

# Smart Key Access for Car Using Android App

Aishwarya ML<sup>1</sup>, Bhuvaneshwari S<sup>2</sup>, Divya B<sup>3</sup>, Harshitha S<sup>4</sup> and Aruna N S<sup>5</sup>

<sup>1,2,3,4</sup>Students, Global Academy of Technology,  
Bangalore, Karnataka, India

<sup>5</sup> Assistant Professor, Department of CSE, Global Academy of Technology,  
Bangalore, Karnataka, India

## Abstract

Recently vehicle tracking system is getting vast popularity because of the rising numbers of the stolen vehicle. Vehicles are crept away while they are parked in an unsecured place. Looking on to the safety of vehicles and preventing it from being stolen has become an important area of concern. In this paper, an android based vehicle anti-theft alarm and tracking system is proposed that tracks the vehicle location and sends the coordinates to the android application when the vehicle is unlocked. Even if fuel theft happens, owner of the vehicle would have no knowledge about it and this leads to financial loss and so, it is necessary to implement a model that monitors and records fuel filled and consumed by vehicle.

**Keywords**— *Anti-theft, Android, Vehicle tracking system, Fuel monitoring system.*

## 1. Introduction

In the last few decades, automobile industry has vigorously grown in India. These automobile industries produce a large number of vehicles per day and so securing these vehicles from being stolen is a challenge. Many innovations like central locking system have quite reduced the problem but haven't nullified the problem. Even if the vehicles are stolen, the best way to recover the stolen vehicle is by tracking the vehicle. The development of satellite communication technology is easy to identify the vehicle locations. Vehicle tracking systems have brought this technology to the day-to-day life of the common person. Today GPS used in cars, ambulances, fleets, and police vehicles are common sights on the roads of developed countries. There are plenty of existing technologies to provide tracking the vehicle location and status. The GPS/IoT based system is one of the most important systems, which integrates both GPS technology and upcoming IoT or Internet of Things terminology. With the help of GPS, the vehicle can be tracked on a continuous basis which in conjunction with law enforcement authorities or hospitals can be used to track the vehicle if it gets stolen or if the vehicle gets involved in a serious mishap. Modern Vehicle Tracking system (VTS) is the technology used to determine the location of a vehicle using different methods like GSM and GPS module. GSM and GPS based vehicle location and

tracking system provide effective, real-time mapping-based vehicle location tracking [1]. The IoT term is a relatively new and upcoming term.

The current technology that is in use is central locking system which requires manual locking and unlocking of vehicle. The problem involved in central locking system is that user might forget to unlock vehicle and could move far away from vehicle and hence creating a chance of theft. In this research paper, the vehicle is automatically locked or unlocked as and when user walks in or out of the vehicle's Bluetooth region.

In recent times, fuel management is to be considered because of high rise in fuel price especially in India. Since there is also rise in fuel theft, being aware of such theft is also necessary. In petrol bunks the management might trick the customer by filling less liters of fuel than for what customer desired to have and get paid more. Hence, monitoring fuel that is currently being filled becomes essential. Fuel sensors are used to estimate the fuel level in fuel tank, using these values it becomes easy to depict fuel theft or quantity of fuel filled.

## 2. Literature Survey

*Manyi Qian, Hailin Gao, Weihong Liu- "Android based Vehicle Anti-theft Alarm and Tracking System in Hand-held Communication Terminal".*

With the rapid development of China's automobile industry, the number of cars is increasing rapidly. Automobile has developed into an important means of transportation for people. However, while people are enjoying the convenience and speed brought by the vehicle travel, the theft of vehicles is causing more and more concern. Owing to the importance of vehicles safety, how to prevent vehicles from being stolen is becoming a hot topic in the field of artificial intelligence. In this paper, a vehicle anti-theft alarm and tracking system based on Android operating system in hand-held communication terminal is designed and developed. By using the built-in sensors of the terminal based on Android Operating System (OS), such as a smart phone, the abnormal information of a vehicle will be sent to the owner's smart

phone through communication network. In this way, the long-distance remote alarm can be realized. In addition, the usage of the positioning function of GPS or communication base station makes vehicle location tracking into possible. Finally, a demo system is performed and it can effectively perform vehicle anti-theft alarm and tracking.

