Smart Anti-Theft System For Vehicle Security And Tracking

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Abstract: *Nowadays most of the public are having their own vehicles also on the other hand there is a need to provide security for vehicles from any external threats. Smart anti-theft system for vehicle security and tracking is used to provide the fundamental security to vehicles. This system is accompanied with a keypad part, placed on the door outside the car to authenticate the valid user. Global Positioning System (GPS) and Global System for Mobile communication (GSM) provides the current location of the vehicle. The system is also designed to recognize any unusual vibrations in case if the car undergoes an accident and sends the respective signal to the owner through GSM. This is achieved by using MEMS accelerometer.*

Keywords: *Atmega 328, GPS, GSM, Keypad, MEMS accelerometer, Vehicle tracking and locking.*

I.   Introduction

Vehicles, which are been used as a means for transportation are grown all over the world. They are used at different circumstances for different applications. For instances; Many co-operate sectors make use of vehicles to provide a pick and drop services for their clients. Whereas many industrious sectors use transport vehicles for the means of carrying goods etc. Most of the private companies provides vehicles for their employees. Vehicles are also used by police departments, as an ambulance, firefighter etc. In recent few years, reports have been noted regarding the misuse of vehicles such as stolen vehicles used for illegal acts such as robbery, kidnapping, rape, car robbery from parking lots etc. Assuming all this problems, there is a need to designed a system which can overcome this.

In the past few decades, technology has made an enormous advancement in its field. It has a significant contribution for reducing human efforts for various applications. The increase of satellite communication technologies is easy to discover the vehicle locations with no trouble. Nowadays most of the people make use of GPS in cars, ambulances and police vehicles. All the available technologies is used to maintain the tracking vehicle place and monitoring various parameter. Thus GSM and GPS system is an important parameter in the field of tracking and provides the user with a group of applications which are widely used by millions of citizens all over the world. By making the use of GSM and GPS technology the above mentioned issues can be overcome to some extent.

Smart Anti-Theft system consists of a keypad part, an accelerometer for accident detection along with a GSM and GPS. On entering the correct password, the registered mobile number will be receiving an SMS having information of the current status of the car. In interrupt case, if an invalid user enters the correct password and enters the car then the current location of the car will be send to the owner in form of latitude and longitude. Owner can now trace the car by using the latitude and longitude on google maps. Also he can lock the invalid user inside the car by sending a command signal to GSM. Now only by entering the correct password the locked door can be opened.

II.   Literature survey

In this paper [1], vehicle tracking and locking is introduced which tracks the place or location of the vehicle along with locking the motor as well as monitoring the fuel and distance of the front vehicle while driving. This system used to track the vehicle, fuel monitoring and announce the distance of the front vehicle. This paper provides the vehicle owner with robbery prevention and rescue device successfully. Vehicle owner or Police can follow the warning symbol getting by the tracking system, corresponding motor vehicle speed going too decreased gradually and pushed to off using SMS.

In this paper [2], the system senses any accident in the vehicle and intimates pre-programmed numbers like the owner of the vehicle, ambulance, police etc. This paper deals with significance of human health and safety when they meet an accident. The GSM and GPS technology is used to send the exact position of the vehicle through an SMS to the registered numbers. Thus the precise position of the vehicle can be obtained by

the rescuer. In case if the person is not severely injured and at the time he do not need a medical treatment then he can simply press a single switch which terminates the sending of message for help.

In this paper [3], Face Detection System is used to detect the face of the driver, and compare with the predefined face. This system is provided with an advanced features. If a vehicle by default remains unlocked and the thieve steals the car, then with the help of the face detection system the robber can be traced. The face detection system captures the image of the person and compares it with the predefined image. If the captured image does not match the stored image then the information is send to the owner through MMS. The owner can now track the stolen car using GPS.

