Smart use of Cell Phone for Vehicle Monitoring and Theft Control Using GPS and GSM

INTRODUCTION

More than a million cars or vehicles are stolen every year, which equates to about one vehicle every 27 seconds. Taking a few extra security precautions can save one from being a victim. The main objective of the work is to develop a real time vehicle monitoring and security system to manage increasing vehicle thefts and to stop misuse of stolen vehicles.

Stolen vehicles are often used as the “gateway” vehicle to assist in a robbery. They are also commonly used for transporting drugs, or other illegal contraband (usually with a fake or switched license plate). Often, a stolen vehicle is used in the crime like kidnapping. All these consequences arising due to vehicle theft are sufficient enough to put the owner into trouble. So it becomes necessary and important to equip your vehicle with a reliable and effective security system.

To overcome the present problem, author proposes a modified vehicle tracking system integrated with anti theft device which would be able to fill up the security gaps where the earlier known technologies do not prevent a vehicle from theft, do not assist to recover it and do not allow the users to know the status of their vehicles. They do not permit the owner to communicate with the vehicle online, even if the owner is certain that his vehicle was stolen.

Modifications integrated to the system enhance its utility and makes it more and more user friendly. These days car theft cases are higher than ever, one can give an excellent protection with the only reliable anti-theft device. A vehicle tracking system may be the solution to the problem of vehicle theft and monitoring. The system makes use of an embedded system based on GSM technology. Vehicle owner can lock/unlock his vehicle with the help of a simple SMS (Short Message Service). Also the vehicle can be tracked with the exact location using GPS module in case of theft.

The system combines the use of automatic vehicle location in individual vehicles with software that collects these fleet data for a comprehensive picture of vehicle locations. Modern vehicle

ABSTRACT

This paper deals with the issues of vehicle monitoring and theft control. This system not only tracks the vehicle but also reduces the risk involved in losing the vehicle. In the proposed system AT89S52 microcontroller is used for interfacing the various hardware peripherals. The current design is an embedded application, which will continuously monitor a vehicle and report the status of the vehicle on demand by SMS through owner’s cell phone. A GSM and GPS modem is used to locate the position of the vehicle in terms of latitude and longitude from a remote place and the same data is sent to the mobile at the other end from where the position of the vehicle is demanded. If owner receives unmatched or unusual location then by sending SMS to the vehicle integrated system he can lock/stop the vehicle by remote location using cell phone.

Keywords: GPS, GSM, Microcontroller, IR Sensor, Relay.
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. Urban public transit authorities are an increasingly common user of vehicle tracking systems, particularly in large cities.

RELATED WORK

Alsadi in [1] has developed an embedded GPS-GSM based real time vehicle tracking system to determine current GPS location of a vehicle in the real time using global system for mobile communication (GSM). Khan et al. in [2] have presented GPS – GSM Based Tracking System that uses the global positioning system to determine the precise location of a object, person or other asset to which it is attached and using GSM modem this information can be transmit to remote user. Ramani et al. in [3] have discussed vehicle tracking and locking system installed in the vehicle, to track the place and locking engine motor using Global Positioning System (GPS) and Global System mobile communication (GSM). These systems constantly watch a moving Vehicle and report the status on demand. When the theft is identified, the person sends SMS to the microcontroller which stops the engine motor. Authorized person need to send the password to controller to restart the vehicle and open the door. Shreenivas Jog et.al. in [4] have designed a System for Localization and Positioning of Vehicles using GPS and GPRS Technology. It describes a system, implemented using GPS and GSM technologies, whereby a command is sent to the system in the form of a SMS by system registered Cell phone and the system responds to it by transmitting its current coordinates in the form of Latitude and Longitude using a reply SMS to same Cell phone. Liu et.al. in [5] have presented a vehicle anti-theft and alarm system based on Computer Vision. POLLUX has been developed as a vehicle guard against theft and alarm system. It is based on hardware system, for real time acquisition of driver’s images using an active IR illuminator. This system can locate and recognize the driver’s face, identify the unauthorized driver. Andy et al. in [6] have presented a military/civilian mixed-mode Global Positioning System (GPS) receiver (MMGR) which describes plans and progress made on the MMGR program funded jointly by Air Force Research Laboratory (AFRL), GPS Joint Program Office (IPO) and industry that started in April 2003. The creation of this military/civilian circuitry with reduced cost and improved speed-power-weight capabilities is enabled through adaptation of commercial and radiation tolerant design and manufacturing abilities that leverage synergies across proven, legacy GPS receiver architectures. Lee et al. in [7] have introduced the vehicle tracking system using GPS/GSM/GPRS technology and smart phone application. The system uses the combination of a smart phone application with a microcontroller used to control the GPS and GSM/GPRS modules. The designed in-vehicle device works using global positioning system (GPS) and Global system for mobile communication/general packet radio service (GSM/GPRS) technology.

