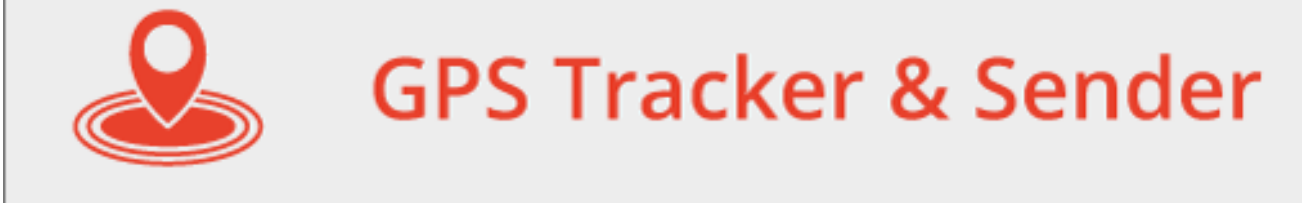
TECHNICAL REPORT: GPS TRACKER



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ABSTRACT

Now a day's accident rate is increasing rapidly, in that road accidents are major in number. Even though there is chance to help by joining them to hospital. We are not able to do that because we don't know the exact location. So, we need a person who always tracking them, but it costs so much.To overcome these circumstances, we came up with an idea, to construct a "**GPS TRACKER**" device using **sensors** and **AURDINO**.

CHAPTER-1

1.1 INTRODUCTION

1.1 Introduction :

A **GPS tracking unit** is a navigation device normally carried by a moving vehicle or person that uses the Global Positioning System (GPS) to track the device's movements and determine its location. The recorded location data can either be stored within the tracking unit or transmitted to an Internet-connected device using the cellular (GPRS or SMS), radio, or satellite 4 modem embedded in the unit. This allows the location to be displayed against a map backdrop either in real time or when analyzing the track later, using **GPS tracking software**.

Data tracking software is available for smart phones with GPS capability. Modern vehicles use GPS for navigation to reach their destinations. The system is not limited to find the location of the target but also calculate the distance traveled between two places. This system is user friendly. Easily installable, accessible and be used for various other purposes, after installation the system will locate target by the use of Web application like Google maps. The system allows to tack the target anytime and anywhere in any weather conditions.

1.2 Statement Of Problem :

The purpose of this device is to decrease the rate of road accidents, by finding the accident location and to track the required person.

1.3 Significance of study :

This system is user friendly, easily installable, accessible and can be used for various other purposes. After installation the system will locate target by the use of Web application like Google maps. The system allows to tack the target anytime and anywhere in any weather conditions, and it

helps us to know the significance of **sensors** and usage of **AURDINO**.
This tends to decrease the rate of road accidents.

1.4 Scope of the study : .

Monitoring and managing the mobile assets are very important for any company dealing with the services, delivery or transport vehicles. Information technologies help in supporting these functionalities from remote locations and update the managers with the latest information of their mobile assets. Tracking the mobile assets locations data and analyzing the information is necessary for optimal utilization of the assets. Vehicle Tracking System is a software & hardware system enabling the vehicle owner to track the position of their vehicle. A vehicle tracking system uses either GPS or radio technology to automatically track and record a fleet's field activities. Activity is recorded by modules attached to each vehicle. And then the data is transmitted to the owner .

