IoT-Based Public Transport & Safety Monitor System

B.Tech. Lab Project Report
On

TECHNICAL PROFICIENCY & TRAINING-1

(21TS4005)

BY

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CERTIFICATION

I hereby certify that the work which is being presented in the B.Tech. Project Report entitled submitted **CHOPPARAPU HEMANTH NAG, SANDU SAI HARISWARI, KANCHARLA DEEPIKA** bybearing Regd.No. **210040322, 2100040344, 210040350** in partial fulfilment of the requirements for the award of the **Bachelor of Technology in Electronics & Communication Engineering** and submitted to the Department of Electronics & Communication Engineering of KLEF, Vaddeswaram, Guntur is an authentic record of my own work carried out during a period from July 2021 to December 2021 under the supervision of **K. V. Sowmya, section-1 faculty, ECE Department**.

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Abstract

As a new paradigm of information technology, the Internet Of Things (IOT) is increasing attention from various industrial fields.

A new frame work for public transport system based on IOT, which integrates the scheduling problems of Public Transport is proposed for better coordination Transfer solution.

Public Transport flow prediction methods based on periodic patterns mining is proposed for road flow analysis and passenger flow analysis.

A comprehensive IOT based Accident dedication system for smart public transport, in this when there is a accidents of public transport there will be a delay in emergency service, but with accident detection system we can save lives. This will mainly work on security cams on road when a accidents happens these cams detect and give the GPS location to near hospital and near recuse centers, So by this we can give safety for public transport.

INTRODUCTION:

Public Transport flow prediction methods based on periodic patterns mining is proposed for road flow analysis and passenger flow analysis.

A comprehensive IOT based Accident dedication system for smart public transport, in this when there is a accidents of public transport there will be a delay in emergency service, but with accident detection system we can save lives. This will mainly work on security cams on road when a accidents happens these cams detect and give the GPS location to near hospital and near recuse centers, So by this we can give safety for public transport.

- Arduino-based vehicle tracking system using global positioning system (GPS) and global system using GSM modules. GSM modem with a SIM card used here uses for the communication technique. The system can be installed or hidden in your vehicle. After installing this circuit, you can easily track your stolen vehicle using a mobile phone. you can also use this application to track the school/college bus.
- A GSM modem or GSM module is **a hardware device that uses GSM mobile telephone technology to provide a data link to a remote network**. From the view of the mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for a SIM to identify themselves to the network .

AIM

Vehicle Tracking System Based on GPS and GSM, we are going to learn how to make a vehicle tracking system using GPS and Arduino.

COMPONENTS REQUIRED

- Arduino Software
- Arduino Uno Board(HARDWARE)
- LCD
- Neo-6M GPS Module
- GSM Module
- Mobile Sim
- Jumper wires

ARDUINO UNO

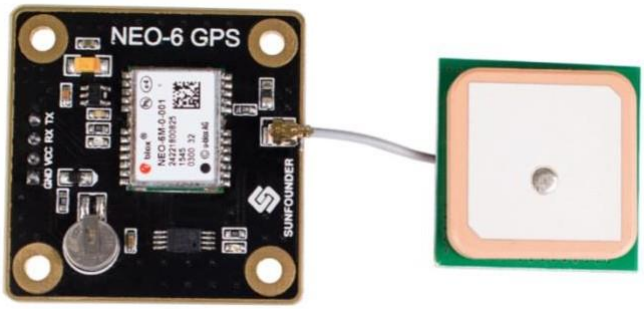
Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and motors as an output

LCD

A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix.

Neo-6M GPS Module

The NEO-6M GPS module is a well-performing complete GPS receiver with a built-in 25 x 25 x 4mm ceramic antenna, which provides a strong satellite search capability. With the power and signal indicators, you can monitor the status of the module.

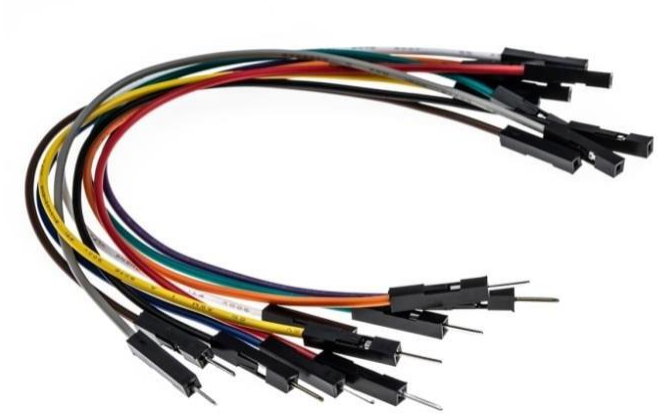


GSM Module

A **GSM modem** or **GSM module** is a hardware device that uses GSM mobile telephone technology to provide a data link to a remote network. From the view of the mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for a SIM to identify themselves to the network.

