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# ANTI-THEFT ALERT SYSTEM FOR SMART VEHICLES USING MOBILE APP

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**Abstract - Theft security of vehicle in common parking places has become a matter to concern. To overcome this problem, we have an idea. There is a system that doesn't allow tampering with ignition systems of vehicles, it captures the picture of a thief and also shares the location. The system will warn the mobile-phone about the tampering of the vehicles ignition key knob etc. when the parking mode is ON in our app. There is mobile application for warning the owner/mobile-phone. If the vehicle is lifted during parking mode, the app will alert the owner/mobile-phone through the app and also track the vehicle. In 2<sup>nd</sup> part of system, there is a Feature when an Unknown person allows to tamper with the Vehicle then Pi camera takes a picture and sending to registered application Gmail. There are the functions like this Tampering detection, tampering of ignition wire, attempt to lift, thief attempt to start vehicle without key, App/mobile warning, GPS tracking of vehicle, capturing picture of thief, and extra function apart from mobile application is Image processing system**

**Keywords:** Android Application; Hardware; Raspberry Pi board B+ model; Software; Vehicular Security System

## I. INTRODUCTION

The vehicle security system is important for the peoples to protect their vehicle from theft person. According to the Satara Police, every year nearly 3600 vehicles which amount to Rs. 115 Crore got stole in India. Only 14,400 vehicles are traced by the police. It is only with the presence of antitheft devices that a theft attempt can be frustrated. To overcome these problems, we proposed a system where, system will send alert message as well as send location if the vehicle cross certain range which we set in the program. if any unauthorized person doing something wrong to the vehicle the system will take the picture of that person. GSM (Global System for Mobile) is the type of modem where we can insert

Sim card and operate like a mobile-phone. It is used to provide alert message to the owner. GPS (Global Positioning System) is inserted in the vehicle which share the location of the vehicle. In our system we are using Raspberry Pi Microcontroller. In this system we will using android application also, which is used to switch on/off the ignition key. PI camera is fit in the vehicle and it capture the image of that person. Flow sensor is connected in the nozzle of the fuel tank which will detect measurement of fuel inserted in vehicle and displayed it on LCD screen. This system will work on both two- wheelers and four wheelers.

## II. RELATED WORK

Mithileysh Sathiyarayanan Srishtibiz (R&D London, UK), Santosh Mahendra Srishtibiz (R&D New Jersey, USA) and Rajesh Babu Vasu Srishtibiz (R&D New Jersey, USA). A smart vehicle security system using IOT, has turned a Customary Vehicle Security Systems to a Smart Vehicle Security Systems which access and controls vehicles remotely using a Smart mobile-phone. The IOT based system employs the integration of Radio Frequency Identification, Global Positioning System, Global System for Mobile communication, wireless communication, cloud networking Manyi Qian, Hailin Gao, Weihong Liu (School of Electronic and Information Engineering, Beijing Jiaotong University, Beijing, China). A novel vehicle anti-theft alarm and tracking system based on Android OS has developed. The system works on latitudes and longitudes of the car received by the mobile-phone's mobile-phone and are combined with a Google map or a Baidu map so the location could be displayed on the map to track more easily. The proposed vehicle anti-theft alarm and tracking system uses the existing communication network and Internet through a kind of instant communication software called Huanxin Instant Messaging Cloud.

Deepali Virmani, Anshika Agarwal (Department of Computer Science, Bhagwan Parshuram Institute of Technology, New Delhi, India) Devrish Mahajan (Amity Institute of Space Science and Technology,



Amity University, Noida, UP, India). An inaccessible and advanced security system that senses vehicle movement, alerts the mobile-phone, accepts mobile-phone's commands and also responds automatically to a security threat has created. The system is easy to use and learn due to its simple message and call alert feature.

B.G. Nagaraja, Ravi Rayappa, M Mahesh (Lecturers, Electronics & Communications Eng. Dept., East West Institute of Technology, Bangalore-91, India), Chandrasekhar M Patil (Research Scholar, Electronics & Communications Eng. Dept., Jayachamarajendra college of Eng., Mysore91), Dr. T.C. Manjunath (Professor & Head, ECE Dept., New Horizon College of Eng., Bangalore-87, India.). The system tracks the vehicle at a higher degree of accuracy by using GSM Technology, Assembly language is used to write Microcontroller codes to control the theft of the vehicle.