*Tareq Monawar , Shafayat Bin Mahmud , Avijit Hira- “Anti-theft Vehicle Tracking and Regaining System with Automatic Police notification using Haversine formula”.*

In this paper a vehicle tracking system is proposed which track the vehicle and offers to incarcerate the vehicle in a minimum period of time when it is lost. Vehicle tracking and locking system has a Global Positioning System (GPS) and a Global System for Mobile Communications (GSM). Owner can send an edict anytime to the device which is in the vehicle. The device is password protected. Owner’s message must be incorporated with the password to unlock the device. When the device is unlocked, then it will give the co-ordinate of the vehicle through the message. If the car is filched, owner can command the device to lock the door of the vehicle and proposed system will automatically apprise nearest police station about stealing event. Haversine formula is used to find out the nearest police station from GPS data and back end database. Then the nearest police station may commence necessary actions to recover the vehicle. The whole system is powered by a rechargeable battery and adapter. This paper elucidates the anticipated result and gives some gist about future implementation.

*Mrs.S.A.Chiwhane, Mrs. Deepa Mishra, Akshada Kawane, Shweta Kompa, Pranali Survase, Pratiksha Thorat- “IOT Based Fuel Monitoring for Future Vehicles”.*

Nowadays, actual record of fuel filled and fuel consumption in vehicles is not maintained. It results in a financial loss. To avoid this loss, monitoring and tracking system is implemented by an IOT based Fuel Monitoring in vehicle. The fuel monitoring system is built on ESP8266 Wi-Fi chip. This system uses Hall Effect Sensor to calculate the information about tank’s current fuel level and also the amount of currently inserted fuel. It delivers data to the ESP8266 Wi-Fi chip. ESP8266 chip is a hardware which connect flow sensor and server, then server send that data on users android app. On the unavailability of device, it stores data into memory. This system is based on IOT technology which provides security to user identity to authenticate access and identify impersonated devices or fake devices in the network. The purpose of the IOT is to make possible things to connect at any time, in any place, with anything and anyone ideally using Network and service.

### 3. Proposed Work

#### 3.1 Problem statement

- In traditional alarming system, since the parking locations of the cars are usually far, the owner cannot hear the alarm.
- If the vehicle is stolen and driven away, the owner cannot track it in time.
- Nowadays, actual record of fuel filled and fuel consumption in vehicles is not maintained, it results in a financial loss when fuel theft happens.

#### 3.2 Existing System

- A system is developed to make a solution to regain the vehicle after notifying law enforcing authorities. In this system, user can track the vehicle using messaging.
- When the vehicle is theft, user or owner can command to lock the vehicle door along with engine killing arrangements and send coordinates of lost vehicle to the nearest police station [2].
- In the initial time sometimes the transmitted latitude and longitude can be big metal object, high building or congested place can disrupt GPS signal [3].
- Use of IOT technology and Raspberry PI computes fuel quantity present in the tank but it cannot estimate the fuel intake that is currently being deposited to vehicle.

#### 3.3 Proposed System

- The owner receives a notification when the vehicle is been touched or displaced from its original position, then he can use his android app to track the vehicle.
- The exact location of the vehicle is been tracked using GPS module [4].
- The owner gets the information about the amount of fuel inserted and consumed to find out the fuel theft and for fuel management.
- The cloud server stores data and further sends it to user application.

### 4. Hardware Requirements

- Renesas microcontroller: The microcontroller which is the core component of the project.
- LCD: LCD is utilized to demonstrate the whole project.
- Bluetooth: It is used for the activation of the vehicle by the specified person without the vehicle key.

- GPS: GPS will track the exact location of the vehicle and send it to an authorized person for the alert [6].
- L293: integrated circuit motor driver used for simultaneous, bidirectional control of motors.
- Dc motor.
- Toggle switch: The toggle switch is used to turn on and turn off the vehicle.
- Fuel sensor: Fuel sensor is used to measure the contact of the fuel in the vehicle.