JUMPER WIRES

A jump wire (also known as jumper, jumper wire, jumper cable, DuPont wire or cable) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test



PROCEDURE

Arduino-based vehicle tracking system using global positioning system (GPS) and global system using GSM modules. GSM modem with a SIM card used here uses for the communication technique. The system can be installed or hidden in your vehicle. After installing this circuit, you can easily track your stolen vehicle using a mobile phone. you can also use this application to track the school/college bus.

Step 1: Connect the TX and RX Pin of the GPS to D3 and D4

We have used software serial for communicating with GPS. so connect the connect the TX of the gps to D4 of the arduino board. RX to D3 of the arduino board.

Connect the TX and RX of the GSM module to the RX and TX of the arduino board.

Step 2: Connect the LCD to the D8 to D13 of the Arduino Board

LCD breakout board to connect the LCD.

LCD - Arduino

RS - D13,

EN - D12,

D4 - D11,

D5 - D10,

D6 - D9,

D7 - D8

Step 3: Add Tiny GPS Library

Add tiny gps library before making the code.

download the library from the website, add through add zip to library, browse it and add it.

Step 4: Download the Arduino Code From the Attachment

Note: before downloading, change the mobile number to receive the SMS.

Step 5: Type "TRACK VEHICLE" to the Sim on the Sim Module

Switch ON the hardware. Download the code. check the Network range on the GSM module with the blinking of the network led.

Type "TRACK VEHICLE" as SMS and send to the sim module in the GSM Modem.

Step 6: You Can Receive the Response SMS From GSM Module

Now you can receive the GPS co-ordinates as SMS. The sms consist of web link which will redirect to the GOOGLE MAP

Step 7: Click the Weblink to Track the Vehicle

Finally we can track the vehicle in the google map.

CODE

```
#include <TinyGPS++.h>
#include <SoftwareSerial.h>
#include<LiquidCrystal.h>
LiquidCrystal lcd(13, 12, 11, 10, 9, 8);

static const int RXPin = 4, TXPin = 3;
static const uint32_t GPSBaud = 9600;
// The TinyGPS++ object
TinyGPSPlus gps;
int temp=0,i;
// The serial connection to the GPS device
SoftwareSerial ss(RXPin, TXPin);
String stringVal = "";
void setup(){
Serial.begin(9600);
ss.begin(GPSBaud);
lcd.begin(16,2);
pinMode(13,OUTPUT);
digitalWrite(13,LOW);
  lcd.print("Vehicle Tracking");
  lcd.setCursor(0,1);
  lcd.print("    System      ");
```

```
 delay(2000);
 gsm_init();
 lcd.clear();
 Serial.println("AT+CNMI=2,2,0,0,0");
 lcd.print("GPS Initializing");
 lcd.setCursor(0,1);
 lcd.print(" No GPS Range ");
 delay(2000);
 lcd.clear();
 lcd.print("GPS Range Found");
 lcd.setCursor(0,1);
 lcd.print("GPS is Ready");
 delay(2000);
 lcd.clear();
 lcd.print("System Ready");
 temp=0;
}

void loop()
{
serialEvent();

    while(temp)
    {
     while (ss.available() > 0)
      {
```

```
        gps.encode(ss.read());
             if (gps.location.isUpdated())
             {
              temp=0;
              digitalWrite(13,HIGH);
              tracking();
             }
        if(!temp)
        break;
       }
      }
      digitalWrite(13,LOW);
}
void serialEvent()
{
  while(Serial.available()>0)
  {
    if(Serial.find("Track Vehicle"))
    {
      temp=1;
      break;
    }
    else
    {
    temp=0;
    }
```

```
  }
}
void gsm_init()
{
  lcd.clear();
  lcd.print("Finding Module..");
  boolean at_flag=1;
  while(at_flag)
  {
    Serial.println("AT");
    delay(1);
    while(Serial.available()>0)
    {
      if(Serial.find("OK"))
      at_flag=0;
    }

    delay(1000);
  }
  lcd.clear();
  lcd.print("Module Connected..");
  delay(1000);
  lcd.clear();
  lcd.print("Disabling ECHO");
  boolean echo_flag=1;
  while(echo_flag)
```