Samir Rana (Assistant Professor, Department of Computer Science & Engineering, Lovely Professional University), Ritu Mewari (Assistant Professor, Department of Computer Science & Engineering, Baba Farid Institute of Technology, Dehradun, India), Lata Nautiyal (Assistant Professor, Department of Computer Science & Engineering. The developed mobile application has the functions of the vehicle, ensure the locking of the accelerator, so that the vehicle will not move. A Raspberry pi board B+ model, a jaw or a gripper and other hardware devices are used. ADT, SDK tools and UI design tools for rapid prototyping are used for designing applications owner's interface. Application is developed in JAVA programming language using Android. Python I used to do coding on the GPIO pins of the Raspberry pi board B+ model.

### III. PROPOSED WORK

In this system we are going to design software and hardware interface device for the security of vehicles mainly we have five features

- 1) Ignition Key Control
- 2) Alert on specific range distance
- 3) Unknown person's image capture
- 4) Vehicle location sharing
- 5) Face Recognition

In this system we are use Raspberry pi microcontroller to design the system pi camera for capturing the image of unknown person (theft person). GSM and GPS are used for sharing the location of vehicle. Relay is use for setting the limited range in vehicle for operating the whole

system Android application will the connect with our device. Python programming will be used for the system.

When application is turn on if any unknown tried to theft the vehicle image of that person will be share to owner with the help of pi camera and Raspberry pi microcontroller. Particular range is set in our system if theft person moves our vehicle beyond the range alert SMS will send to owner. Flow sensor will measure how much amount fuel insert in our vehicle.

## IV. METHODOLOGY

### A. BLOCK DIAGRAM

The system contains both hardware and software part. Hardware parts contain raspberry pi microcontroller, Pi camera, GPS (Global Positioning System), GSM (Global System for Mobile), Relay, Flow sensor. Software part include python programming and android application. The raspberry pi is the main component of the project. It is the major components of the system which control the action/performance of other devices

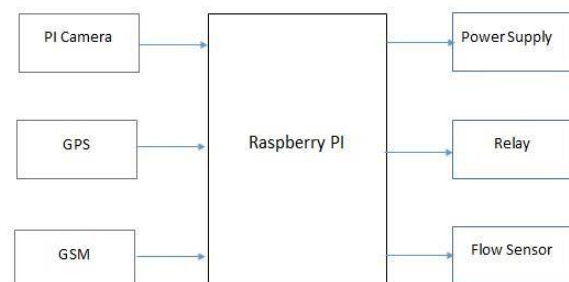


Fig No.1: Block Diagram of the System

### B. WORKING

#### 1. Ignition key Control –

In our mobile application, when the switch is off vehicle's ignition key does not start. Owner send some value or password to the Raspberry Pi. Then that information will be read by the inbuilt Wi-Fi which is already fixed in the Raspberry Pi. After that it will compare that values and check if it is right or wrong. If that value is right then owner can use the ignition key and start the vehicle. This all will be possible by the help of Relay and Raspberry Pi.

