

Android App for Stolen Vehicle Tracking and Engine-Disengaging System

Jayashri. M. Ahire
Computer, NDMVP's KBTCOE, Nashik
Nashik, India
Jayashriahire93@gmail.com

Swapnali.S.Baste
Computer, NDMVP's KBTCOE, Nashik
Nashik, India
swapnabaste@gmail.com

Krutika. S. Bhadke
Computer, NDMVP's KBTCOE, Nashik
Nashik, India
krutikabhadke@gmail.com

Pratibha. G. Shelake
Computer, NDMVP's KBTCOE, Nashik
Nashik, India
shelakepratibha@gmail.com

Abstract— Vehicle Security has become one of the Major problem for Owners. Due to this Avoiding vehicle theft is making buzz in present automatic industry. The aim of this project is to develop an android application to Dis-Engage the Engine of Vehicle. The system has Mobile Phone that is embedded in the vehicle with an interfacing to Engine Control Module(ECM) through microcontroller(ATMEGA328), which in turn communicates to the ECM. The vehicle being stolen can be stopped by using GPS feature of mobile phone & this information is used by owner of the vehicle for further processing. The owner sends a notification to mobile which is embedded in the vehicle that has stolen which in turn controls the engine of vehicle by locking it immediately. The engine can be unlocked by only by the sending the password to microcontroller by Authorized person only. For more safety a desktop application would be provided at the tollbooths which would also locate Stolen vehicles by using the information provided by owner at the server through his Android app. The goal behind the design is to develop security for vehicle and Embedded system to communicate with engine of vehicle.

Keywords - Microcontroller(ATMEGA328),Engine Control Unit(ECU),Global Positioning system(GPS),100 amps relay, Android 2.2(Eclipse).

I. INTRODUCTION

Thousands of automobiles are lost each year in the state and thousands of automobiles are also recovered by the Police from when they catch the culprits or even when the culprits leave the vehicles they have stolen after they have used them. The usual problem with the recovered vehicles reaching the actual owners is that the vehicle need not be found in the same jurisdiction as one in which the complaint was launched. So, when a vehicle is recovered, usually the Police try to trace out the actual owner of the vehicle from the RTO based on the license and chassis number. But this is a lengthy and time consuming process for the RTO to trace out the actual owners from the records and inform back to the Police stations. Because of these delays, vehicles that are recovered all long time to actually reach their owners. Despite the various technologies that have been introduced in recent years to detect car thefts and tracking it, It was reported that as many as cars were stolen yearly in the world. According to NCIC, in 2006, 1,192,809 motor vehicles were reported stolen, the losses were 7.9\$ billion. Several security and tracking systems are designed to assist corporations with large number of vehicles and several usage purposes. A fleet management system can minimize the cost and effort of employees to finish road assignments within a minimal time. [1][2]This project consists of a android based remote vehicle disengaging system will provide effective, real time vehicle location, mapping and

reporting this information value and add by improving the level of service provided. A vehicle tracking system will inform where your vehicle is and where it has been, how long it has been. The system uses geographic position and time information from the[8] Global Positioning Satellites. The system has an "On-Board Module" which resides in the vehicle to be tracked and a "Base Station" that monitors data from the various vehicles.

II. LITERATURE SURVEY

Vehicle security [3][4] is always been an important priority in the automobile industry. Various techniques like central locking system with alarm were one of the security parameter, which could only protect against thefts only when the vehicle was stationery. However, to keep in touch with a remote vehicle and track its other aspects like speed and location are being developed and tested Today's generation phones are not only capable of sending mails, making phone or video calls but also have the capability to control other smart phones. In this project we introduce a new efficient technique to dis-engage a remote vehicle using android technology.

A. Existing system

Vehicle security is always been an important priority in the automobile industry. Various techniques like central locking system with alarm were one of the security parameter, which

could only protect against thefts only when the vehicle was stationary. Unitracking Vehicle Tracking Unit has the ability to integrate the GPS tracking system with existing vehicle alarm or provide alarm features when someone is tampering with owner vehicle. It allows detecting the security threat before the vehicle is driven away and gives the ability to track the vehicle over the internet. The existing system has, Car alarm techniques are used to prevent the car theft with the help of different type of sensors like pressure, tilt and shock & door locking system, and GPS systems which provides a broad layout of geographical address. If Owner vehicle has been stolen then he/she must be file FIR to the police station.

