

Design and Implementation for Theft Vehicle Tracking and Engine-Disengaging System

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Abstract— Vehicle security has become one of the major problem for owners. The aim of this project is to design & development of a vehicle location based system, which is used to control the theft of the vehicles. The developing system uses an embedded system based on (GSM) technology with CAN bus. An interfacing mobile is also connected to the microcontroller, which is connected to the engine system. Once, the vehicle is theft, the information is used by the vehicle owner for further procedure. The owner sends the message to the mobile which is embedded in the vehicle that has stolen in turn controls the vehicle engine by locking the working of the engine at once. The developed system accepts the message and broadcasted to the Vehicle Network through CAN Bus. The main concept in this design is introducing the mobile communication into an embedded system. The designed system is low cost & very simple.

Index Terms— GSM, GPS, Microcontroller, Relays, CAN Bus, Mobile Phone, Vehicle theft controlling unit.

I. INTRODUCTION

In this world, every industry likes to keep advancement in the technology. Automobile industry is also not behind in this aspect. Now a day's almost everyone has a car. As purchasing a car is a big investment, people are really worried about the advanced technologies in automobile industry. Therefore, automobile companies have witnessed a major boost in their technological aspects by introducing automation in the vehicles to provide user friendly and advance features to their customers.

As far as vehicle security is concerned many options are available depending upon the technology being adopted. Many auto theft alarms and devices are installed in cars but they didn't prove to be a solution to the customer's satisfaction. The automotive electronics results in customer's better safety and greater comfort and also other requirements like emission control and fuel consumption. So a more developed system makes use of an embedded system based on GSM technology. The proposed system is installed in the vehicle. Anyway if there is another way of transmitting the alarm to the car owner that is not limited to the audible and the system can be updated. SMS is a better choice of the communication than the conventional alarm, because it is not much expensive to invest. Already many people know GPS can provide more security for the car but the main reason people does not apply it because the cost. The main concept in this design is introducing the mobile

communications into the embedded system. Automotive industry use CAN as the in-vehicle network for the Engine Management system, the different body parts like door and roof control, air conditioning and lighting and also for the entertainment control. Now a day's all most all manufacturers have also started implementing CAN based vehicle automation.

II. LITERATURE SURVEY

Vehicle security is always been an important priority in the automobile industry. Different 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. However, to keep in contact 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.

III. PROPOSED SYSTEM

Commercially available anti-theft vehicular systems are very expensive. The proposed systems make use of an embedded system and GSM or GPS technology. The developed system, installed in the vehicle can be easily controlled by the owner of the vehicle by sending a message from his/her mobile to the vehicle engine by interfacing with CAN bus and GSM modem.

Once, the vehicle is stolen, the information is being used by the vehicle owner for further processing, by sitting at a remote place, a message can be sent to the interfacing GSM modem that is interfaced with the ECU which is installed in the vehicle. The main idea behind the design is to introduce the Mobile technologies into the embedded system. The proposed system is consistently good, when a cellular network is available and a tracking device is connected it transmits data to a server; when a network is not available the device stores data in internal memory and will transmit stored data to the server later when the network becomes available again.

A. Existing System

Vehicle security is always been an important priority in the automobile industry. Different 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.

B. Drawbacks of Existing System

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

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IV. BLOCK DIAGRAM

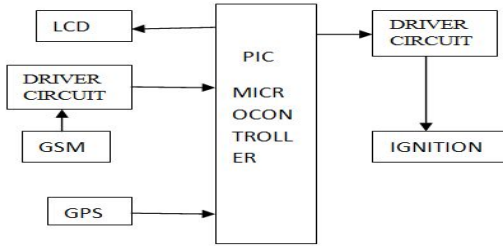


Figure 1. Block schematic for vehicle locking and tracking system.

The block diagram of the proposed system is as shown in Fig. 1. The design and development of the proposed system is done in two modules, first one was designing of module to retrieve the location and second module is to control the vehicle engine by either to lock or unlock the engine by sending ON/OFF message from the user to the Theft Control Unit.

A. Location Retrieval of the Vehicle

Location of the vehicle is a two way procedure. Initially the latitude and longitude of the vehicle is to be obtained from the satellite. The acquired latitude and longitude values are used for further computation of geographical address. The owner can receive the location details only upon sending a message. That message is set by the owner before deploying the system. Obtaining the vehicle’s location is explained in the activity diagram shown in Fig. 2.