CHAPTER : 2

2.1 METHODOLOGY

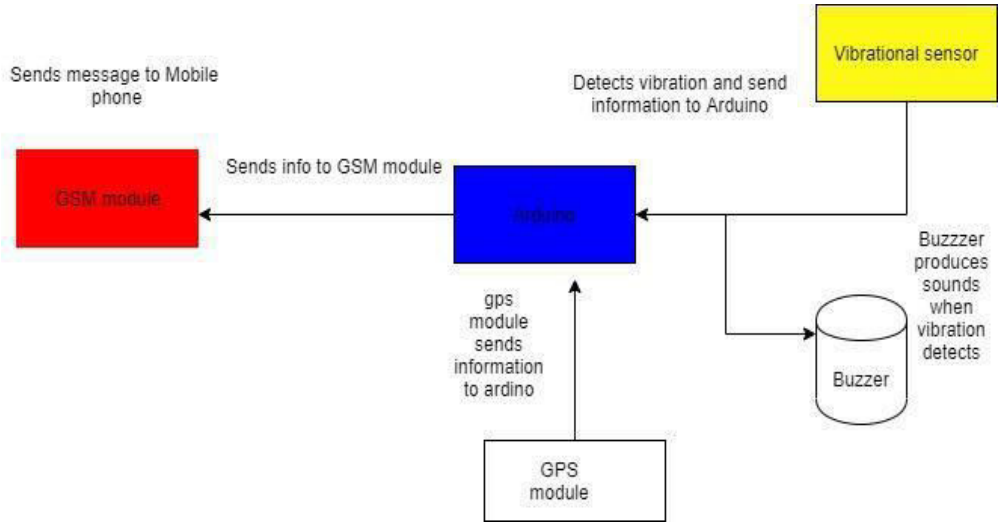

FIG ; 2.1 : Block diagram

GPS satellites circle the Earth twice a day in a precise orbit. Each satellite transmits a unique signal and orbital parameters that allow GPS devices to decode and compute the precise location of the satellite. GPS receivers use this information and trilateration to calculate a user's exact location. Essentially, the GPS receiver measures the distance to each satellite by the amount of time it takes to receive a transmitted signal. With distance measurements from a few more satellites, the receiver can determine a user's position and display it.

Once your position has been determined, the GPS unit can calculate other information,
such as:

- Speed
- Position
- Track
- Distance to destination

2.2 Modules Identification

- GPS Module
- GSM Module
- Arduino
- Buzzer
- Tilt Sensor
- Bread bord

S.No	Name Of Equipment	Quantity	Cost
1	Ardiuno Uno	1	Rs 500
2	(GPS +GSM)Module	1	Rs600+1100
3	Buzzer	1	Rs 50
4	Vibration Sensor	1	Rs250
5	Adapter	1	Rs 150

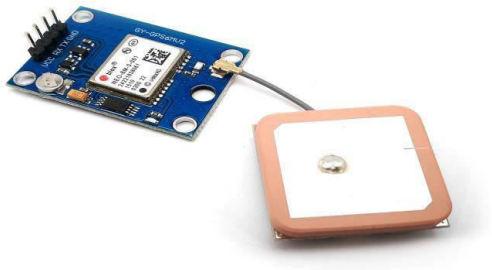

FIG : 2.2 : GPS Module

Source: https://www.google.com/url?sa=i&url=https%3A%2F%2Fnettigo.eu%2Fproducts%2Fneo6

2.2.1 : GPS Module:

The Global Positioning System (GPS) is a satellite-based navigation system made up of at least 24 satellites. GPS works in any weather conditions, anywhere in the world, 24 hours a day, with no subscription fees or setup charges.GPS satellites circle the Earth twice a day in a precise orbit. Each satellite transmits a unique signal and orbital parameters that allow GPS devices to decode and compute the precise location of the satellite. GPS receivers use this information and trilateration to calculate a

user's exact location. Essentially, the GPS receiver measures the distance to each satellite by the amount of time it takes to receive a transmitted signal. With distance measurements from a few more satellites, the receiver can determine a user's position and display it.