B. Drawbacks of Existing System

The existing system does not provide any security to two wheelers vehicles. The cost and maintenance of the system is high. Owner must give statement to the police and wait for action that will be taken from the police. The GPS system does not provide street-wise address. Owner doesn't have knowledge about his vehicle until the police take action.

C. Proposed System

The proposed system for stolen vehicle tracking and engine Dis-engaging system is a new and self-contained product that gives complement to the existing system. The product combines the installation of an electronic device in a vehicle, or fleet of vehicles, with purpose-designed android software(application) at least at one operational base to enable the owner or a third party to track the vehicle's location, collecting data in the process from the field and deliver it to the server using GPS technology for locating the vehicle and also lock/unlock the engine of the vehicle by sending a notification to the electronic device using JSON parsing technology. Vehicles location will be located on google maps. An another android application will be provided at the tollbooths which will detect the stolen vehicles with help of information provided by the owner at the server using his android application.

III. METHODOLOGY

A vehicle tracking system [6] combines the installation of an electronic device in a vehicle, or fleet of vehicles, with purpose designed computer software at least at one operational base to enable the owner or a third party to track the vehicle's location, collecting data in the process from the field and deliver it to the base of operation. Modern vehicle tracking systems commonly use GPS technology for locating the vehicle, but other types of automatic vehicle location technology can also be used. Vehicle information can be viewed on electronic maps via the Internet or specialized software Vehicle tracking systems are also popular in consumer vehicles as a theft prevention and retrieval device. Police can simply follow the signal emitted by the tracking

system and locate the stolen vehicle. The vehicle tracking application is installed in the android mobile of the owner. [11] There is an embedded system in the vehicle which helps tracking and locking system installed in the vehicle. In case there is a theft the owner can react accordingly using the application installed in his android phone.

There are 5 buttons in the app

1. Registration
2. Lock
3. View
4. Alert
5. Unlock

Block Diagram

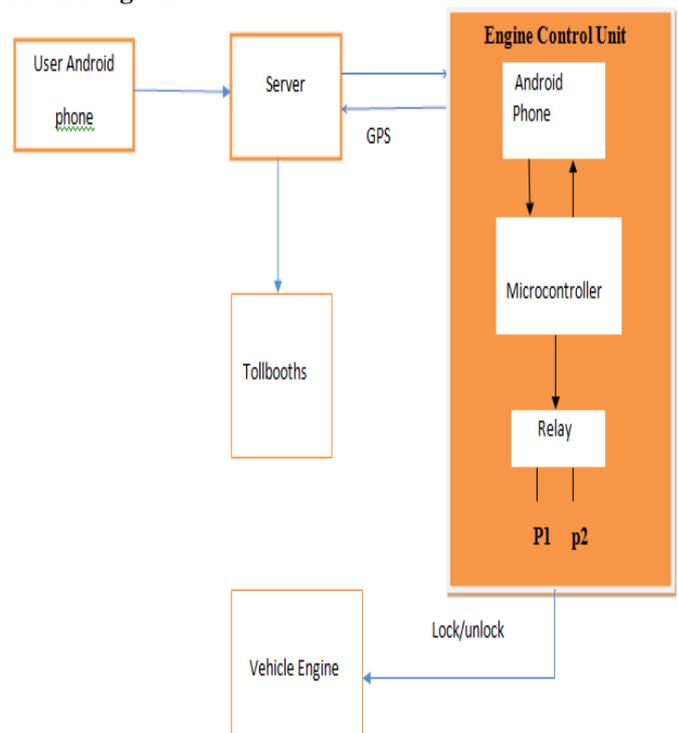


Fig: Structure of Stole Vehicle Tracking And Engine Dis-Engaging System

The registration button helps to register to the system using this we can enter the details of the stolen vehicle and owners information. Lock button is used to lock the vehicle View button is used to view the current location of the vehicle Alert button is used to alert the owner's close friends and relatives which is optional Unlock button is used to unlock the locked vehicle .The data is sent from GPS to the broadcasting satellite. The GPS receiver in the system installed within the vehicle then retrieves the location information from the satellites in the form of latitude and longitude readings in real time which is sent in the form of a message to the owner's android mobile using which the owner can track the current location of his vehicle using Google earth. [9]The owner sends messages using his android phone to the embedded system within the vehicle which successfully retrieve his vehicle. The

