notify the person's family/relatives, police & ambulance or nearby hospital

★ Stimulus/Response Sequences

WORKING

- 👉 The accident will be detected by an accelerometer.
- 👉 Engine stops.
- 👉 Alarm starts.
- 👉 Gsm module activates and sends a notification.

System Interface



Attaching and integrating message system with Display.



Calling API of google map and converting longitude and longitude to location.




The device uses the latest messaging apps ex. messenger





Location sent can be used by any browser.

User Interface

 The system can track geographical information automatically and sends an alert SMS regarding an accident.

 Arduino system sends the alert message through the GSM MODULE to police, hospital, relatives. So they can immediately trace the location through the GPS MODEM, after receiving the information. Then after conforming to the location necessary action will be taken.

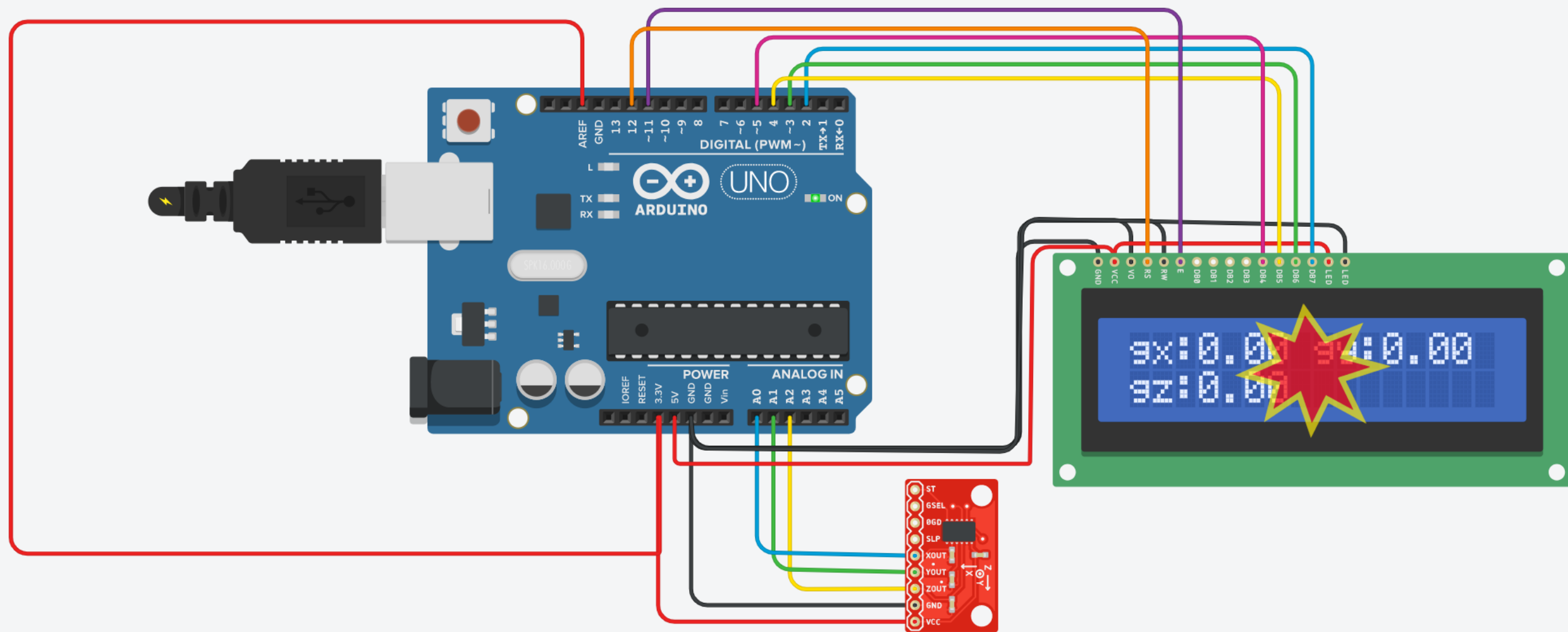
 If the person meets with a small accident or if there is no serious threat to anyone's life, then the alert message will be terminated.

 If there is any damage to the device then the second part attached with the airbag inflator starts working which when gets excess nitrogen pumps and on the sensor which further send the notification.

THIS WILL
MEASURE
THE CHANGE
IN SPEED.

