

IoT Based Vehicle Theft Detection

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Property crimes are said to hover around 10 million annually. Of this, vehicle theft tops the list and often occurs in all parts of the world. There are so many recent technologies evolving and new methods are being upgraded to overcome this issue. The methods involved in vehicle theft detection have become aware to everyone including the burglars and they try to break the system and steal the vehicle. This paper proposes a system presenting a mechanism to minimize vehicle thefts. The system provides security by sending an alert message as soon the vehicle is stolen or moved without knowledge of owner. System also offers location updates periodically to the registered user through internet of things. This provision for theft vehicle tracking is provided by GPS technology by sending location. GSM technology is used to send an alert message to intimate the owner when the vehicle is started.

Keywords: *GSM technology, GPS, alert message, location, internet of things, vehicle tracking.*

I. INTRODUCTION

In recent years vehicle theft has become a major issue which should be traced and detected. The safety and security of the vehicle is essential. Even there are many existing mechanisms they have some limitations and high cost. So, an efficient security mechanism is needed.

This project detects vehicle theft. Arduino is the main component which is used to interface dc motor and GPS, GSM. The place of the vehicle identified using

Global positioning system (GPS) and Global system mobile communication (GSM) with the help of Wi-Fi module ESP 8266. GPS is a space-based navigation system used to track the vehicle and it gives the location of the robbed device in all weather conditions. It gives the latitude and longitude of the device using GPS antenna. GSM is a specialized type of modem

which accepts a SIM card, and operates just like a mobile phone. It is used to provide information to the owner and alert him with a message having latitude and longitude of the vehicle. This total system is operated with a switch which is made on when we park the vehicles out. Now if the vehicle theft happened, dc motor starts and the above procedure continues and the information is posted using internet of things. This vehicle theft prevention and tracking system is used in client's vehicle as a theft prevention and rescue device.

II. EXISTING METHODS

Mostly used systems are beepers, alarms, and biometrics. But, all these commercially available products are very high-priced. By using the car buzzer it's easy to protect your vehicle from getting theft. But when your car is far away from you the buzzer or alarm detection might not be that beneficial.

Car alarm techniques are used to prevent the car theft with the help of different type of sensors like pressure, tilt and shock & door sensors. These systems however bear some limitations such as high cost, high false-alarm rate, and easy to be disabled. In order to solve these problem recent advancements in computer hardware and software have enabled automobile industry to develop affordable automated biometrics-based identification and verification systems. Many biometrics, including face detection, facial features, hand geometry, handwriting and voice have been used for the identification and verification of individuals. But biometric has its own disadvantages such as the systems are not 100% accurate, they require integration and/or additional hardware and cannot be reset once compromised, you can always change your password if somebody learns it, but there's no way to modify your iris, retina or fingerprint. Once somebody has a working copy of these, there's not much you can

do to stay safe, other than switching to passwords or using another finger.

Some of the reasons due to which vehicle protection using alarm is limited like due to longer distance (range), siren cannot be heard, most of the cars have similar sounds, and physically, alarms can be disabled on theft attempts, alarm sound can be mitigated in crowded areas.

III. PROPOSED METHOD

This paper presents an IOT based vehicle theft detection system. As there are many systems used till date to detect the robbed vehicle, proposed system overcomes most of the limitations of existing systems and methods. In this mechanism as soon as the dc motor starts i.e., vehicle theft occurs, Arduino activates GPS, GSM and sends an alert message to the owner and the longitude and latitude readings of vehicle are posted using internet of things with the help of Wi-Fi module. The entire mechanism can be operated with a switch for user convenience. Proposed system block diagram can be shown below in Fig 1