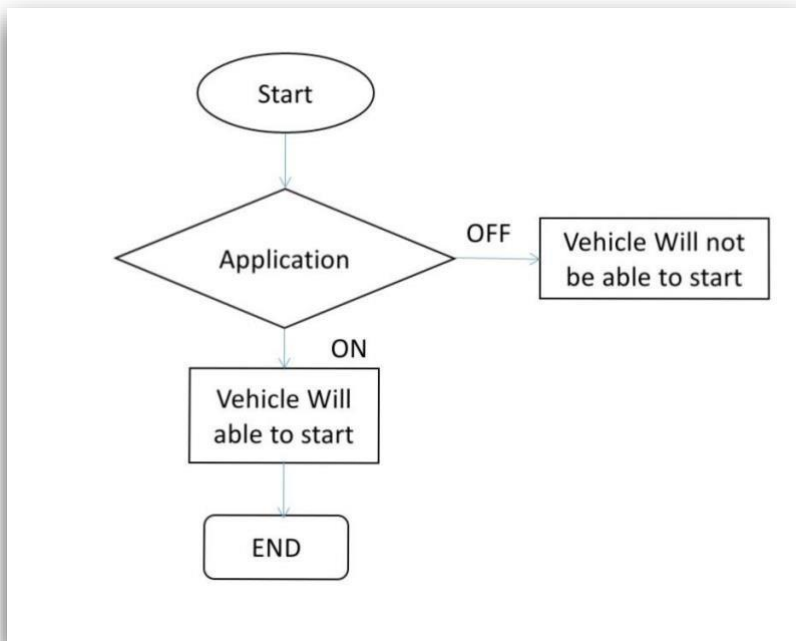


Fig No.2: Flowchart for Ignition Key Setup

## 2. Vehicle Range Setup:

This feature works to give an alert to the owner that his vehicle is going out of given range. In this condition owner gets an alert through the email which is send by Raspberry Pi. And it is possible by using GPS. We set some range in GPS and then it will check the vehicle is going out of range or not. If vehicle goes out of given range then it sends alert with the location of vehicle.

In this way Vehicle range setup works.

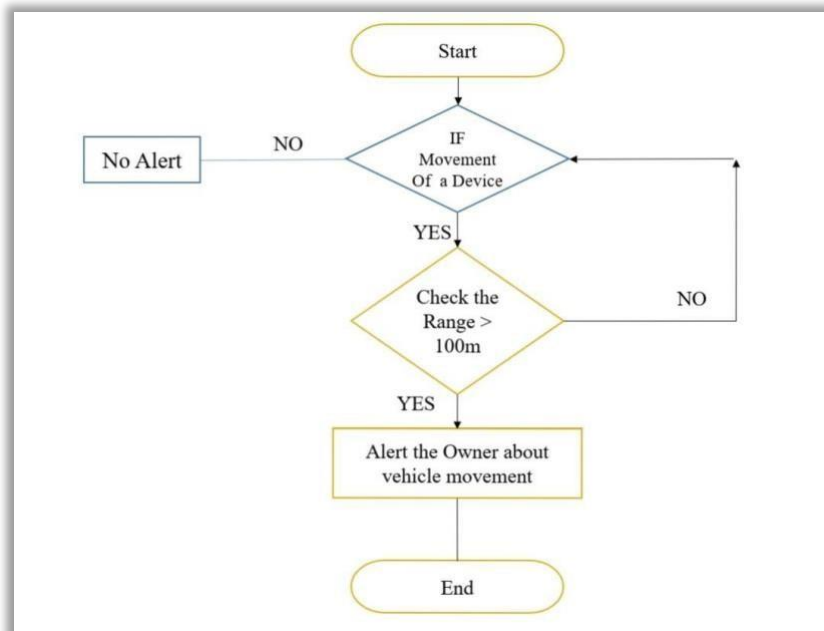


Fig No.3: Flowchart for Vehicle range setup

### 3. Taking picture of unauthorized person

If unauthorized person is detected by the system. The system will capture the image of that person and send it the email which is saved in the programming. Also, the system will send the alert message. For these modules there is raspberry pi microcontroller where we used python programming. And pi camera which is connected to the microcontroller will take the picture of unknown person. The image will be saved in raspberry pi and after this microcontroller send this image to mail.

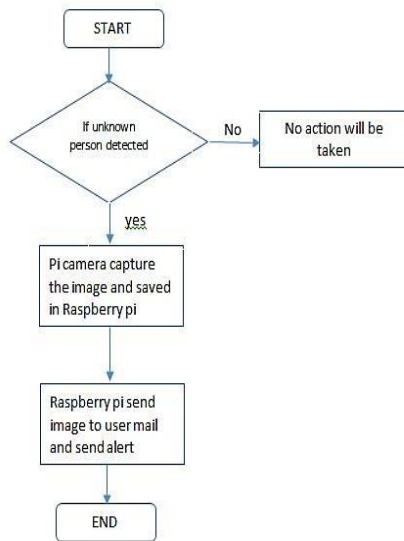


Fig No.4: Flowchart for Taking image of unknown person

### 4. Vehicle location sharing

Here we are using GPS System for sharing our vehicle. If any Unknown Person lifting the vehicle the and it Cross the limit of range the instance will give an update on registered g-mail or application owner interface we will track our vehicle by using GPS system and it will be Helpful to the Owner for tracking the Vehicle.