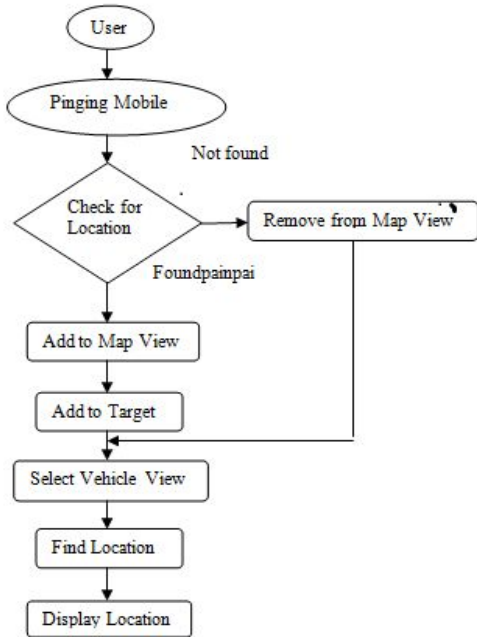


Fig 2. Activity diagram to retrieve the location of the vehicle.

V. SIMULATION RESULTS

Proteus ISIS software is used for the system simulation. This software is used for simulating and drawing the circuit diagram consists of microcontrollers, virtual GSM modem controller, relays, LED and series of resistors and transistors. Fig. 3 shows the basic circuit diagram of the system.

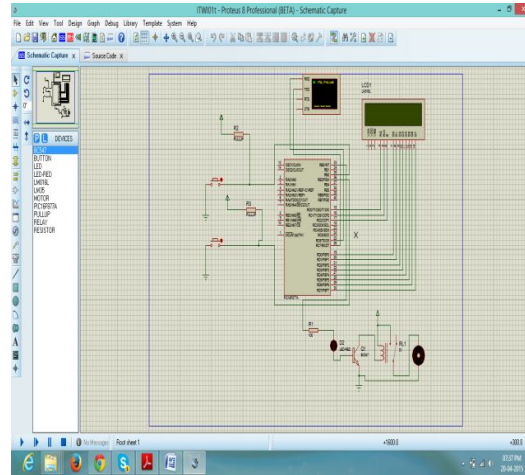


Figure 3. Schematic diagram of the system

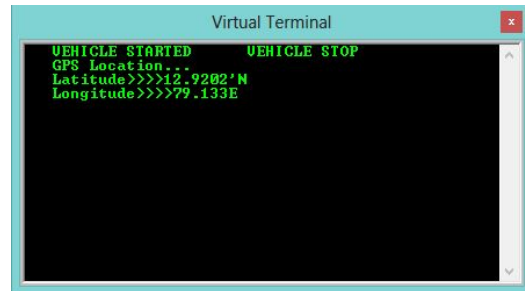


Figure 4. Results obtained in simulation software

VI. EXPERIMENTAL RESULTS

The results that are obtained after carrying out the experiment by using the following hardware components. The component includes Android Phone, LCD Display, PIC Controller, GSM Module & Relay Circuit.



Figure 5. Hardware part of project

When “OFF” message sent by the owner of the vehicle to the mobile embedded in the control unit and it displays the message in the LCD as in Fig. 6(a) & 6(b) and invokes the relay which is connected to the vehicle engine which will stop the ignition of vehicle by sending message through the CAN Bus in the CAN readable format.

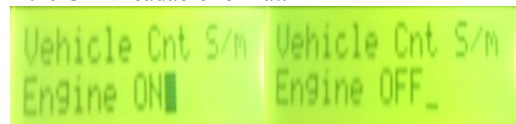


Figure 6. (a) LCD displaying “Engine is off”. (b) LCD displaying “Engine is on”.

The Fig. 6 shows the typical message sent by the Android mobile to the owner mobile when there is a network, by

invoking app in Android mobile and hence displaying the location in terms of latitude & longitude in mobile phone.

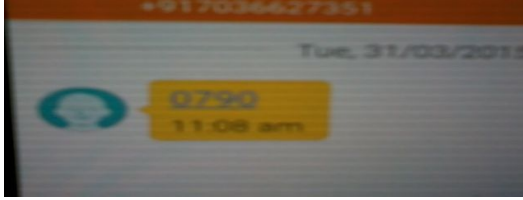


Figure 7. Location details received on owner mobile.

CONCLUSION

The developed system in this paper for avoiding vehicle theft makes use of a mobile phone that is embedded in the vehicle through Controller Area Network (CAN) Bus. The theft vehicles can be stopped by using GPS feature of mobile phone and this information is used by the owner of the vehicle for future processing. The proposed system is less cost effective vehicle tracking control system that could be implemented on any vehicle since the system is developed by using mobile and GSM technology which is operated by sending and receiving SMS. The ignition system can be activated or deactivated by reading the message received.

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