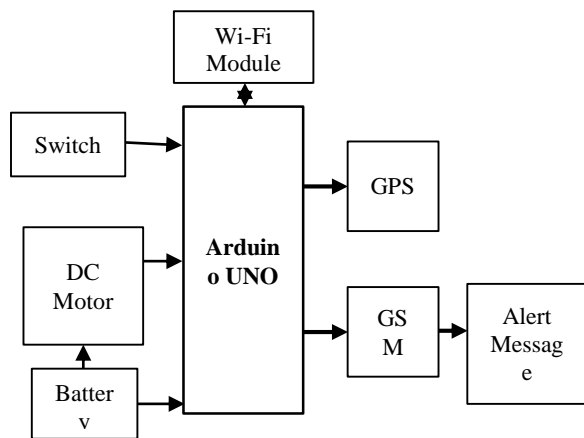


Fig 1. Proposed System Block Diagram

A. Arduino UNO:

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. Arduino when connected to a computer with a USB

cable or power it with a AC-to-DC adapter or battery gets started.

B. Wi-Fi Module - ESP 8266:

The ESP8266 Wi-Fi Module is a self-contained SOC that can give any microcontroller access to your Wi-Fi network. Each ESP8266 module comes pre-programmed with an AT command set firmware, that is, it can simply have hooked up to Arduino device and get Wi-Fi ability. The ESP8266 module is an extremely cost-effective board with a huge, and ever growing, community.

C. DC Motor:

Most common type of motor. DC motors normally have just two leads, one positive and one negative. If you connect these two leads directly to a battery, the motor will rotate. If you switch the leads, the motor will rotate in the opposite direction.

D. Switch:

This is used to activate the entire theft detection system. As long as switch is in ON position SMS alert and location will be sent to owner as soon as vehicle starts. If the switch is OFF, no alert will be sent and location details are also not shared. In this way, using switch we can control system activation and deactivation.

E. GPS (Global Positioning System):

Global Positioning System (GPS) is a satellite-based navigation system. We use NEO-6M GPS module as it is compatible with a variety of GPS receivers. It has a built-in ceramic antenna. Integrates with a 3V button battery. Normally GPS works in any weather conditions at anywhere in the world. A GPS receiver must be locked on to signal of at least 3 satellites to estimate 2D position (Latitude and longitude).

F. GSM (Global System for Mobile Communications):

GSM is a specialized type of modem which accepts a SIM card, and operates just like a mobile phone. Here we are using SIM 900A GSM module. SIM900A Modem is built with Dual Band GSM. It works on

frequencies 900/ 1800 MHz. SIM900A is a compact and reliable wireless module. Here as soon as the motor initializes an alert message having latitude and longitude of the vehicle is sent to the owner using GSM module.

IV. RESULTS AND DISCUSSIONS

The below figures show the circuit (figure 2) and alert message received as soon as the motor starts and location of the vehicle can also be sent in message (figure 3) and the vehicle longitude and latitude readings are also posted using internet of things (IoT) as shown in figure 4.

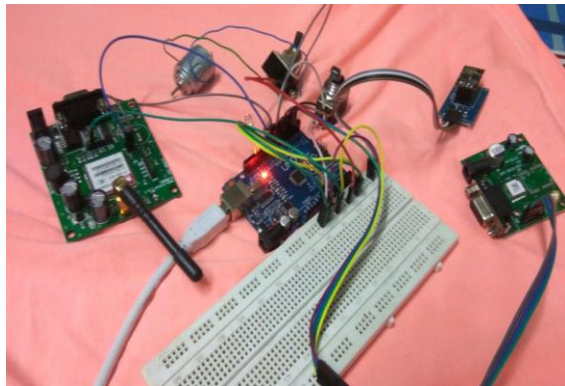


Fig. 2 Circuit connecting Arduino and other components

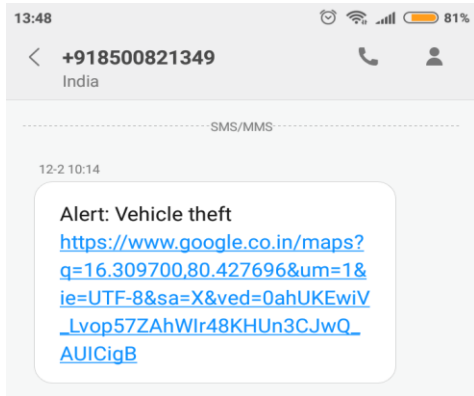


Fig 3(a)