HISTORY OF VEHICLE TRACKING SYSTEM USING GPS

GPS or Global Positioning Systems were designed by the United States Government and military and the design was intended to be used as surveillance. After several years went by the government signed a treaty to allow civilians to buy GPS units at precise downgraded ratings. Years after the Global Positioning Systems were developed the military controlled the systems despite that civilians could still purchase them in stores.

GPS units are also called tracking devices that are quite costly still. Despite the innovative technology and designs of the GPS today the devices has seen some notable changes or reductions in pricing. Companies now have more access to these devices and many of the companies can find benefits.

These days you can pay-as-you go or lease a GPS system for your company. This means you do not have to worry about spending upfront money, which once stopped companies from installing the Global positioning systems at one time. Today’s GPS applications have vastly developed as well. It is possible to use the Global Positioning Systems to design expense reports, create time sheets, or reduce the costs of fuel consumption. You can also use the tracking devices to increase efficiency of employee driving. The GPS unit allows you to create Geo-Fences about a designated location, which gives you alerts once your driver(s) passes through. This means you have added security combined with more powerful customer support for your workers.

Today’s GPS units are great tracking devices that help fleet managers stay in control of their business. The applications in today’s GPS units make it possible to take full control of your company. It is clear that the tracking devices offer many benefits to companies, since you can build automated expense reports anytime. GPS units do more than just allow companies to create reports. These devices also help to put an end to thieves. According to recent reports, crime is at a high, which means that car theft is increasing. If you have the right GPS unit, you can put an end to car thefts because you can lock and unlock your car anytime you choose. GPS are small tracking devices that are installed in your car and it will supply you with feedback data from tracking software that loads from a satellite. This gives you more control over your vehicles. The chief reason for companies to install tracking devices is to monitor their mobile workforce. A preventive measure device allows companies to monitor their employees’ activities. Company workers can no longer take your vehicles to unassigned locations.

PROPOSED MODEL

In order to meet out the problem defined author has proposed a modified vehicle monitoring system integrated with theft control device to avoid vehicle theft and keep our vehicle safe. The rapid development of electronics provides secured environment to the human. As a part of this, author has proposed to design “smart use of cell phone for vehicle monitoring and theft control using GPS and GSM” which not only tracks the vehicle but also reduces...
the risk involved in losing the vehicle. By incorporating new technologies, author has tried to come up with more efficient and reliable system to get the solution of the proposed problem.

Real time vehicle tracking system is a method that can be used to track and monitor any remote vehicle equipped with a hardware unit that receives and transfers signals through Global Positioning System (GPS) satellite. It makes use of GPS to provide actual geographic real time position of the vehicle. A vehicle tracker is therefore a major and essential device that should be in every vehicle because it gives the owner the ability to know the exact location of such vehicle at any point in time anywhere in the world with Geography Information Systems (GIS). It is very useful for both individuals and companies. Tracked vehicle if loss or stolen, then owner can also lock the vehicle or switch off the vehicle engine by providing command with his cell phone and can re-open or activate the engine by providing password.

**ALGORITHM AND IMPLEMENTATION**

The author proposes to design a model by using control engineering to overcome the problem defined. The hardware to be used in the present work provides a technique which allows monitoring and tracking of vehicle and controlling of theft by locking the vehicle also.

The flow chart describing hardware implementation used in proposed work is shown in Fig. 1.

This system is proposed for the four wheelers. In the proposed system author uses AT89S52 microcontroller for interfacing the various hardware peripherals. The current design is an embedded application, which will continuously monitor a vehicle and report the status of the vehicle on demand by SMS through owner’s cell phone. A GSM modem is used to send the position (Latitude and Longitude) of the vehicle from a remote place. The GPS modem will continuously give the data i.e. the latitude and longitude indicating the position of the vehicle and displayed on the LCD. The same data is sent to the mobile at the other end from where the position of the vehicle is demanded. When the request by owner is sent to the number at the modem, the system automatically sends a return reply to that mobile indicating the position of the vehicle in terms of latitude and longitude.

If the vehicle is lost or theft then vehicle owner or police follow the signal emitted by the tracking system to locate a robbed vehicle, in parallel the system closes the gate of the stolen vehicle and speed of the vehicle decreases and pushed to off. After switching off the vehicle engine motor and closing the vehicle gate, engine cannot restart. When vehicle is traced then owner re-opens the vehicle gate and engine motor with his cell phone by providing password.

**CONCLUSIONS AND FUTURE SCOPE**

Proposed system provides an effective and efficient solution for monitoring and tracking the vehicle with controlling over theft or loss of the vehicle. Real time vehicle tracking method tracks and monitors any vehicle from remote locations by just sending a request message by owner’s cell phone. If vehicle is stolen or theft then one can easily track the vehicle. One can close the gate of the vehicle and stop the engine of the vehicle from remote location as well. After tracking the vehicle the owner would be able to re-open vehicle gate and engine motor with his cell phone by providing password.

In future more work can be carried out on the proposed system to make it more users friendly.
REFERENCES