## 5. Software Requirements

- Renesas flash Programmer tool: This tool is used in microcontroller which is used for memory storage. It provides functional support for programming the on-chip flash memory of Renesas microcontroller.
- CubeSuite+ IDE: It is a workspace where the RC78 microcontroller code is been written. It offers a highly user-friendly environment featuring significantly shorter build time.
- Android app: This is used for the user to interact with the hardware.

## 6. Implementation

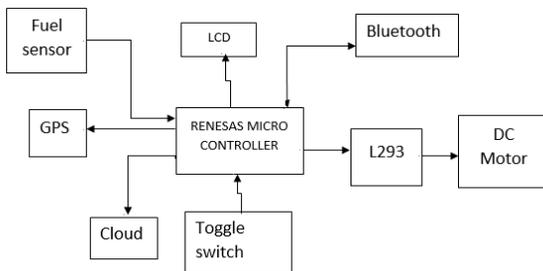


Fig. 1 Block Diagram.

Many embedded systems have substantially different designs according to their functions and utilities. In this project design, the structured modular design concept is adopted and the system is mainly composed of a microcontroller, DC, GPS, toggle switch, fuel sensor, LCD and Bluetooth as shown if Figure 1.

The microcontroller located at the center of the block diagram forms the controller unit of the entire project. Embedded within the microcontroller is a program that helps the microcontroller to take action based on the inputs provided by the output of the sensors. Based on the code embedded within the microcontroller, the D.C motors is turn on and turn off. The D.C motor in the project demo represents a vehicle. Here LCD is used in the

demonstration to display the actions taking place. The Bluetooth module is used for the communication between the vehicle and the owner, suppose the owner forgets the key during that time he can make a communication between the vehicle and android and turn on the module by using the toggle switch, where the toggle switch is used for the turn on and turn off the vehicle. If the theft has happened, then the system will send an GPS co-ordinate to the registered cloud. Meanwhile, using the co-ordinates stored in cloud, owner can track the vehicle.

Here the fuel sensor has been used for the measurement of the oil to the vehicle; in the module the sensor will measure the fuel. Cloud is used for storage of location, fuel level and other information regarding the vehicle. A vehicle tracking system combines the installation of an electronic device in a vehicle or fleet of vehicle to enable the owner or third party to track the vehicle's location and collecting data in the process.

## 7. Results

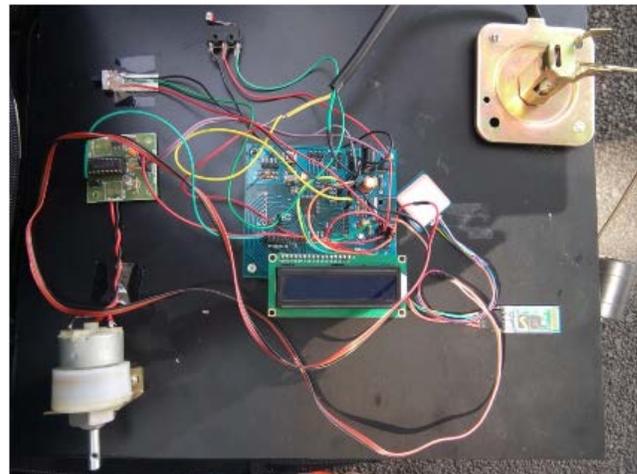


Fig. 2 Hardware components connections

Figure 2 shows the connections done using wires. The sensors such as Bluetooth, GPS, Fuel sensor, DC motor and its L293 driver are connected to the microcontroller for receiving and sending commands and data.