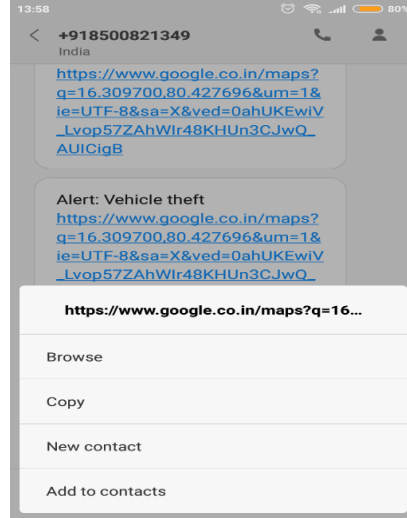


Fig 3(b)

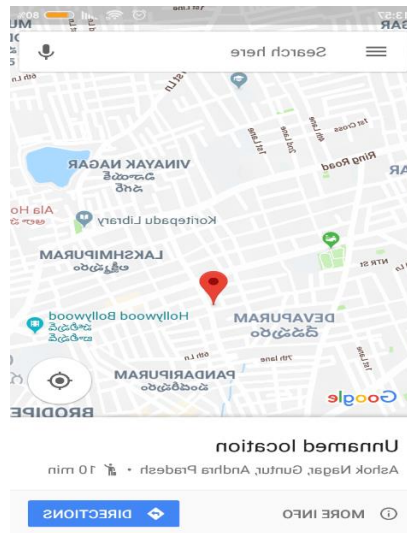


Fig 3(c)

Fig3 (a)(b)(c) Alert message and location sent to vehicle owner

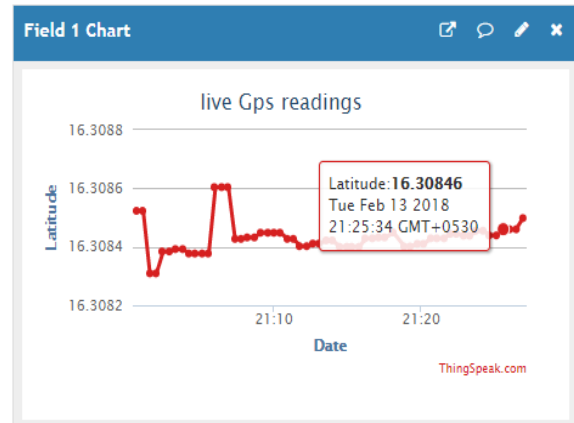


Fig 4(a)

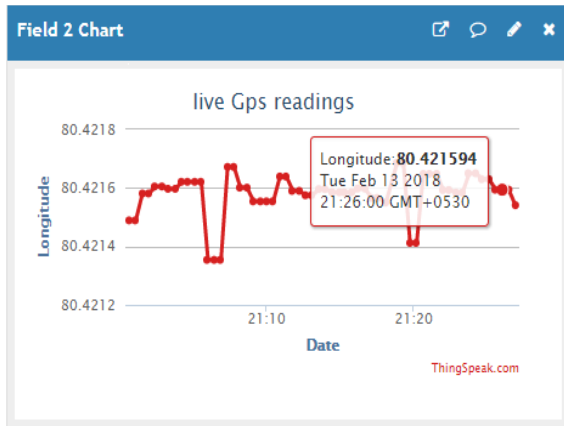


Fig 4(b)

Fig. 4(a)(b). Latitude and longitude readings posted using internet of things

V. CONCLUSION

Vehicle theft, although not as intrusive as violent crimes, causes greater loss to its victims in terms of monetary value and also in secondary economic effects. Proposed system provides vehicle safety and detects theft efficiently and effectively at very low cost.

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