Car Anti-Theft System using GPS and GSM Module

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Abstract: The IOT is Changing the car security system of the people with a glut range of techniques. IOT has become very popular and is growing rapidly over the years. Nowadays, car security system has become mandatory because of customers need and increased amount of thefts occurring in today's world. Due to increase in number of vehicle there are many chances of getting your vehicle stolen or damaged or broken. So we can use easy ways to protect our vehicle and increase our safety. Car theft is not unusual as you may think. Around 700000 cars were stolen in 2011 according to the report submitted by FBI. Hence Car Anti-Theft System can be used to protect our car from theft and increase safety that is a prior concern of everyone in today's world.

Keywords: Vehicle monitoring system, Internet of Things, Machine to machine communication, Accelerometer, IoT, Vehicle theft

1. Introduction

Today we live in the time where the security of one's assets are of the top priority concerns for one, their vehicles being one of these. Every individual feels the need of monitoring their vehicle parked in unknown vicinity. The vehicle may or may not be fitted with an alarm system and the alarm system may or may not trigger. The proposed system will monitor the vehicle continuously whenever it is in motion. The vehicle will be fit with a smart device with a Global Positioning System (G.P.S.), internetwork and Global System for Mobiles (G.S.M.) based notification sending facilities along with an Accelerometer (A.M.).

2. Literature Survey

A review of existing security systems implemented in automobiles was done and below are some of the findings found. Based on this review some solutions were proposed to improve certain functional security aspects of the antitheft system that we are going try to implement in this project. A number of developments have taken place in anti-theft systems for vehicles and some of the relevant ones are as follows:

1) The utilization of ARM 7 microcontroller, GSM and GPS module together with an accelerometer and temperature sensor is carried out by Joshi and Mahajan [1]. The GPS and GSM module is being utilized for following the area of vehicle. The extra part is being included is the accelerometer which essentially contains the sensor offering a low pass filter and is fundamentally utilized for Shake Detection.

2) A hybrid GPS-GSM localization of vehicles Tracking System has been developed by Al- Khedher [2] that portrays an incorporated GPS-GSM framework to track vehicles utilizing Google Earth application. The remote module has a GPS mounted on the moving vehicle to recognize its present position, and to be exchanged by GSM with different parameters procured by the car's information port as a SMS to a beneficiary station.

3) Shaikh [5] describes arm7 based smart car security system. The principle point of this undertaking is to offer a development security framework in automobile, which comprises of a face detection subsystem, a GPS module, a GSM module and a control stage. The face location subsystem can discover confronts in vehicle amid the period in which no one ought to be in the auto, and make an alert uproariously or soundlessly.

4) J.M. Hu [6] describes vehicles against robbery framework utilizing GSM and GPS module. The framework is created utilizing fast blended sort single-chip C8051f120 and stolen vehicle is discovered by the utilization of vibration sensor. The framework stays in contact with auto holder through the GSM module, for the safety and reliability of car.

3. Material and Methodology

Arduino board: Uno Is A microcontroller board based on the ATmega328P. It has 14 digital input/output pins, 6 analogs inputs, a 16 MHZ quartz crystal, a USB connection, a power jack, an ICSP header and a rest button. This configuration is being used to control the interfacing of GSM module and process using the dump code.

GSM Module: GSM is a mobile communication modem; it stands for Global System for Mobile Communication. It is an open and digital cellular technology used for transmitting mobile voice and data services. A GSM digitizes and reduces the data, then sends it down through the channel with two different streams of client data, each in its own particular time slot. The coverage of each cell varies according to the implementation environment.

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-4, April-2019
www.ijresm.com | ISSN (Online): 2581-5792

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DC Motor: Here we are treating DC MOTOR as a Car Engine. DC Motor is a machine which converts electrical energy into mechanical energy. The working of DC motor is based on the principal that when a current carrying conductor is placed in a magnetic field, it experiences a mechanical force.