user interface is on the owner's Android mobile where the user can track the vehicle on Google map. When the engine starts the owner of the vehicle receives a confirmation message saying 'engine on'. If an intruder has started the car the owner clicks the lock button on the anti-theft app installed on his android phone else he simply ignores the msg. when anti-theft system installed in the vehicle receives the lock message, it locks the vehicle instantly and sends a message containing the longitude and latitude of the current location of the vehicle. The owner then clicks the view button on the app and enters the longitude and latitude to track the vehicle using Google earth. The owner can optionally alert his close friends and relatives by clicking the alert button on the app which will notify his close friends and relatives about the theft After tracing and retrieving his vehicle successfully the user can unlock the car by just clicking the unlock button on the app which will unlock the vehicle and once the vehicle starts the same procedure begins. After starting the application we select the position of the vehicle and send the data to the satellite and then we find the vehicle using the GPS coordinates sent by the satellite, after which we verify if they found vehicle is that of the owner. If the vehicle is that of the owner we stop otherwise we add the data to the target set which is then sent to the satellite.

GPS Technology

The Global Positioning System (GPS) [5] is a satellite based navigation system consists of a network of 24 satellites located into orbit. The system provides essential information to military, civil and commercial users around the world and which is freely accessible to anyone with a GPS receiver. GPS [8] works in any weather circumstances at anywhere in the world. Normally no subscription fees or system charges to utilize GPS. A GPS receiver must be locked on to 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. GPS receiver is used for this research work to detect the vehicle location and provide information to responsible person.

Json Parsing Algorithm

JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of the JavaScript Programming Language, Standard ECMA-262 3rd Edition - December 1999. JSON Algorithm

A. Client side:

1. Create socket that will communicate with server.
2. Open the port for establishing communication.

3. Check for the response from server side. Server side port should be made visible for communication.
4. Request for connection establishment i.e. handshaking between android client and web server.

5. If permission granted from server, send data.

B. Server Side:

1. Listen to incoming request. If request found assign port and create server socket.
2. If socket established and pairing between both sockets is done, Receive incoming data using PHP web service. PHP Web service will contain HTTP Request And HTTP Response for interacting with android client.
3. Check Incoming data in Database and get response.
 - a. If (response==true) then Send corresponding data to client.
 - b. If(response==false) then go to step 10
4. Parse the data from android device in the form of JSON data with the PHP web service.
5. De-serialize the data with the help of HTTP request service.
6. Service execution.
7. Serialize the data with the HTTP response service in JSON format again.
8. Android client will fetch the JSON data and parse into user readable format
9. If data sending finished, go to step 10. Else go to step 3.
10. Destroy the sockets and disable the ports using Socket. Destroy ();
Port. Enabled=false.

ATMEGA328

The **ATmega328** is a single chip micro_controller created by Atmel and belongs to the megaAVR series. The Atmel 8-bit AVR RISC-based microcontroller combines 32 KB ISP flash memory with read-while-write capabilities, 1 KB EEPROM, 2 KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter, programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughputs approaching 1 MIPS per MHz.

Android

ANDROID (Automated Numeration of Data Realized by Optimized Image Detection) Android is an operating system for mobile devices such as Smartphone and tablet computers. It is developed by the Open Handset Alliance led by Google. Android consists of a kernel based on the Linux kernel, with middleware, libraries and Computer Engineering and Intelligent Systems APIs written in C and application software running on an application framework which includes Java-compatible

libraries based on Apache Harmony. Android uses the Dalvik virtual machine with just-in-time compilation to run Dalvik dex-code (Dalvik Executable), which is usually translated from Java byte code.

ADT Plug-in for Eclipse

Android Development Tools (ADT) is a plug-in for the Eclipse IDE that is designed to give you a powerful, integrated environment in which to build Android applications. ADT extends the capabilities of Eclipse to let you quickly set up new Android projects, create an application UI, add components based on the Android Framework API, debug your applications using the Android SDK tools, and even export signed (or unsigned) .apk files in order to distribute your application. Developing in Eclipse with ADT is highly recommended and is the fastest way to get started.

IV. CONCLUSION

Thus the low cost proposed system acts as an anti theft and stolen vehicle recovery system which can be used to track a vehicle by simply sending a notification to the proposed embedded device in the vehicle. The android app both in case of personal as well as business purpose improves safety, security, communication medium, performance monitoring and recovery of vehicle. Upgrading this setup is very easy which makes it open to future requirements without the need of rebuilding everything from scratch, which also makes it more efficient.

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