IF THERE'S A
SUDDEN
CHANGE, IT
WILL
ACTIVATE THE
GPS MODULE

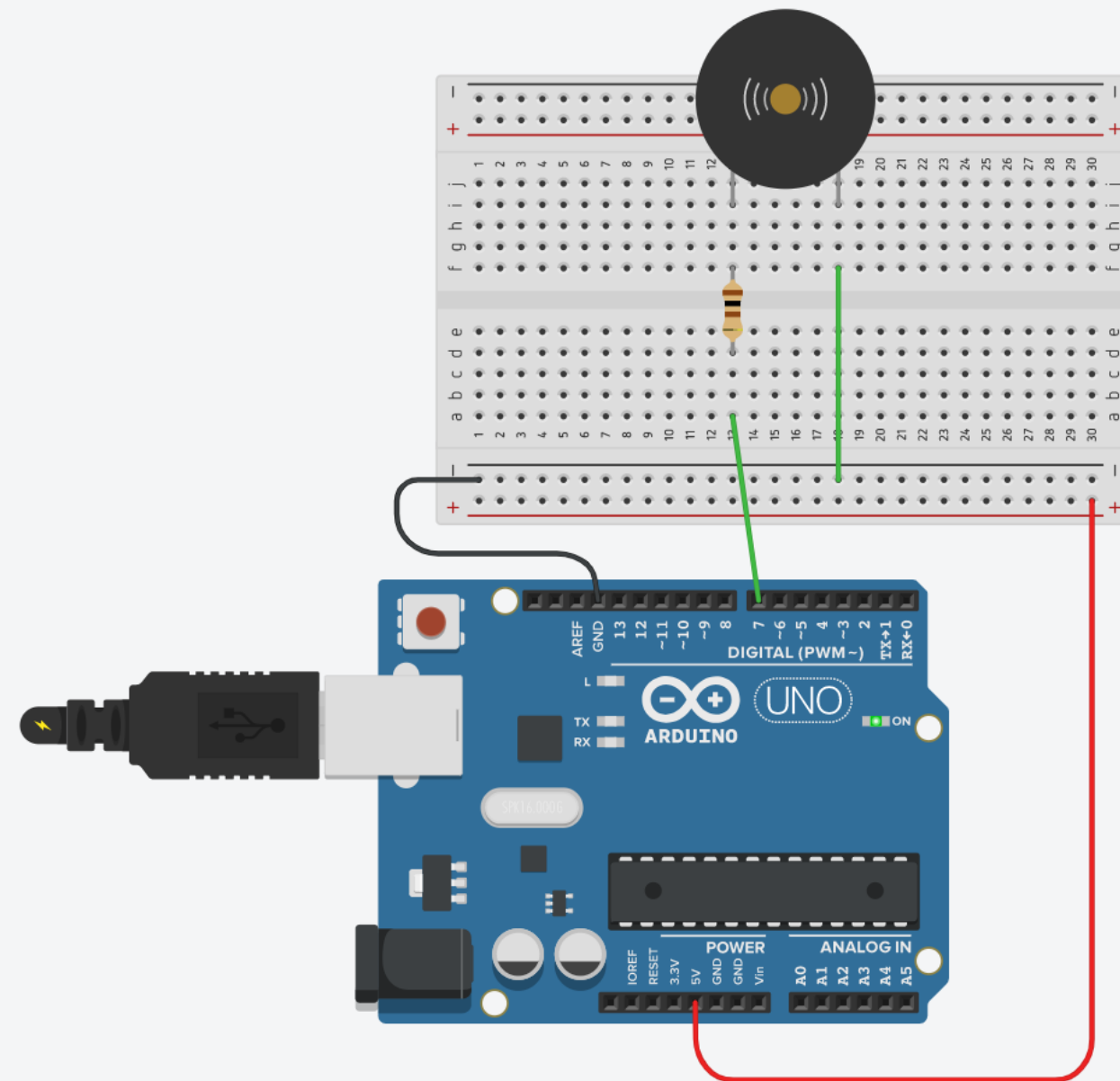
ACCELEROMETER



ALARM SYSTEM
WILL BE
ACTIVATED WHEN
ACCIDENT HAS
OCCURED

IT WILL ALARM
THE LOCAL
PEOPLE AROUND
WHO CAN
PROVIDE FIRST
AID TO THE
INJURED

BUZZER ALARM SYSTEM

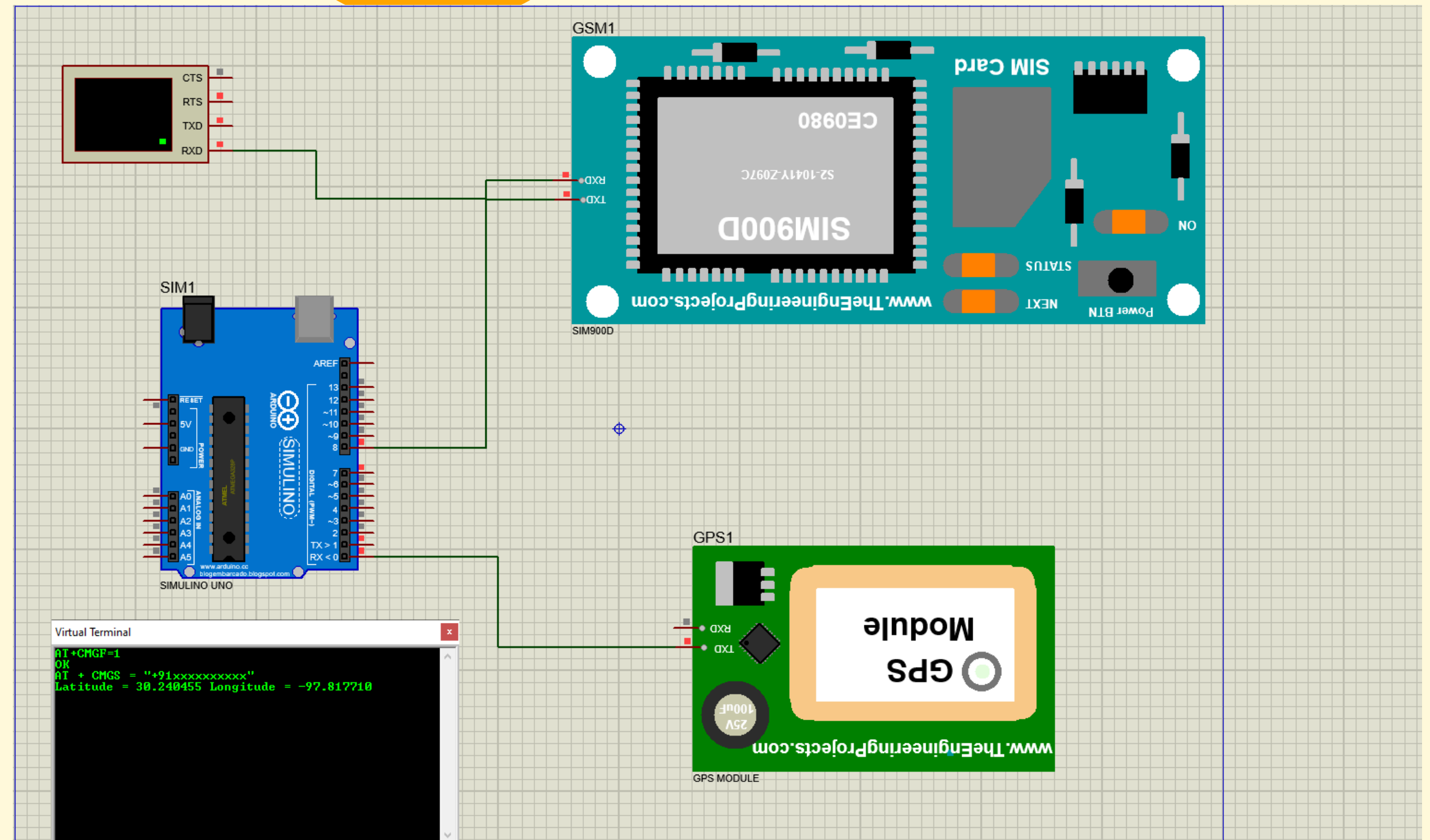


WHEN ATTACH TO
ACCELEROMETER,
IT GENERATE THE
LOCATION OF THE
ACCIDENT SPOT

IT WILL ALSO
SEND THE
LOCATION AS
LINK OR SMS
WHEN ATTACHED
TO AN ANTENNAS

GPS MODULE

```
Virtual Terminal
AT+CMGF=1
OK
AT + CMGS = "+91xxxxxxxxxx"
Latitude = 30.240455 Longitude = -97.817710
```



CODE FOR ACCELOROMETER

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

```
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
```

```
int Xread;
```

```
int Xrest;
```

```
int Yread;
```

```
int Yrest;
```

```
int Zread;
```

```
int Zrest;
```

```
double Gx;
```

```
double Gy;
```

```
double Gz;
```

```
int xpin = 0;
```

```
int ypin = 1;
```

```
int zpin = 2;
```

```
int t1;
```