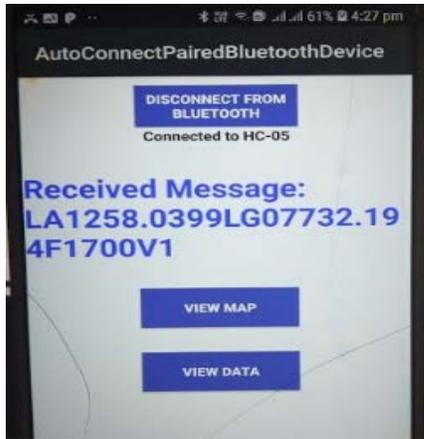


Fig. 3 Android app in Phone.

Figure 3 is a picture of app running on android phone. When the Bluetooth module in vehicle and phone gets connected the latitude and longitude co-ordinates are displayed on phone.

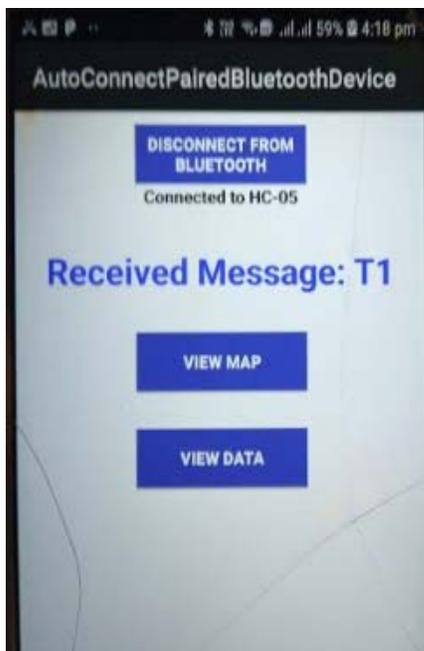


Fig. 4 Touch notification in app.

When vehicle has been touched the message is sent to android app as shown in Figure 4. Even a voice message is thrown when app receives a T1 message from hardware.

## 7. Conclusions

In this project we have designed and developed a vehicle anti-theft alarm and tracking system based on android OS

in hand-held communication terminal. In addition, a demo system is realized to perform the function of vehicle anti-theft alarm and tracking effectively. The traditional central locking system can be overridden. An android app is designed such that it sends a notification to the user when the vehicle theft happens. Android app deployed in owner's phone is sufficient to unlock the vehicle and henceforth, unlocking of vehicle by any unknown persons would be difficult. Owner's phone gets the exact location of the vehicle. The amount of fuel filled and fuel consumed is calculated, and the information of the transaction is recorded and can be viewed by the user. For the demo purpose we will develop a prototype model.

## 8. Future Enhancements

For project demo concern, we have developed a prototype module. In future, this project can be taken to the product level. To make this project as user-friendly and durable, we need to make it compact and cost-effective. Going further, most of the units can be embedded along with the controller on a single board with the change in technology, thereby reducing the size of the system. Finger print scan can be used for Bluetooth connection and authentication.

## References

- [1] A.T. Hapsari, E.Y. Syamsudin, and I. Pramana, "Design of Vehicle Position Tracking System Using Short Message Services And Its Implementation on FPGA", in *PCA PDA '05*, 2005, p. 56-61.
- [2] O. Al-Bayari, B. Sadoun, "New centralized automatic vehicle location communications software system under GIS environment", *IJCS*, vol. 18, Issue 9, pp. 833-846, April 2005.
- [3] Committee on the Future of the Global Positioning System; National Academy of Public Administration (1995). *The global positioning system: a shared national asset: recommendations for technical improvements and enhancements*. National Academies, National Research Council, U.S.A., 2013.
- [4] M.F. Saaid, M.A. Kamaludin, M.S.A. Megat Ali, "Vehicle Location Finder Using Global Position System and Global System for Mobile," in *ICSGRC'14*, 2014, p. 279-284.
- [5] Mohammad A. Al-Khedher, "Hybrid GPS-GSM Localization of automobile Tracking System", *International Journal of Computer Science & Information Technology (IJCSIT)*, Vol. 3, No 6, pp. 75-85, Dec. 2011.
- [6] (2015) Official U.S. Government website about the Global Positioning System (GPS) and related topics. [Online]. Available: <http://www.gps.gov/>