
VEHICLE THEFT DETECTION TECHNIQUE

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ABSTRACT

An IoT based vehicle theft detection and remote engine locking system is GPS technology that helps the users identify the vehicle in theft mode and enables the controlling mechanism technique. At present day scenario, there is a rise in the number of vehicle thefts exponentially. Criminals are becoming smarter day by day and have reached the stage of applications present against the existing vehicle safety system. Vehicle theft has become a major issue which should be traced and prevented. The proposed system overcomes most of the limitations and the cost effectiveness and also reducing complications by making use of few high-priced products like ignition key. In proposed method we have the extension for controlling mechanisms which remotely locks the vehicle engine and prevents the theft. In proposed technique, user start/stop the vehicle either by using the android application or by the ignition keypad-based security unlocking system, tracks exact location (latitude, longitude) of the vehicle using the application anywhere any time. Android application is are very helpful for locking the vehicle engine in case of theft and upon rash driving of vehicles. In this way vehicles provided with better controlling mechanism and thus reducing the crimes.

Keywords: Vehicle Theft, Android Application, GPS, Tracking.

I. INTRODUCTION

Vehicle Tracking system is getting popular and widely used in a lot of countries worldwide. It has tons of advantages to users even more to the vehicle users in which it will make it easier for them to track their vehicles. Nowadays, everyone cannot be separated from their smartphones. a number of five thousands individuals from USA, UK, South Korea, India, China, South Africa, Indonesia and Brazil took a survey regarding which was done by Time magazine. The result proved most of them is inseparable from their smartphones, eighty four per cent allegedly claimed that survive without their smartphones Another study shows that seventy five per cent of the market share is smartphone and a total of one hundred and six million smartphone were shipped in the second half of 2012. Smartphone became the top telecommunication medium in the market in the present time worldwide and it became the most popular used telecommunication medium known to man. So, from the above mentioned survey now it's clear that how smartphones became important and integral part of our modern day life, that's the reason to make this vehicle tracking system IOT message oriented so that we can take care of our own vehicle in just one touch of our hand. Through smart phone we can track real time location of our vehicle with the help of internet connection. In such a manner, this tracking system designed so that users can have easy and user friendly interface to fetch their vehicle.

In the present day vehicle tracking is becoming essential for the purpose of improving our life condition. Convenience and ease of using vehicle is what home vehicle tracking is offering. Vehicle tracking offers a futuristic way of life in which an individual gets to control his vehicle using a smart phone, from tracking a vehicle /detecting accidental place of a vehicle; it also offers an efficient use of technology. But to get or acquire such system installed will cost a lot of money and that is the major reason of why vehicle tracking has not received much demand and attention, adding to that also the complexity of installing it and configuring it. Thus it is essential to make it cost effective and easy to configure, if this is granted to people then they will be willing to acquire it in their personal vehicles, school buses and taxis/cabs etc. In other words, a system modification for the vehicle tracking is required in order to lower the price of applying it to vehicles. Also this tracking project can be used to purpose of women safety as well as parents can be used to take care of their child/kid for the safety or missing purpose or to track their activities for their future

II. LITERATURE SURVEY

A Literature survey is a type of review article, where literature review is a scholarly paper which includes the current knowledge as well as the theoretical and methodological contributions to a particular topic.

Paper Title	“Smart Anti-Theft Vehicle Tracking System based on Internet of Things”	“Theft Detection and Controlling System of a Vehicle using GSM”	“A smart Vehicle Tracking, Accident Detection, Alert Generation Using IoT”	“Design and Implementation of a Vehicle Theft Control Unit Using GSM and CAN technology”
Methodology	Switch is provided for turning on/off the fuel line of vehicles during any emergency. RFID used for authentication purpose and the LinkIt ONE development is used as the control board system for prototyping wearable and IoT device.	An anti-theft system used to cut-off the fuel supply for the engine from the carburettor a solenoid-valve, GSM system, buzzer & GPS system, OSIM 808 module, ATmega328 microcontroller are used in this system.	Alcohol sensor is used to check if the driver is drunk or not. To check the vibrations produced, vibration sensors are used. To detect speed breakers and potholes on the road, accelerometer is used	This System, deals with the design and development of theft control system by making use of embedded system, which is based on Global System for Mobile provisioning/ communication (GSM) Technology along with CAN bus technology and RFID system.
Implementation Drawbacks	*It is an Anti-theft vehicle tracking system based on IoT which only tracks the vehicles location (latitude and longitude). *It uses RFID based driver authentication system which provides an extra layer of security	*When the vehicle is stolen, an alert message is sent to the owner to trace the vehicle’s location. *When the owner finds any threat, with the help of SMS he will cut the ignition of the spark plug with the help of relay.	*To remove the unwanted sound and noise from the readings of the sensor, Signal Conditioning circuit is used. *Via Bluetooth, the hardware unit is connected to the mobile applications	*This system is reliable, when a cellular network is available *This system makes use of a mobile phone which is embedded in the vehicle with an interfacing Engine Control Module (ECM) through control area network (CAN).