### 5. Face Recognition

The face recognition procedure simply requires any device that has digital photographic technology to generate and obtain the images and data necessary to create and record the biometric facial pattern of the person that need to be recognised. If any person tampered with our vehicle then the install camera will automatically click the picture and send to the application owner interface. From we can identify the thief and we protect our vehicle from them.

### C. SOFTWARE

### 1. ADT (Android Developer Tools):

ADT is a plugin for eclipse that has a set of tools integrated with the eclipse IDE. It will help to developed an Android apps. ADT has SDK tools and UI design tools for rapid prototyping, designing and building your applications owner's interface. Application is developed in JAVA programming language using Android SDK.

### 2. Python:

Python is an open-source programming language. It has a clear syntax as compared to other languages. Which can't be done in C and C++. Python is a portable language across all major hardware and software platforms. We have used python language for the GPIO coding pins of the Raspberry pi board B+ model, as it is the best and easy language to use with Raspberry pi board B+ model.

### D. HARDWARE

### 1. Raspberry Pi 3-model B+:

This system works on the microcontroller. In this system. it supports wireless internet out of box with built in WIFI and Bluetooth. raspberry pi exists with a series of small single board components with 1.5 GHz 64-bit quad core processor, memory with 1 GB LPDDR2 SDRAM .and the power has a USB connector for 5.1V /2.5 A. It has a GPIO Header 40 pin connection. It has four USB 2.0 ports.



### 2. Pi Camera:

It captures the various facial features of authorized and unauthorized person and access the information as data base. The pi camera supports a horizontal and vertical subsampling and have various effects such as whiteboard, blackboard, film, blur, saturation etc.



### 3. Relay:

Relays are the electric switches that use electromagnetism to convert small electrical stimuli into larger currents. These conversions take place when electrical inputs activate electromagnets to either form or break existing circuits. By supporting weak inputs to power stronger currents, relays effectively act as either a switch or an amplifier for the electric circuit, based on the desired application.



### 4. Flow sensor:

A flow sensor (referred to as a “Flow Meter”) is an electronic device it is used to measure the flow of the liquids in the pipes. Flow sensors are generally connected to gauges to provide their measurements, but they can be connected to computers and digital interfaces also. They are commonly used in HVAC systems, medical devices, chemical factories, and often in septic systems. Flow sensors are able to detect leaks, blockages, pipe bursts, and changes in liquid concentration due to contamination or pollution.



### 6. GPS:

The global positioning system (GPS) is a space based satellite navigation system that provides location and time information in all weather conditions anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellite.



### 7. GSM:

It is an open digital cellular technology which is used to transmit mobile voice and data services. GSM is a trademark owned by the GSM association. It is the most common voice code used Full rate.



## V. FUTURE SCOPE

In Future, when the prototype system would be commercially implemented as a working system in modern day vehicles A security Concern would also arise when an illegal access to the mobile-phone's mobile-phones provides access to the password required to run the vehicle, the vehicle unable to judge mobile-phone's identity smartly. This scenario can be tackled by further improving the system using IoT. i.e. Internet of Things.

The idea of proposed system is to replace the conventional security system with the internet of things (IoT), where the vehicles are connected to the internet and can be accessed from anywhere by means of android smart mobile-phone which is capable of connecting to the internet through wireless network.

## VI. CONCLUSION

The purpose of developing this system is mainly to introduce an inaccessible and advance security system that senses vehicle movement, alert the mobile-phone and also respond automatically to a security threat by using Raspberry micro controller. This work is to protect vehicles from the thief. By



this work which is presented in the paper it is very easy to track the vehicle at a higher degree of accuracy, since it is based on GSM technology which is very develop now. It can also capture the image of unknown person who's tampering with the ignition key by the help of pi camera we are using the flow sensor to calculate the exact amount of fuel inserted in a vehicle.

This system easy to used and proposed in this system proves to be an effective solution over the existing anti-theft system with a owner -friendly environment, ease of use and more security.

#### **ACKNOWLEDGEMENT**

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