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Smart Vehicle Safety System Using Arduino

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***Abstract*—**Vehicle theft is one of the major problems faced by civil society today. Statistics shows vehicles which get stolen only 1 by 4th of them recovered. Current systems uses key and remote to lock the vehicle. At main locations CCTV camera's are present which are used to locate the stolen vehicle. But at many places CCTV camera's are not present. Control of vehicle and knowledge of their location even after theft can help recovery of the stolen vehicle fastly. The proposed system helps to find the location of vehicle using GPS also the vehicle speed is gradually reduced by reducing speed of ignition motor using GPS system. It helps finding the vehicle immediately after knowing its stolen. As GPS system is used, the location is also known. The command sent from mobile goes to the GSM system which is interfaced with controller which reduces the speed of ignition motor and immobilizes it. The developed system is reliable, low cost and user friendly which can help in recovery of vehicle if it gets stolen

***Keywords*—** *Stolen,Recovery,GPS,GSM,Arduino*

I. INTRODUCTION

Every year, nearly 36,000 vehicles, which amount to nearly Rs.115 crore, are stolen in India among these, only about 14,500 are traced, often in un-roadworthy conditions, with many components missing. Many vehicles are stolen only because people are provided with the many opportunity to steal the vehicles. Very often, cars are left improperly secured and unattended. It is only with the installation of anti - theft devices that a thief's attempts can be frustrated. In 2012, there were about 16 crore vehicles registered in the country while 1.7 lakh got stolen. Despite tall claims made by law-enforcement agencies about their success in controlling car thefts, information tabled in the Lok Sabha shows that as many as 1.65 lakh vehicles were stolen in a single year--2013. Theft with access to keys also Known in some places as "Taken Without Owner's Consent (TWOC)". The unauthorized use of a vehicle in which the owner has allowed the driver to have possession of or easy use to the keys. Often, this is the employee of the vehicle's owner ,adolescent or grown child or of the vehicle's owner who, at other times, may be authorized to use the vehicle. This may be treated differently, depending on the laws, and the owner of the vehicle may choose not to press charges. However, this method also applies to criminals who break into a car and find that the owner has left a spare set of keys in the car, and use these keys to drive the car away. The other one is Opportunistic theft (i.e).,The removal of a vehicle that the owner or operator has left unattended with the keys visibly present, sometimes idling. Alternatively, some cars offered for sale are stolen during a 'test drive'. A 'test drive' may also provide a potential thief with insight into where the vehicle keys are stored, so that the thief may return later to steal the vehicle. Tracking systems were developed initially for the shipping industry as they needed to locate where each vehicle was at any instant of time. The real time location is found using GPS technology and transmitted by means of GSM modem. The work in this paper is divided in two stages. 1) Finding the vehicle' location 2) Immobilizing the vehicle Thereafter, the vehicle can be easily found without delay. It provides following facilities Stolen vehicle tracking and recovery,Remote vehicle immobilization / Door lock controls. It can be used for trucks carrying valuable goods, to keep track of the status of delivery and location of the truck at all times. It can be used to keep tab on the driver. It reduces vehicle abuse and ultimately results in significant cost-savings for individuals.

II. RELATED WORK.

Asaad M. J. et al, proposed a novel method in 2012.In this method Vehicle tracking device is installed in specific vehicle which helps the owner to track location of the specific vehicle. This is done using Global positioning system and Global system for mobile communication. This method will monitor a vehicle continuously and report its status to the owner on requisition command

Ramya V et al., proposed a system in 2012 which detects obstacles when an obstacle comes near the vehicle. It alerts the vehicle user of the approaching danger. The vehicle user takes immediate action to avoid any change of accident to himself and the pedestrian. It also monitors the system for any toxic gases and intimates the owner if it becomes aware of its presence.

Peijiang Chen et al., proposed a system in 2008 in which the vehicle parameters are monitored from remote location. The various parameters received from vehicle is sent to the remote centre via GSM where a computer is used to show the results in VB

Saranya.B, Sasikala.N, et al proposed a system with a barcode scanner is used to read the barcode present on the object. The microcontroller will check the input from the barcode scanner with the predefined code present in it. If the barcode is not matched with the code then the microcontroller will send the signal to the driver circuits for controlling the motor operations.

Kiruthikamani.G et al proposed a system in which the speed of the vehicle is controlled by means of communication through RFID Technology for short distance range. Which won't be applicable for long distances.

Albert Alexe, R.Ezhilarasie et al proposed a system based on cloud computing. Here sensor datas's are collected and based on that required actions are taken. Also the vehicle's location is found using GPS.

III. PROPOSED METHOD

The Proposed method consists of Arduino mega 2560. The monitoring system involves an Arduino development board as a processing unit. It uses GPS Technology to track the location of vehicle.

The GSM technology is used to instantly lock the door and stall the speed and stop the Engine motor. The Relay circuit is used to switch the speed of motor thus reducing gradually and stopping the Engine motor in the end. The command is sent from mobile to the GSM module interfaced with Arduino mega 2560.The Arduino megabased on the command received takes the required action .i.e., it reduces speed of the ignition motor

gradually and locks the car door. This system is capable enough to control the vehicle via a command from vehicle owner.