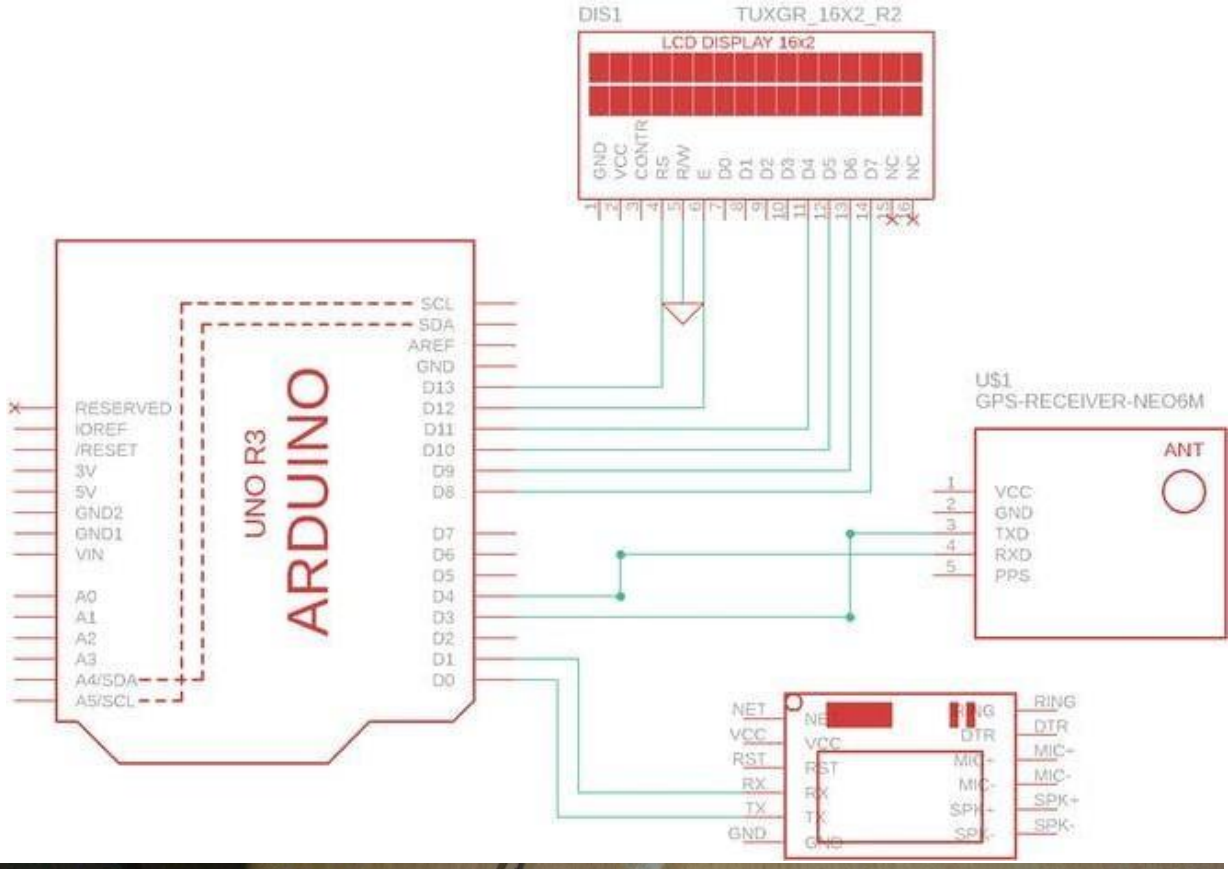
```
{
  Serial.println("ATE0");
  while(Serial.available()>0)
  {
    if(Serial.find("OK"))
    echo_flag=0;
  }
  delay(1000);
}
lcd.clear();
lcd.print("Echo OFF");
delay(1000);
lcd.clear();
lcd.print("Finding Network..");
boolean net_flag=1;
while(net_flag)
{
  Serial.println("AT+CPIN?");
  while(Serial.available()>0)
  {
    if(Serial.find("+CPIN: READY"))
    net_flag=0;
  }
  delay(1000);
}
lcd.clear();
```

