

# VEHICLE THEFT INFORMATION AND TRACKING USING IoT

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**Abstract** - The theft alert function makes use of a GSM application developed and installed in a mobile phone device, which is embedded in the vehicle to communicate with the vehicle owner's mobile phone. The fingerprint scanner scans the fingerprint of the owner of the vehicle, if it is not the owner, then the vehicle won't ignite and the communication is established via SMS. The GSM modem is used to send the position of the vehicle from a remote place. The GPS modem will continuously give the data to indicate the position of the vehicle. The same data is sent to the mobile at the other end from where the position of the vehicle is demanded. When the request by the user is sent to the number at the GSM modem, the system automatically sends a return reply to that mobile indicating the position of the vehicle. The proposed design provides information regarding vehicle identity, Safe controlling and positioning on real-time basis. This information is collected by the ARM7 Using different modules.

**Key Words:** IOT, GPS, GSM, LCD, Tracking

## 1. INTRODUCTION

According to recent reports, the crime rate is high related to vehicle theft. If you have the right Vehicle theft detection unit, you can put an end to thefts because you can lock and unlock your car at any point of time you choose. GPS are small tracking devices that are installed in your vehicle and it will provide you with feedback data from tracking software that loads from a satellite. This gives you more control over your vehicles.

This paper presents Vehicle Theft Information and Tracking using IoT to determine the location of a vehicle using different methods like GPS and other radio navigation systems operating through satellites and ground-based stations. By taking the help of triangulation or trilateration methods the tracking system enables to measure easy and accurate location of the vehicle. Vehicle information like details of location, vehicle speed, and distance traveled, etc. can be displayed on a digital mapping with the help of software via the Internet. It stores data and downloaded to a computer from the GPS unit at a base station and that can later be used for analysis. This system is important for tracking vehicle at a given period and now it is becoming increasingly popular for people having expensive cars and hence as a theft prevention and retrieval device.

## 2. BLOCK DIAGRAM

At the initial condition of robot, (In the subsequent sections robot indicates the vehicle) we have to insert a sim in the sim insertion module which is present in the GSM modem. Before inserting the sim, let us check whether there is balance in that particular sim or not. After inserting the sim to the system let us connect our kit through wires. After switch it ON the kit will be on and a "Welcome" message is displayed on the LCD screen. After displaying the welcome message, we should reset the system two times by pressing the reset button (RS2) then the wheels of our robot which are in off condition will be rotated two times as a sign of reset process is initiated. After some time "send message" notification will be displayed on the LCD board.

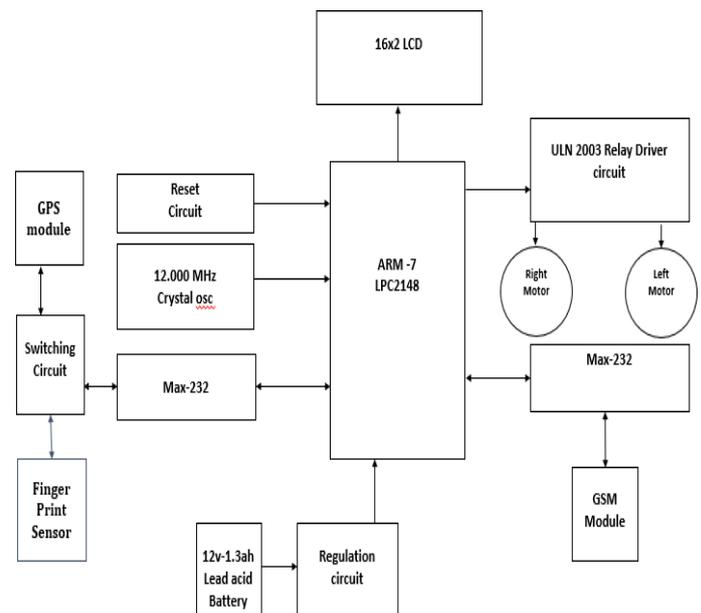


Fig -1: Block Diagram

Further, register the operating mobile number by sending a message through that android mobile to SIM number which is present in our GSM module. For example, the SIM number which is in the GSM module is 9999999999. To this number we should send SMS as 1111111111 which is the operating mobile number from our android mobile phone to register it. After sending the message that sent number will be displayed on the screen. Now the registration of the mobile number was completed.