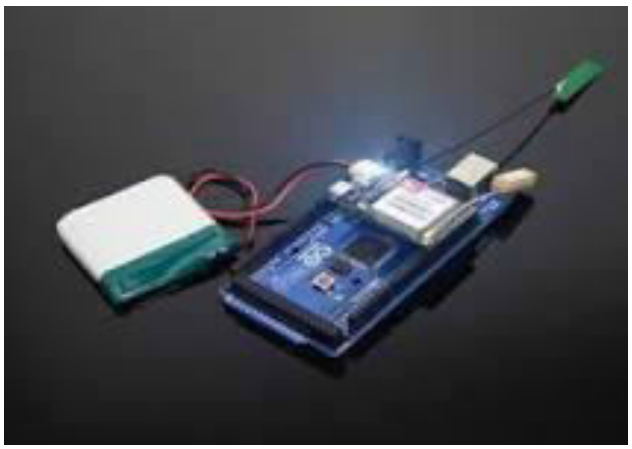

FIG : 2.3 : GSM Module

SOURCE: https://www.google.com/search?q=gsm+module&rlz=1C1CHBF_enIN859IN859

2.2.2 : GSM Module :

GSM (or Global System for Mobile Communications) was developed in 1990. The first GSM operator has subscribers in 1991, the beginning of 1994 the network based on the standard, already had 1.3 million subscribers, and the end of 1995 their number had increased to 10 million! There were first generation mobile phones in the 70's, there are 2nd generation mobile phones in the 80's and 90's, and now there are 3rd gen phones which are about to enter the Indian market. GSM is called a 2nd generation, or 2G communications technology. In this project it acts as a SMS Receiver and SMS sender. The GSM technical specifications define the different entities that form the GSM network by defining their functions and interface requirements.

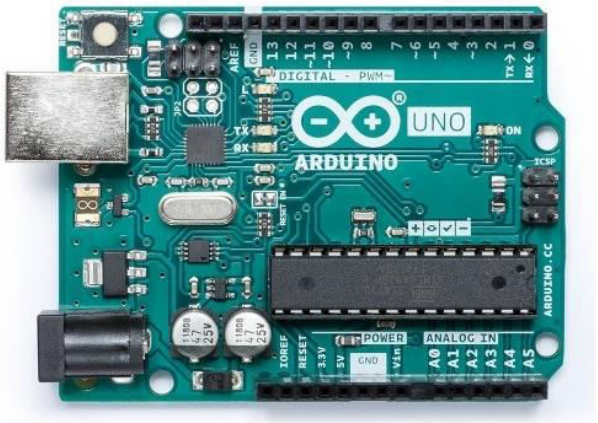

FIG ; 2.4 : Aurdino Processor

SOURCE: https://aws.robu.in/wp-content/uploads/2019/12/Arduino-Uno-Rev3-2.jpg

2.2.3 Arduino :

Arduino UNO Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does notneed a separate piece of hardware (called a programmer) in order to load new code onto the board – you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

SOURCE: https://www.google.com/imgres?imgurl=https%3A%2F%2Fimages-na.ssl-images–

2.2.4 : Buzzer*:* Behaves as switch to ON or OFF the circuit.

FIG : 2.6 : Tilt Sensor

2.2.5 : Tilt Sensor :

A **tilt sensor** is an instrument that is used for measuring the **tilt** in multiple axes of a reference plane. **Tilt sensors** measure the **tilting** position with reference to gravity and are used in numerous applications. They enable the easy detection of orientation or inclination and vibrations.

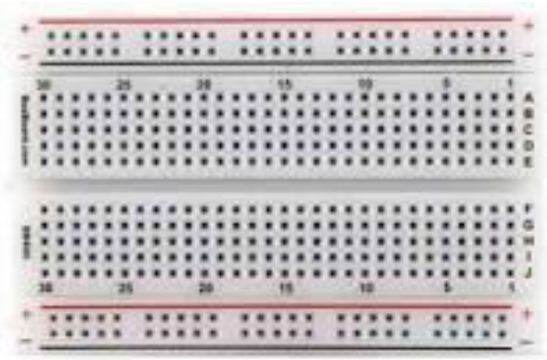

FIG ; 2.7 : Bread Bord

Source: https://www.google.com/search?q=breadboard&rlz=1

2.2.6 : Bread Bord:

A **breadboard** is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting diode).