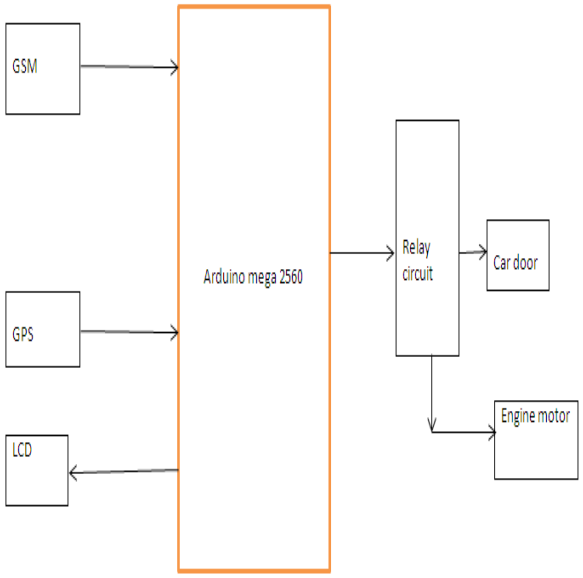

Fig. 1. Block diagram of proposed system

A. *Arduino mega 2560*

The Mega 2560 is a microcontroller which has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The controller has 256KB of flash memory,8KB of RAM and 4KB of EEPROM.Here the arduino is programmed such that depending upon command received from GSM it controls the vehicle.

B. *GSM Module*

GSM system was developed for communication purpose as a digital system using TDMA (Time division multiple access) technique. A GSM digitizes and reduces the data, then sends it through a channel with two entirely different streams of client data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates. The GSM module is used to remotely control the vehicle and provide security to the vehicle used. Serial pin of Arduino processor (RX and TX) is interfaced to the GSM module to control it by means of AT commands so as to receive SMS and set the mode.Arduino mega 2560 controller will initialize the GSM module and wait to receive SMS.2×16 LCD display is connected to PORT0 of Arduino mega 2560, it will display the status of the system (i.e. it will show what the system is doing). When system is started GSM module will be in Text mode by sending "AT+CMGF=1", AT command .After this setting, Arduino mega will display in LCD that it's waiting for SMS and will wait until it receives SMS.

The data sent from each satellite down to earth contains different pieces of information that allows the GPS receiver to accurately find the position and time

C. *GPS Module*

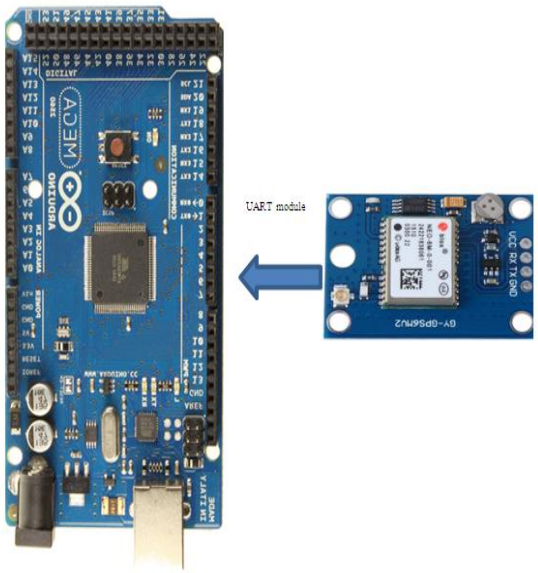

Fig. 2. Data of location sent from GPS module

If GPS receiver's antenna is able to get signal from four satellites it will calculate the position accurately. The GPS chipset contains a processor that is responsible for the user interface, the calculations, as well as circuitry for the antenna. Through the chipset the data can be sent to the GPS receiver to configure different parameters like update rate, baud rate etc. The GPS module uses NMEA data format. The GPS module is interfaced with UART port of Arduino mega. Voltage convertor is used to convert RS232 voltage to TTL.

D. *Relay circuit*

The Relay circuit is interfaced with Arduino mega controller. Depending upon the GSM command received the relay switches the power supply which controls the speed of DC motor and finally switches off the DC motor.

IV. EXPERIMENTAL RESULTS

The Figures shows the results of GSM command after sending lock command

Fig. 3. GSM modem is initialized through the AT Commands through software.

Fig. 4. Door Locking when GSM command is sent through mobile.

Fig. 5. Door Unlocking when GSM command is sent through mobile.

Fig. 6. shows the LCD display when GSM command is sent to unlock the door when vehicle is found.

CONCLUSION

Smart vehicle safety system with GPS System and GSM System is implemented. This system provides control over the vehicle even after it is stolen. It provides security to vehicle by locking the doors and stopping the vehicle movement. To restart the vehicle and unlock the door command has to be sent from mobile. This system reduces the strain in finding stolen vehicle. In future biometric recognition also can be added to provide high security. It makes stolen vehicles recovery easy and fast. You can locate your stolen vehicle easily using your mobile without any extra cost.

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BIOGRAPHY

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