III. 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.

IV. PROPOSED METHODOLOGY

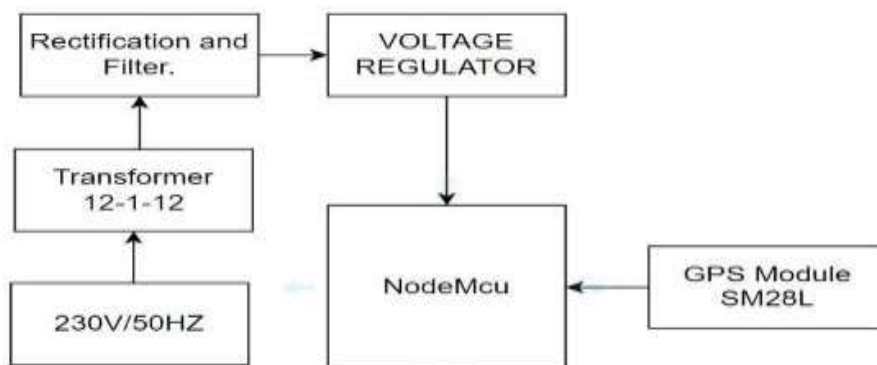


Figure 1: 3D Block Diagram of Vehicle Theft Detection Technique.

The GPS module receives the location information from the satellites it is processed by the NodeMCU (Advanced development kit within built micro controller) and sends that information to the firebase real time database (cloud). Further the information can be viewed in the android application which is developed using Blynk. The location information is updated for every 10 seconds The block diagram consists of the six blocks satellite, GPS antenna, GPS module, NodeMCU, Mobile, and Cloud. The location information (latitude and longitude) is received by the GPS module through the GPS antenna. For better reception there should be a proper impedance matching between GPS antenna and GPS module which is typically 50Ω. Further the information is transmitted to cloud (Fire base) through NodeMCU.

A NodeMCU is used for interfacing to various hardware peripherals. The current design is an embedded application, which will continuously monitor a moving Vehicle and report the status of the Vehicle on demand. For doing so Node MCU is interfaced serially to a GPS Receiver. The Global Positioning System (GPS) is a satellite based navigation system consists of a network of 24 satellites located into orbit. GPS works in any weather circumstances at anywhere in the world. A GPS receiver must be locked onto the signal of at least three satellites to estimate 2D position (latitude and longitude) and track movement. With four or more satellites in sight, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the vehicle position has been determined, the GPS unit can determine other information like, speed, distance to destination, time and other. The GPS modem will continuously give the data i.e. the latitude and longitude indicating the position of the vehicle. The GPS modem gives many parameters as the output such as the vehicle is moving or parked which then the data will be sent to the mobile at the other end from where the position of the vehicle is demanded.

V. HARDWARE DISCRPTION

Node MCU

The NodeMCU (Node MicroController Unit) is an open-source software and hardware development environment built around an inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains the crucial elements of a computer: CPU, RAM, networking (WiFi), and even a modern operating system and SDK. That makes it an excellent choice for Internet of Things (IoT) projects of all kinds.

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.

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.

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.

