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Vehicle Theft Detection and Remote Locking

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Abstract—*At present times, the security of the vehicles is a prime concern. This paper proposes a reliable and economic method of vehicle theft detection and remote locking using Arduino UNO, IR sensors, Global Positioning System (GPS) and Global system for mobile communication (GSM). This design monitors the vehicle continuously and reports to the user in the case of any theft and also stops the vehicle through a switch mechanism. An algorithm is also presented that helps to locate the co-ordinates of the vehicle in real time and also locks it if the user demands.*

Keywords*: GPS, GSM, Arduino, Vehicle Tracking, AT-Mega.*

1. INTRODUCTION

With the continuous increase in the population, there is an increased dependency on transports. With such excess amount of vehicles on the road, the accidents and vehicle theft has tremendously increased.

Therefore, an efficient tracking system plays an important role in such a scenario. Such a system informs the user about the location of it's vehicle through telecommunication. There are two types of vehicle tracking system, active and passive. A passive tracking system simply tracks the position of the vehicle which can later be removed and analyzed. This paper presents an active tracking system that transmits the location of a vehicle in real time.

We have tried to build a system that incorporates GPS/GSM technology to keep a track of the vehicle and also prevent its theft. When any suspicious activity occurs, a message is send to the user through GSM alarming about the location of the vehicle. If the use further demands, a locking action may also be performed that stops the ignition of the vehicle.

2. SURVEY OF RELATED WORK

In [1], a vehicle tracking model is designed which works as an anti theft system. An AT89C51 microcontroller is interfaced serially with GSM and GPS. The system continuously monitors the vehicle and reports the status of the vehicle on demand.

The [2] discusses the method of vehicle tracking and locking using GPS/GSM technology. When the vehicle is handled by an authorized person, the system is in sleep mode whereas if any interruption is sensed by IR sensor then it sends a message to the microcontroller about the location of the vehicle. An additional security feature is that the engine stops and doors gets locked.

In [3], the authors have proposed a plan of action to be informed about the vehicle using GSM technology. The vehicle can be protected from theft and accidents by switching off the ignition of the engine. AVR AT-Mega is used as the microcontroller.

The [4] paper uses ARM 7 processor, GPS, GSM to prevent vehicle theft and accidents. An additional MEMS sensor is used for collision detection. Kiel software is used to write a program which includes C++ compilers.

In [5], Face Detection System used to detect the face of the driver, and compare with the predefined face. The car owner is sleeping during the night time and someone theft the car. Then Face Detection System obtains images by one tiny web camera, which is hidden easily in somewhere in the car. Face Detection System compared the obtained images with the stored images. If the images don't match, then the information sends to the owner through MMS. The owners get the images of the thief in mobile phone and trace the place through GPS.

In [6], the sensors are used to monitor the fuel level, driver conditions, and speed of the vehicle. All the data transferred to cloud server-using GSM enabled device. All the vehicles equipped with GPS antenna to locate the place. To avoid the drunk and drive, the alcohol sensor installed to monitor the driver status. The proposed technology significantly avoids the accident in highways.

3. PROPOSED DESIGN OF THE SYSTEM

3.1 Component Required

- ARDUINO UNO (AT-Mega 328)

It is a microcontroller board with AT-Mega 328, and has 14 input/output digital pins.

- GSM Modem

It is specialized type of modem which accepts a SIM Card, and operates over a subscription to a mobile operator, just like a mobile phone. GSM modem can be a dedicated modem

device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities.

- GPS Module

It is a navigation device that accurately calculates geographical location by receiving information from GPS satellites.

- 555 Timer

The 555 integrated circuit is an extremely versatile timer that can be used in many different applications. This IC is monolithic timing circuit that is a highly stable controller capable of producing accurate time delay or oscillations.

- LED

Light emitting diodes is two lead semiconductor light source. It is p-n junction diode, which emits light when activated.

- LCD

It is flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. LCDs are available to display arbitrary including images or fixed images which can be displayed or hidden, such as preset word, digits, and 7 segment displays in a digital clock. Liquid crystals do not emit light directly.

- Resistors

It is two-terminal passive electrical component which uses electrical resistance as circuit element.

- Capacitors

It is a passive two terminal electrical component used to store energy electro statically in a electric field.

- IR Sensors

Infrared sensors are an electronic instrument which is used to sense certain characteristics of its surrounding by either emitting and/or detecting infrared radiation.

- Battery

It converts chemical Energy into electrical energy by a chemical reaction.

3.2. Block Diagram

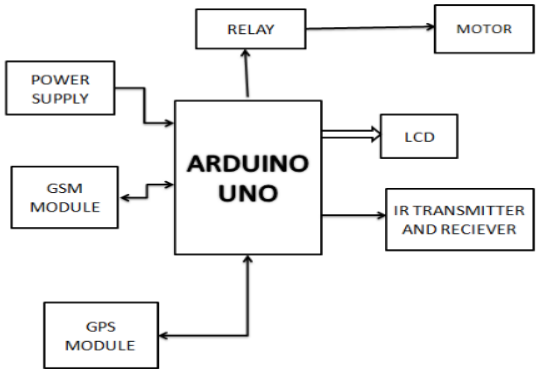

Figure 1: Vehicle tracking and Locking System.

4. PROPOSED METHOD

- The working of this system similar to that of vehicle tracking and locking system which is used to track the vehicle by using GPS and GSM modules.
- Here in this system, the system is put into off mode while the owner or the authorized person is using the vehicle otherwise it is kept into active mode via a person or remotely.
- If any interruption occurs in the car while it is in active mode then IR Sensors sends the message to microcontroller.
- The controller is programmed such that it sends message about the place to the car owner or the authorized person.
- Till then the Motor Speeds are gradually decreased and come to stop. After that all the doors get locked.
- To open the doors or restart the engine, the owner has to enter the passwords.
- By this method we can avoid vehicle theft and track the vehicle easily.

5. FUTURE SCOPE

- We can use this system for detection of bomb by connecting the bomb detector.
- With the help of high sensitivity vibration sensors we can detect accident. Whenever the vehicle met with an accident unexpectedly, with the help of vibration sensors we can detect the accident and we can send the location to the owner, hospital and police.
- We can use EEPROM to store the previous navigation positions up to 256 locations and we can navigate up to N number of locations by increasing its memory.

6. RESULT

Whenever accident or theft of the vehicle is occurred then the device sends message to given mobile.

Message for theft:

“Theft alert

Latitude: 2400.0090, N

Longitude: 12100.0000, E

7. CONCLUSION

Vehicle tracking system makes better fleet management and which in turn brings large profit. Vehicle tracking both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity.

This device is much more useful for the accident occurred in deserted places and midnights. This vehicle tracking and accident alert features plays much more important role in day to day life in future.

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