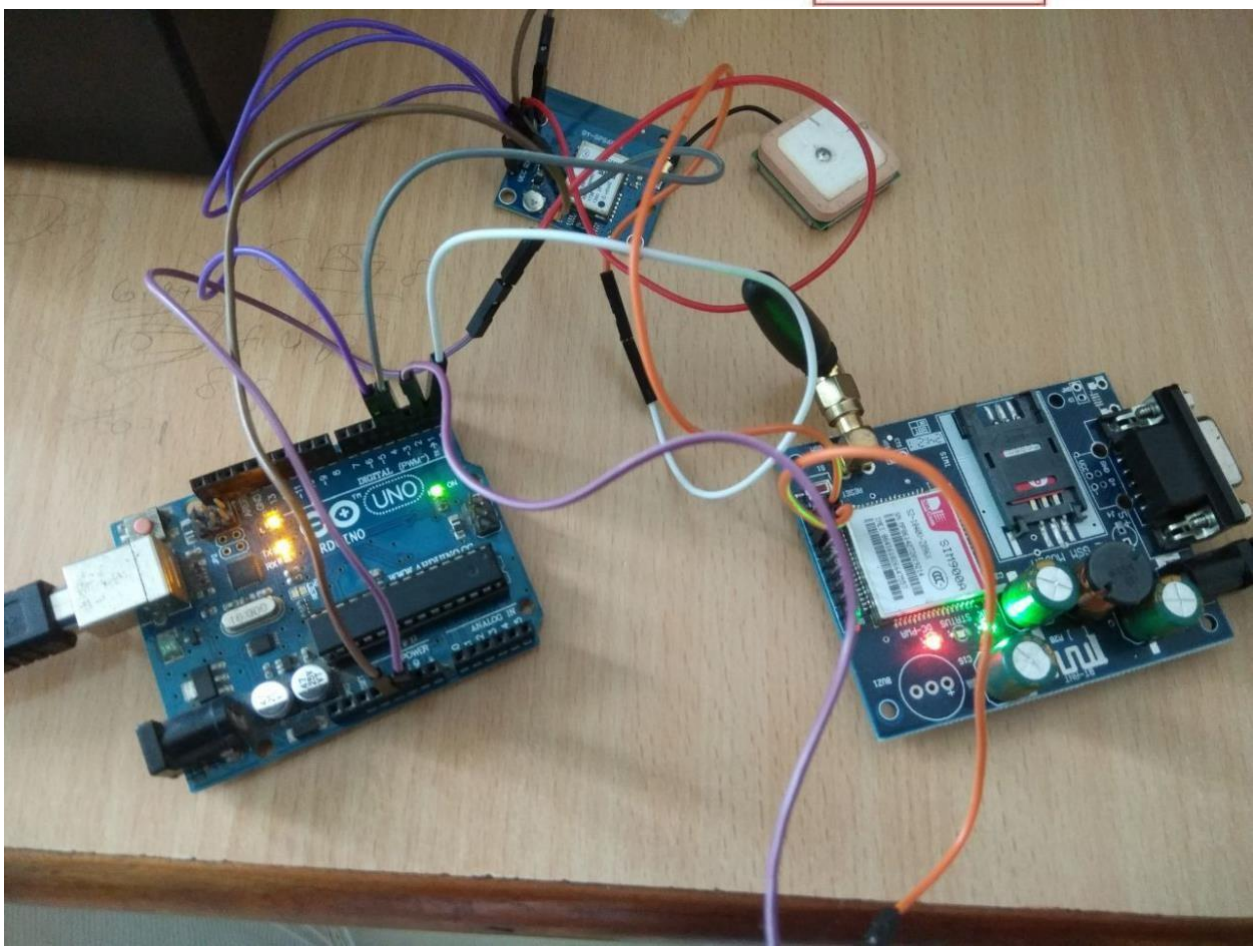
```
  lcd.print("Network Found..");


  delay(1000);
  lcd.clear();
}
void init_sms()
{
  Serial.println("AT+CMGF=1");
  delay(400);
  Serial.println("AT+CMGS=\"93814267029\"");   // use your 10 digit
cell no. here
  delay(400);
}
void send_data(String message)
{
  Serial.print(message);
 delay(200);
}
void send_sms()
{
  Serial.write(26);
}
void lcd_status()
{
  lcd.clear();
  lcd.print("Message Sent");
```