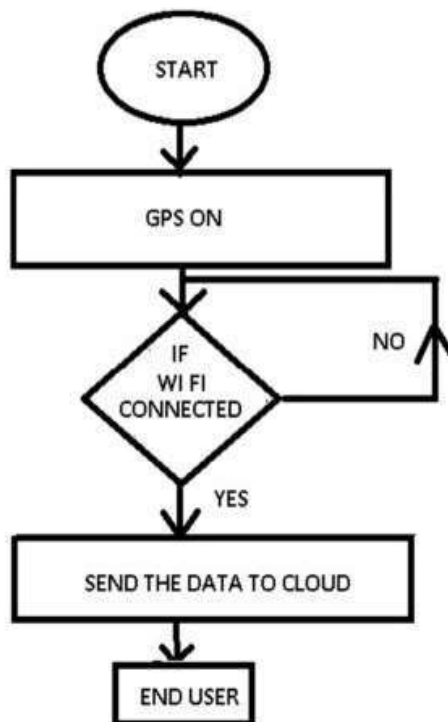
GPS (Global Positioning System)

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).

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.

VI. FLOWCHART



VII. 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.

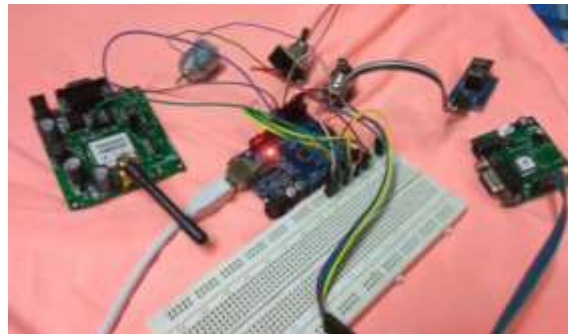


Figure 2: Circuit connecting Arduino and other components

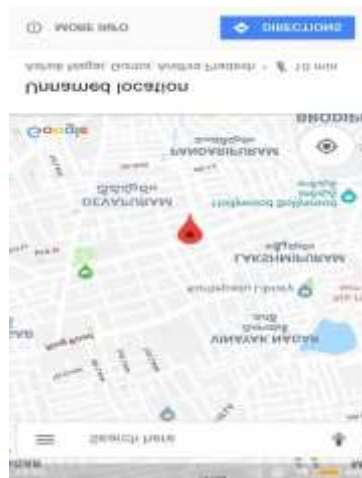


Figure 3

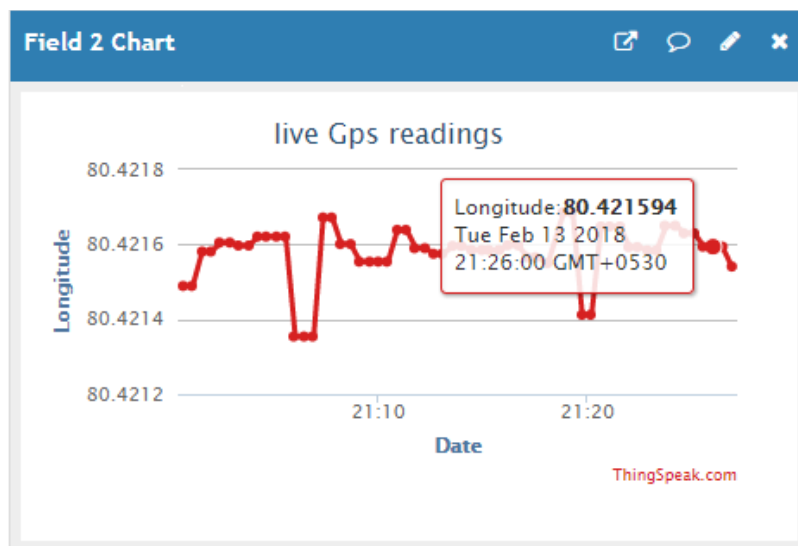


Figure 4: Latitude and longitude readings posted using internet of things

VIII. 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.

IX. FUTURE SCOPE

Establishing a wireless network communication between the Gps module and the smart phone, using a microcontroller (NodeMCu). Create a simple yet reliable vehicle tracking system using NodeMCu as a microcontroller that will be the medium between the GPS and the vehicle so that embed system works

efficiently. To find a suitable place locator app (in this project we are using Blynk app) that will work efficiently with the internet connection in order to track the vehicles.

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