After this process, a message "put your finger" will be displayed on the LCD screen. Before inserting a finger we

should enrol first. For the enrolling purpose, click on the enrol button and place a finger on the fingerprint module. Then the finger will be enrolled. After completion of enrolment, to start our system we should scan our finger again for the identification process. For the identification process, we have press identify button and scan fingerprint by placing it on the fingerprint scanner. If the fingerprint matches then the vehicle will starts. If the fingerprint mismatches then the vehicle will not move and a message is displayed as “unauthorized finger” and buzzer starts ringing as a warning alarm. After identification completed the vehicle starts moving

After identification completed the vehicle starts moving. In order to stop our vehicle, we should send an SMS to the number present in the sim module using registered mobile number i.e., \*0 then the vehicle will stop and we will get coordinates message of vehicle position where it has stopped. Now to start the Robot again we should send an SMS to the number present in the sim module using registered mobile i.e., \*1 then the vehicle will start moving by sending a coordinates message of where the vehicle has started. To know the status of our vehicle we should send the SMS i.e., \*S then the status will be shown in the LCD board as well as in our android mobile. It displays the Latitude and longitude positions. To know our vehicle exact position, we can copy the obtained message in the Google maps then we can know the accurate position of our vehicle.

### 2.1 Arduino Uno

In Arduino Uno some analog pins and also digital pins are used for connection. In this A0, A1, A2 pins are used for connecting the accelerometer. The purpose of these pins is used to convert the analog information into digital signals. The pin A0 is connected to X<sub>OUT</sub> pin which is presented in the accelerometer sensor. The pin A1 is connected to Y<sub>OUT</sub> pin and A2 is connected to Z<sub>OUT</sub> pin. These are used to produce analog signals from the motion of the body and this signal is given to Arduino and these signals are converted into digital signals and are used for further process.

D0, D1, D2 digital pins for connections and D10, D11 with PWM functionality. The D0, D1 pins are connected with GPS module for transmitting and receiving locations. D0 pin is connected to TX pin of the GPS module. D1 pin is connected with RX pin. The D11 pin is connected to RX pin of the GPS module and D10 pin is connected to TX pin of the GSM module. The D2 pin is connected to the anode of the LED and the cathode is connected to D5. In between the cathode and D5 pin there is a resistance with 720 ohms is connected to boost the life time of LED. D9 pin is connected to the positive of the buzzer. The buzzer is used to produce sound when fall is occurred. V<sub>CC</sub> and GND: Every V<sub>CC</sub> and GND pins are

connected to the Arduino for accelerometer V<sub>CC</sub> is 5V and for GPS also V<sub>CC</sub> is of 5V. The 12V supply is given for the GSM module.

### 2.2 GSM

The GSM module is used for sending and receiving messages through worldwide. The GSM stands for Global Service for Mobile Communication. The GSM module consists of 3 pins from these 3 pins 2 pins are of digital pins and 1 is the GND pin. The TX pin of the GSM module is connected to the digital pin D10 of the Arduino and also the RX pin is connected to D11 digital pin of the Arduino. The GND is connected to GND pin of Arduino. The supply voltage of the GSM module is of 12V which is connected to V<sub>in</sub> pin of the Arduino. When the position of the body is crossing the threshold value, fall is detected; the message will send to relatives or care taker’s mobile phone through GSM as shown in figure.



Fig -2: Message Displayed on the Mobile

### 2.3 GPS

The GPS module is used for tracking a particular object or place with the exact location in the form of latitude and longitudinal values. The purpose of the GPS module is to track the location worldwide. The GPS stands for Global Positioning System. The GPS module consists of 4 pins from these 4 pins 2 pins are of digital pins and the remaining 2 pins are the V<sub>CC</sub> and GND pins. The GPS module consists of TX and RX pins. The RX pin is connected to digital pin D1 of the Arduino and TX pin is connected to digital pin D0 of the Arduino. The V<sub>CC</sub> is 5V and the GND pin is connected.

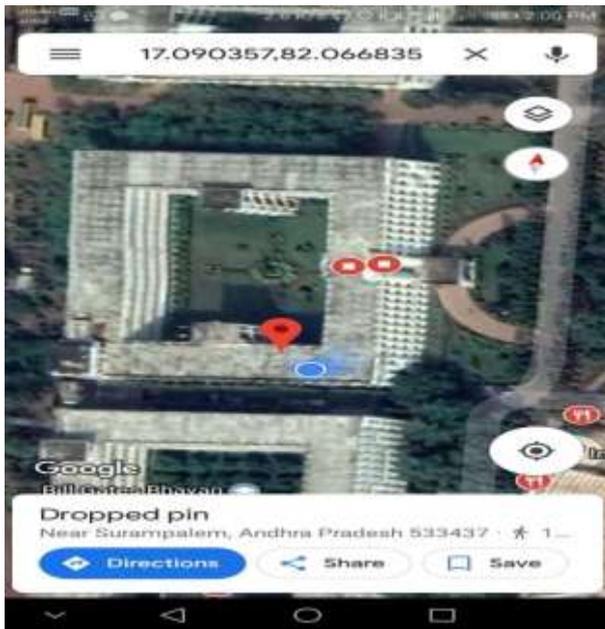


Fig -3: GPS Location

### 2.4 Finger Print Sensor

This is a fingerprint sensor module with TTL UART interface for direct connections to microcontroller UART or PC through MAX232 / USB-Serial adapter. The user can store the fingerprint data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The FP module can directly interface with 3v3 or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC serial port. Optical biometric fingerprint reader with great features and can be embedded into a variety of end products, such as access control, attendance, safety deposit box, car door locks.