CHAPTER : 3

PROCEDURE

3.1.1 Connection of Arduino with GSM SIM 900A

It is very easy to interface GSM with Arduino uno .we have to connect it in following way .

- Connect Tx pin of GSM to receiver pin 2 of Arduino (due to Software Serial Library).
- Connect Rx pin of GSM to transmitter pin 3 of Arduino
- Connect GND of Arduino to GND of GSM.
- Supply power to GSM and Arduino using 12 V,1A adapter.

3.1.2 Connection of Arduino with GPS module NEO-6m

- Connect Tx pin of GPS to receiver pin 0 of Arduino (due to Software Serial Library).
- Connect Rx pin of GPS to transmitter pin 1 of Arduino
- Connect GND of Arduino to GND of GSM.

Supply power to GPS from Arduino VCC +3.3V Connect vibrational pin to aurduino pin 11. Connect the buzzer pin to aurduino pin 10.

3.2 Source Code :

```
#include <TinyGPS.h>

#include <SoftwareSerial.h> SoftwareSerial Gsm (7, 8);
char phone_no[] = "Mobile number"; int vib_pin=11;
int buzzer = 10; TinyGPS gps;
 int sensorThres = 400; int val;
void setup()

{

  Serial.begin(9600); Gsm.begin(9600);
  pinMode(buzzer, OUTPUT);
}

void loop()

{

  val=digitalRead(vib_pin); Buzz();
  bool newData = false; unsigned long
  chars;
  unsigned short sentences, failed;

  for (unsigned long start = millis(); millis() - start < 1000;)

  {

    while (Serial.available())

    {


char c = Serial.read(); Serial.print(c);

    if (gps.encode(c))

    {

      if(val==1)

      {newData = true;

    }

  }

}

}
```

```
 if (newData)
 {

float flat, flon; unsigned long age;
   gps.f_get_position(&flat, &flon, &age);
   Gsm.print("AT+CMGF=1\r"); delay(40);
   Gsm.print("AT+CMGS=\""); Gsm.print(phone_no);
   Gsm.println("\"");
   delay(30); Gsm.print("http://maps.google.com/maps?q=loc:");
  // Gsm.print("Latitude = ");
      Gsm.print(flat == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flat, 6);
      //Gsm.print(" Longitude = "); Gsm.print(",");
      Gsm.print(flon == TinyGPS::GPS_INVALID_F_ANGLE ? 0.0 : flon, 6);
      delay(2);
      Gsm.println((char)26); // End AT command with a ^Z, ASCII code 26
      delay(2); Gsm.println(); delay(2);
   }
      }
   Serial.println(failed);
 }
 void Buzz(){ if
   (val==1)
   {
     tone(buzzer, 1000, 2000); Serial.println ("On");
   }
    else

noTone (buzzer); Seial.printl ("Off");
   }
 }
```