CODE FOR ACCELOROMETER

```
void setup()
{
  Serial.begin(9600);
  lcd.begin(16, 2);
  digitalWrite(13,HIGH);
  delay(1000);

  Xrest=analogRead(xpin);
  Serial.print(Xrest);

  Yrest=analogRead(ypin);
  Serial.print(Yrest);

  Zrest=analogRead(zpin);
  Serial.print(Zrest);

  digitalWrite(13,LOW);
}

void loop()
{
  Serial.print("Time ");
  t1=millis();
  Serial.println(t1*0.001);

  Xread = analogRead(xpin)-Xrest;
  Yread=analogRead(ypin)-Yrest;
  Zread=analogRead(zpin)-Zrest;
```

CODE FOR ACCELOROMETER

```
Gx=Xread/67.584;
Gy=Yread/67.584;
Gz=Zread/67.584;

Serial.print("Acceleration X :");
Serial.print(Gx);

Serial.print("Acceleration Y :");
Serial.print(Gy);

Serial.print("Acceleration Z :");
Serial.print(Gz);

Serial.print("\n");

lcd.setCursor(0, 0);

lcd.print("gx:");
lcd.print(Gx);

lcd.setCursor(8, 0);
lcd.print("gy:");
lcd.print(Gy);

lcd.setCursor(0, 1);
lcd.print("gz:");
lcd.print(Gz);

delay(1000);
lcd.clear();
}
```

CODE FOR ALARM SYSTEM

```
void setup() {  
  pinMode(7, OUTPUT);  
}
```

```
void loop(){  
  tone(7, 220, 100);  
  delay(200);  
}
```


CODE FOR GPS MODULE

```
#include <TinyGPS.h>
#include <SoftwareSerial.h>
SoftwareSerial SIM900(7, 8);

TinyGPS gps;          //Creates a new instance of the TinyGPS object

void setup()
{
  Serial.begin(9600);
  SIM900.begin(9600);

}

void loop()
{
  bool newData = false;
  unsigned long chars;
  unsigned short sentences, failed;

  // 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;
    }
  }
}
```

CODE FOR GPS MODULE

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

gps.f_get_position(&flat, &flon, &age);
SIM900.print("AT+CMGF=1\r");
delay(400);

SIM900.println("AT + CMGS = \""+91xxxxxxxxxx "\"");           // recipient's mobile number with country code
delay(300);

SIM900.print("Latitude = ");
SIM900.print(flat == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flat, 6);
SIM900.print(" Longitude = ");
SIM900.print(flon == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flon, 6);
delay(200);

SIM900.println((char)26); // End AT command with a ^Z, ASCII code 26
delay(200);
SIM900.println();
}

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

Future Scope of the project

This project when integrated into a single unit can be used in automobiles as a safety device.

It will help save many lives with its early messaging system to alert hospitals or ambulances. Its alarm system will alert nearby people who could provide the injured with first aid.

It can also be used by police to detect the location of the vehicle and catch the thief.

when attached to a data storage device, this device can also be used to track the history of the automobile.

With the advancement in technology and growing demand for electrical automobiles, this device can make its way into the market easily as a safety and theft security device.

Project Links

1

Accelerometer Circuit

<https://www.tinkercad.com/things/7SPdOlcvGoo-accelerometer/editel?sharecode=AWAKqk--Babh8qxG-Ghb6Vm6u2fr0cd2DU-BpXzWtfM&sharecode=0PU2F7LBhMwZQ9wpf51yvOUmMKNRVELDbdA7qIqZHB4>

2

Alarm Circuit

https://www.tinkercad.com/things/92itu653XGR-buzzer-alarm-circuit/editel?sharecode=Y0ogA_wZcOL7kQ8OdPxAbWGa1kIQFLvJwZgHAW3U_Nl&sharecode=KUuf9aAszDuNZmrkdrxA813SpzpWiAz8zrqXqmDCNRA

3

GSM Module

<https://github.com/siddharth177/GSM-Module>



References

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2. <https://www.cnbc.com/2019/03/29/tesla-model-3-keeps-data-like-crash-videos-location-phone-contacts.html>
3. <https://www.eetimes.com/how-does-a-gps-tracking-system-work/#>

Wikipedia

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2. https://en.wikipedia.org/wiki/Automotive_navigation_system

How to electronics

1. <https://how2electronics.com/gps-gsm-based-vehicle-tracking-system-using-arduino/>

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Thank you

Have a great
day ahead.

Submitted by
Siddharth Deep Katiyar
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Sec :- EEE B