### 2.5 Buzzer

The Buzzer is an electronic component which is used to make an alarm sound. We call it as piezo buzzer because it is a piezo electronic component. It is a digital component. It has two polarities as positive and negative polarity. The positive polarity is connected to 5V supply and the negative polarity is given to the ground pin of Arduino. The main function of the buzzer is to make alarm, if the fingerprint mismatches then the vehicle will not move and a message is displayed as “unauthorized finger” and buzzer starts ringing as a warning alarm.

## 3. RESULTS

The Results of the designed Vehicle theft information and tracking using IoT are displayed on the LCD screen step by step as shown below.

### Step 1: Registration of the Mobile number

After SIM insertion & kit connection, a welcome message displayed then after resetting, “Send Message” notification is displayed and the registered Mobile Number is displayed as below.



### Step 2: Enrolling fingerprint of the vehicle owner

For enrolling purpose, click on enroll button & place finger in fingerprint module then the fingerprint is enrolled and it generates user identification number.



### Step 3: Identification of Vehicle owner

i) When the fingerprint matches, a message ‘Successfully authorized’ is displayed on the screen then the Vehicle will start. (Robo indicates the vehicle)



ii) When the fingerprint mismatches, a message ‘Robot Stops’ is displayed on the screen then the vehicle Stops.

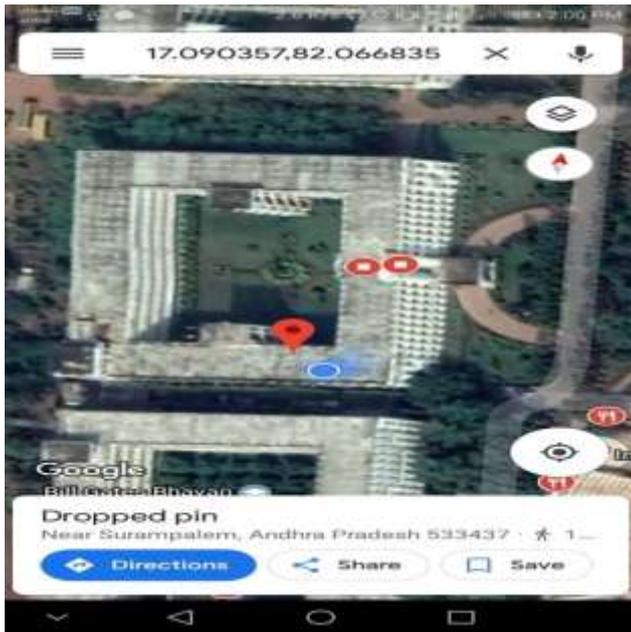


### Step 4: Tracking the location of the Vehicle

After the vehicle stops the location of the vehicle in terms of coordinates in the Google map are displayed.



Step 5: Location of the Coordinates in the Google map



- [3] Manisha Chaple SS Paygude "Vehicle detection and tracking from video frame sequence" International Journal of Scientific & Engineering Research vol. 4 no. 3 pp. 1-7 2013.
- [4] Akande Noah Oluwatobi, "A GPS based automatic vehicle location system for bus transit," 1999.
- [5] Kunal Maurya, Mandeep Singh, Neelu Jain, "Real-time tracking system using GSM and GPS technology – an anti-theft tracking system," International Journal of Electronics and Computer Science Engineering, volume 1, number 3, 2006.
- [6] Theodore, S. Rappaport. "Wireless Communications": Principles & Practice, Prentice-Hall, New Jersey, 1996.
- [7] Understanding GPS: principles and applications: by Elliott D. Kaplan, Christopher J. Hegarty– 2006

### BIOGRAPHIES



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### 4. CONCLUSION

The Vehicle tracking system is the tracking device which is generally operated by GPS is attached to the vehicle. Satellite signals are first received by it and then it determines its position co-ordinates with latitude and longitude. These coordinates are generally observed on a computer screen and by using mapping software we can see the exact position of our vehicle. Generally, vehicle tracking technology user can access the information of a vehicle based on vehicle's position and duration of each stoppage with a central operating center by entering the mobile number of users through mobile phones or websites using SMS or Internet. Vehicle-tracking technology is advantageous for tracking and monitoring both commercial and passenger vehicle, as concerned with personal vehicle tracking, it allows recovering our stolen vehicle by pinpointing that gives the exact location.

### REFERENCES

- [1] Akshatha S.A, "GPS based vehicle tracking and monitoring system- a solution for public transportation", Volume: 04 Issue: 04 | Apr -2017.
- [2] Abid Khan & Ravi Mishra, "GPS - GSM Based Tracking System", International Journal of Trends and Technology, ISSN: 2231 - 5381, Volume 3, Issue 2, 2012