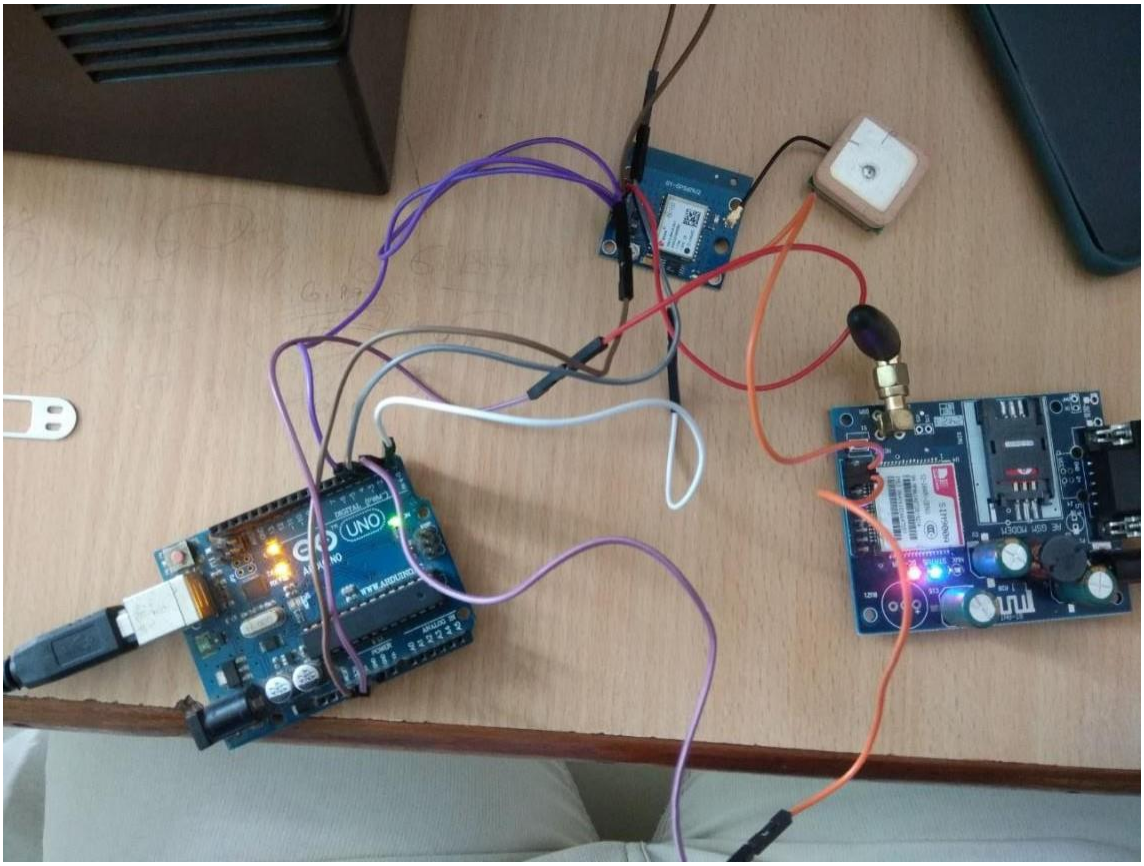
```
  delay(2000);
  lcd.clear();
  lcd.print("System Ready");
  return;
}
void tracking()
{
    init_sms();
    send_data("Vehicle Tracking Alert:");
    Serial.println(" ");
    send_data("Your Vehicle Current Location is:");
    Serial.println(" ");
    Serial.print("Latitude: ");
    Serial.print(gps.location.lat(), 6);
    Serial.print("\n Longitude: ");
    Serial.println(gps.location.lng(), 6);
   Serial.print("https://www.google.com/maps/@");
   Serial.print(gps.location.lat(), 6);
   Serial.print(',');
   Serial.print(gps.location.lng(), 6);
   Serial.print(",14z");
    send_sms();
    delay(2000);
    lcd_status();
}
```