3.3 Result :

$GPGGA,113759.00,1629.58817,N,08030.24747,E,1,04,4.30,59
.2,M,-77.0,M,,*42

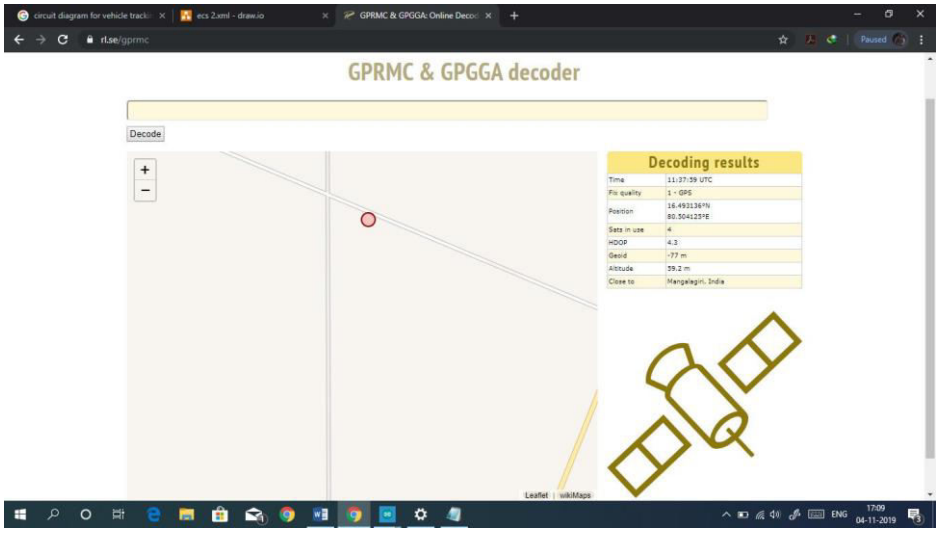

FIG : 2.8 : Target Location

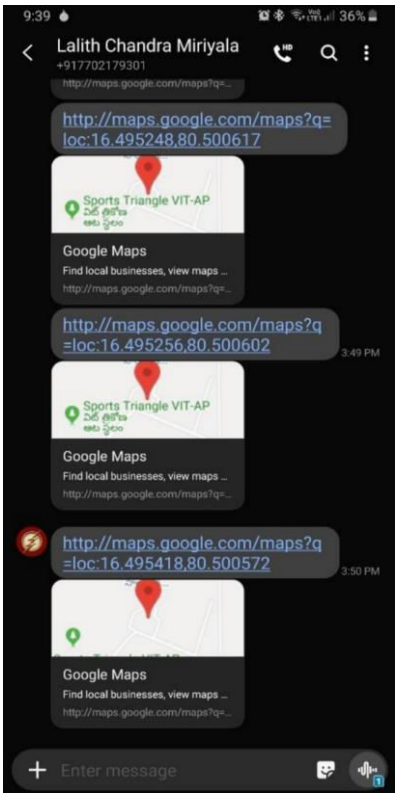

FIG : 2.9 : GPS Location

Completed prototype :

FIG : 3.0 : Prototype

Conclusion:

In our project GPS module uses a network of satellites to determine the location of a device by a process called trilateration to determine its physical location based on its distance from three GPS satellites.

It receives information in the form of NEMA code and by using google maps it will convert it into longitudes and latitudes. When the vibrational sensor detects the vibration in surrounding area buzzer turns on and Arduino sends location in the form of google link by using GSM module to mobile number that registered in code.Finally the aim of the project that is to trace the vehicle and to detect accident is successfully achieved

Limitations:

While this advanced technology based tracking system can benefit users, company or any organization, there are also some limitations to using this vehicle tracking devices. Often GPS takes time to connect with the network due to poor weather conditions. For the GPS to work properly, it needs to have a clear view of the sky. That is it is unlikely to work indoor or may even have problem outside where it has no clear path of transmitting to and receiving signal from satellites. Therefore, due to obstacles like tall buildings or such infrastructure which block view

of the sky, often causes multipath error to the receiving signal of the GPS receiver. As a result, location seems to appear to jump from one place to another leading to inaccurate results. Thus incorrect values of latitude and longitude are sent to the server for displaying in the Google map in the device.

Future scope :

- We can reduce the size of the kit by using GPS+GSM on the same module.
- We can increase the accuracy up to 3m by increasing the cost of the GPS receivers. iii. We can use our kit for detection of bomb by connecting to the bomb detector.
- We can use our kit to assist the traffic. By keeping the kits in the entire vehicles and by knowing the locations of all the vehicles.
- If anybody steals our car we can easily find our car around the globe. By keeping vehicle positioning vehicle on the vehicle. 22
- By connecting the co2 sensor we can detect the person when he entered the area with low o2 percentage in air.

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