In [4], the system makes use of GSM and GPS for tracking. A door sensor senses an interrupt at the doors of vehicle and sends the respective signals to the microcontroller. The microcontroller then initiates the keypad slot asking for password. If an unauthorized user tries to drive the vehicle, then the current status of the vehicle are send to the owner and local police station using GSM. Simultaneously the unauthorized user is trapped inside the car by activating the door lockers.

In [5], the vehicle cabin protection and safety implemented based on embed system by modified the offered modules. This paper introduces a novel method which can monitor the level of the toxic gases, like alcohol, CO, LPG within the vehicle and provides an alert information at the same time as alarming a dangerous situation. This information is transmitted to the owner through GSM. In addition this paper also provides a technique to detect the immobile obstacle in front of a vehicle and the vehicle is stopped. Therefore avoiding the accident due to any static obstacles.

In this paper [6], 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.

III.   Proposed method

In this proposed work, a novel method of vehicle tracking and locking system is used to track the theft vehicle by using GPS and GSM technology. A keypad slot is placed on the door of the driving seat outside the vehicle. User of the vehicle is asked for a password to get an access to the vehicle. In normal case, when the valid user enters the correct password then the doors of the vehicle are unlocked by the system. The authorized user can simply drive the vehicle by pressing the start button. Again after the use of vehicle, by pressing a particular command button for ex. " # " button on keypad the doors of the vehicle can be locked again. Once the correct password is accepted by the system, the system sends an SMS regarding the current location and status of the car to the registered numbers. The received location is in the form of latitude and longitude. Hence the user can simply trace the location by using latitude and longitude on Google maps.

Even if an invalid user tries to get an access to the vehicle, he/she is asked for a password. If he enters the incorrect password then the access is denied by the system. Thus the unauthorized user cannot get into the vehicle without correct password. This avoids the risk of getting theft of the vehicle. If the keypad part is placed inside the car then the unauthorized user can get into the car expect an access to drive the car. In worst case if the correct password is known to the unauthorized user, then once he enters the password the system transmits a message to the registered numbers in the system. The authorized user can now verify the unauthorized user. If the user is find faulty then the valid user can transmit a command signal to GSM to lock the doors of the vehicle. The theft is now trapped inside the vehicle.

Another feature is added to this system i.e the Accident detector. MEMS accelerometer is used for detecting any unusual vibration on the vehicle. If the vehicle undergoes any unusual vibration or accident then the GSM transmits the respective status and location to the registered numbers.

IV.   Block diagram

The block diagram for smart anti-theft vehicle tracking and locking system is shown in fig.1. The block diagram consists of Atmega IC 328, LCD display, keypad, relay driver, relay, MEMS accelerometer sensor, GSM & GPS module, power supply, door lockers and voice alarm. The GSM module used is a 900sim. The complete system requires an overall supply of 9volts and 5 volts. The same system can be carried out using Arduino but in this caseAtmega IC 328 is used.
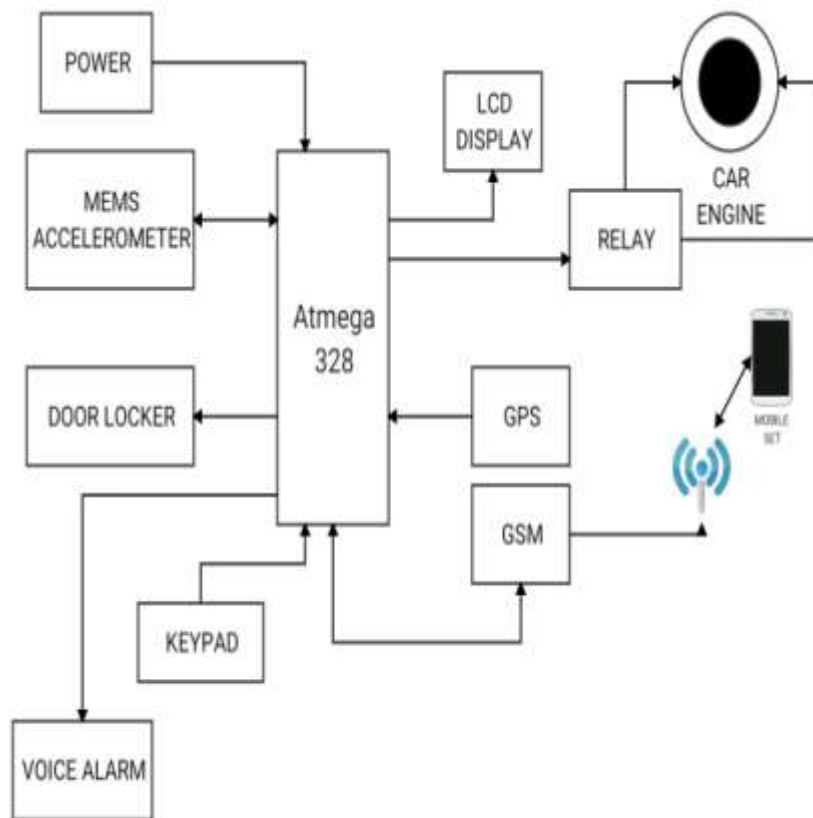
Fig.1. Block diagram for Smart Anti-theft Vehicle Tracking and Locking System