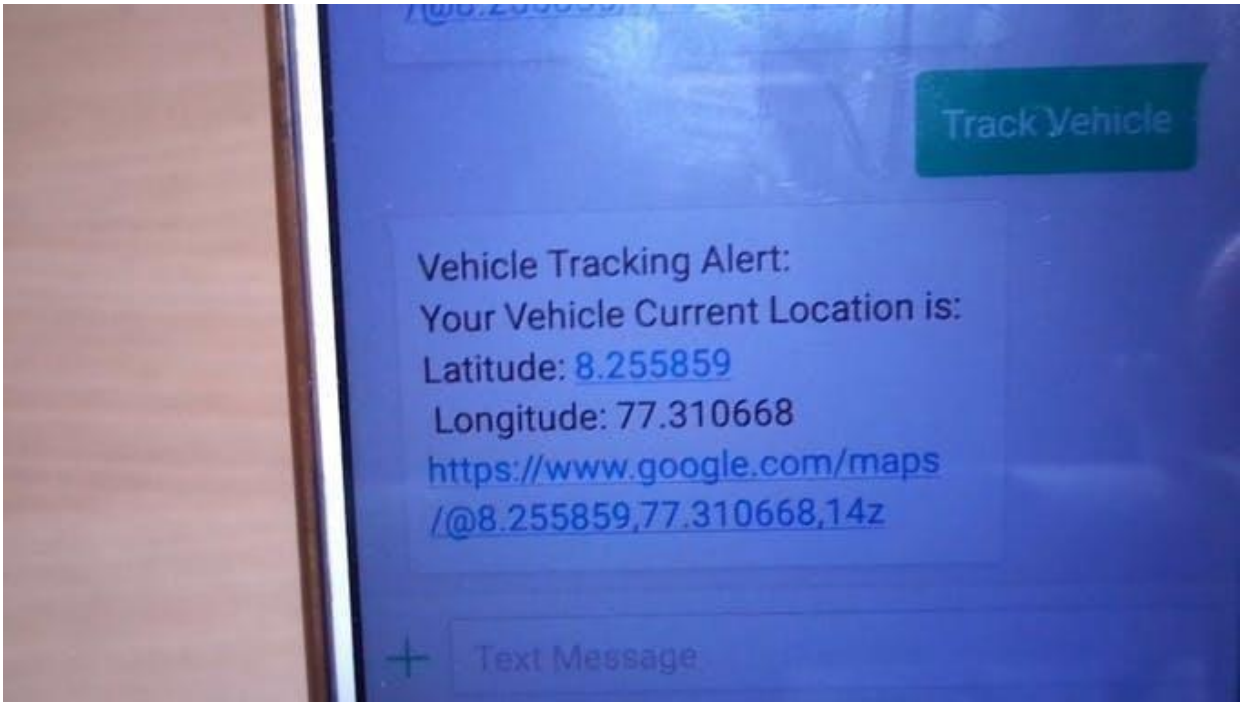
CIRCUIT DIAGRAM





OUTPUT:




Track Vehicle
Vehicle Tracking Alert:
Your Vehicle Current Location is:
Latitude: 8.255859
Longitude: 77.310668
https://www.google.com/maps
/@8.255859,77.310668,14z
Text Message

Conclusion:

The tracking system has become one of the most important tools for individuals, especially when it comes to vehicle security. This is a key reason why vehicle tracking systems are gaining popularity not only in metropolitan areas but also in smaller cities. These systems are fully integrated, making it possible for users to easily track their cars at any time and from anywhere.

With vehicle theft on the rise, people are not deterred from buying vehicles; instead, they are finding efficient ways to monitor their vehicles without needing to be physically close to them. These systems help control thefts and prevent them to some extent. Essentially, GPS and GSM technologies are used in these systems to track vehicles. Using this system, users can determine the position of their vehicle and the distance it has traveled. They are able to access the location of their vehicle at any given time.

This system is reliable and very secure. Upgrading the setup is straightforward, making it adaptable to future requirements without the need to rebuild everything from scratch, which also enhances its efficiency. The GSM module discussed in this paper is used to send and receive SMS. The GSM module can support 2G, 3G, and 4G, but only 2G is supported in this country, as different countries use different frequency bands for the GSM SIM 900A. Therefore, MPT and Telenor were used, while Ooredoo and Mytel were not used in this thesis. Additionally, the GSM module can be interfaced with Arduino using AT commands. However, it was noted that the GPS module did not easily receive signals from GPS satellites.