GPS Module: GPS is integrated mainly to use mobile communication services. A Mobile sim will be provided in the system of which number will be used to communicate with the users mobile via designed application. A SMS facility will help out to give instruction for switching on and off the system.
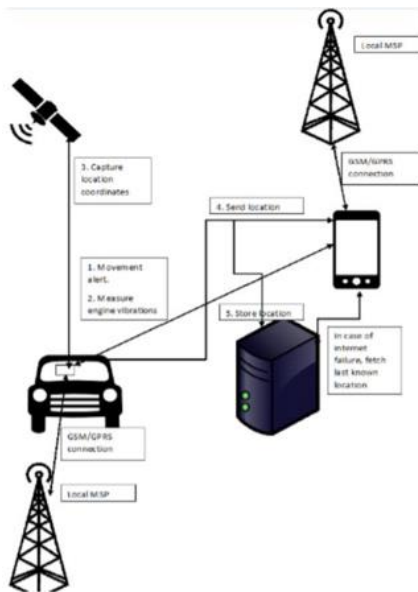
4. System Design

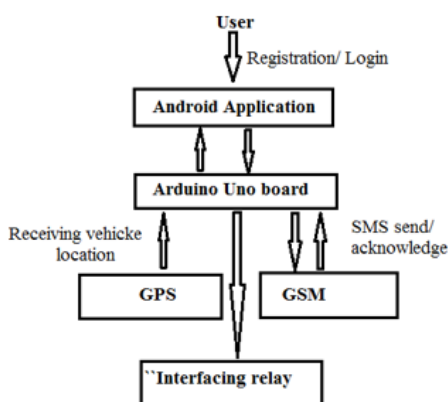Fig. 1. Block diagram of the system

5. Process flow

Fig. 2. Process flow

On the start of the system user have to make a registration by providing basic details. On the successful registration user can access the application at any time via provided valid credentials. Using android application interface user can command to vehicle by pushing desired feature button. This will lead to sent a respective message on GPS module via Arduino support. If the valid SMS is received, then desire action on the vehicle will be performed like accessing the location.
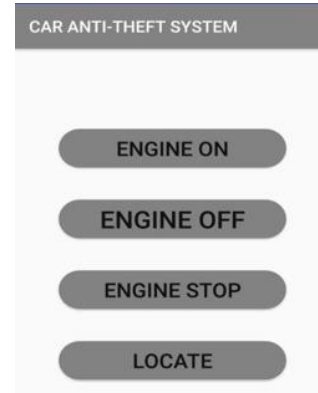
6. User interface

Fig. 3. User interface

An android application will be help out to the user to communicate with the Arduino module. This application will be provided with the basic functionalities needed to operate the system on the vehicle. It includes features like switching on, off and locating the vehicle. To operate on any operation it will sent an SMS to the GPS module on the Arduino kit and the expected operation will get performed.

7. Advantages

1) In present time, the criminals have more enhanced tools to either disable the vehicle security or override it. Hence our system is upgraded for such scenarios providing security by adding some features that can detect, if not prevent, any kind of suspicious movement of the vehicle.
2) Also, whenever a vehicle is towed to the traffic police station due to incorrect parking, we always get to know about it after getting back to the parking location.
3) Remotely stopping of the car's engine is now possible with IoT based features.

8. Drawbacks

1) *App crashes:* Sometimes the system application may crash and the system then can no longer be in use.
2) *System installment in two-wheeler:* As bike engine is outside the device will be viewable or easily visible so we need to find a perfect place to install the system.
3) *Portable mobile Jammer:* If the thief uses a portable jammer that will lock the service provider connectivity. In this scenario the system will no longer be functioning. This is a one of the biggest drawbacks of the system.

9. Conclusion

On the basis of our analysis we came to know about modern life advance threat to the vehicle and necessity of advance

security features to be get integrated in the same. Considering the scenario we have encapsulated the IoT based concepts to enhance to security utility of Anti-Theft System making modern life vehicle management more advance and secure. The proposed work is cost-effective, reliable and has the function of preventing theft and providing accurate tracking system. A smart anti-theft system is one of the essential systems that homogenize both GPS and GSM systems. It is fundamental because of the huge numbers of uses of both GSM and GPS frameworks and the wide use of them by a great many individuals all through the world. This framework intended for clients in area development and transport business, provides real-time information such as location, speed and expected arrival time of the user is moving vehicles in a concise and easy-to-read format.

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