4.1   Global system mobile communication (GSM).

The SIM900 is a complete Quad-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. With a tiny configuration of 24mm x 24mm x 3mm, SIM900 can fit almost all the space requirements in your M2M application, especially for slim and compact demand of design. Some of the fundamental features of GSM Sim 900 are as follows.

4.1.1 SIM900 is designed with a very powerful single-chip processor integrating AMR926EJ-S core

4.1.2 Quad - band GSM/GPRS module with a size of 24mmx24mmx3mm

4.1.3 SMT type suit for customer application

4.1.4 An embedded Powerful TCP/IP protocol stack

4.1.5 Based upon mature and field-proven platform, backed up by our support service, from definition to design and production

Fig.2. GSM SIM 900_V2.03

4.2 Global Positioning System (GPS)

The Global Positioning System (GPS) is a satellite-based navigation system consists of a network of 24 satellites located into orbit. The system provides essential information to military, civil and commercial users around the world and which is freely accessible to anyone with a GPS receiver. GPS works in any weather circumstances at anywhere in the world. Normally no subscription fees or system charges to utilize GPS. A GPS receiver must be locked on to the signal of at least three satellites to estimate 2D position (latitude and longitude) and track movement. With four or more satellites in sight, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the vehicle position has been determined, the GPS unit can determine other information like, speed, distance to destination, time and other. GPS receiver is used for this research work to detect the vehicle location and provide information to responsible person through GSM technology

Fig.3 GPS module

4.3   MEMS Accelerometer

The Accelerometers are sensors or transducers that measure acceleration. Accelerometers generally measure acceleration forces applied to a body by being mounted directly onto a surface of the accelerated body.Accelerometers are useful in detecting motion in objects. This motion is indicative of motion in the larger object application in which the accelerometer is mounted. Thus, a sensitive accelerometer can quickly detect motion in the application.The accelerometer is connected with Atmega 328 and placed in vehicle. If any accident occurs in the highways, the accelerometer sensor (vibration sensor) will indicate the controller and controller will in turn transmit the message to the registered numbers through GSM technology.

V. Conclusion

In this paper work, a novel method of vehicle tracking and locking system based on embedded is implemented, which is used to track the location of the theft vehicle by using GPS, GSM technology in addition of accident detecting process. The keypad slot is used for the authentication of the user. If any threat is detected then the system commands for locking the door which is handled by the authorized user. Thus the theft is trapped inside the car. The authorized user have to enter the correct password to open the locked doors. The system can be modified by implementing a face recognize sensor to get an access for the valid user to drive the vehicle. The system can be used to track employees and keep an eye on staff driving habits. Thus a new proposed technique is been used designed. The system is having a low cost efficient whereas the whole system can be made compact so that it can be hided in vehicle away from the reach of the theft.

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