

Intelligent Vehicle Anti-Theft and Security System

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ABSTRACT

In this paper, an intelligent vehicle tracking and accident detection technique is proposed using GSM as well as GPS. A vehicle tracking system allows the user to locate the exact position of the vehicle using Global Positioning System (GPS). Vehicle information can be viewed and located on the electronic Google maps via the Internet or specialized software. Also accidental conditions are increasing day by day. They are limited by the use of some sensors like accelerometer and alcohol sensor.

Keywords : GSM(Global System for Mobile Communication), GPS(Global Positioning System), MQ-303A(Alcohol sensor), ADXL335(Accelerometer),etc.

I. INTRODUCTION

A Security System for vehicles is provided which includes a password confirmation as well as an alcohol detection test to reduce the increasing number of accidents these days. A GPS based tracking system is proposed which keeps track of the location of the vehicle based on a mobile phone text messaging system. The system is able to provide real time text alerts for location. Particularly, the present location can be locked and the system will alert the owner if the vehicle is moved from present locked location. The vehicle engine will be locked until the correct password is entered and negative alcohol test result is obtained to avoid Drink and Drive cases. Vehicle accident detection is determined using accelerometer sensor which detects "SHAKE" or "TITL" to this sensor module. These conditions are actions of an accident. When sensor experiences these forces it avoids the supply to motor which HOLTS/STOPS the vehicle immediately.

II. SYSTEM METHODOLOGY

The LPC2148 Microcontroller is used in this system which can easily handle the functions of GSM, GPS and other sensors used in this system. Whenever the driver wants to start the vehicle, will have to enter the correct password and send it to the GSM. Once GSM confirms that the password is correct, alcohol test will be performed. As the result is negative GSM will notify the registered number that the vehicle has started. One can be able to locate the status of the vehicle with the help of GPS which will be sent to the registered number. Accident detector will detect the orthogonal axes tilts which will stop the engine and notify the registered number that the accidental condition has occurred. Vehicle can be stopped by messaging the password for stopping the vehicle whenever theft condition occurs.

III. PROBLEM STATEMENT

This project is a standalone system build with the help of microcontroller so can be installed in any vehicle with some minimum modifications. As the system uses LPC2148 extra security can be added by interfacing sensors. So to develop vehicle theft detection and security system using modules, sensors and LPC2148 microcontroller, to stop the ignition of engine whenever the vehicle is being stolen and inform the owner about the location and other security related information.

IV. PROPOSED METHOD

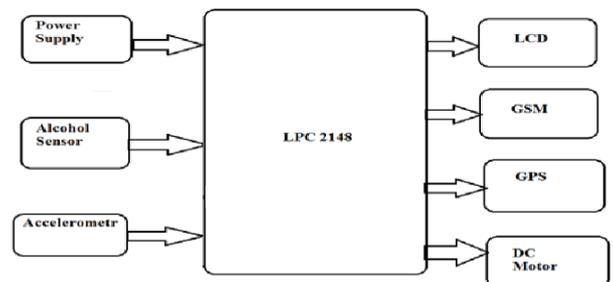


Fig 1. Block Diagram

Above block diagram represents the vehicle theft security system in diagrammatical form. It consists of two concepts.

1) If the Vehicle is being stolen then immediately inform the owner about the motion of vehicle with the help of GSM and locate the exact position of the vehicle by using GPS system.

2) If any of the Accidental conditions occur will be detected by Accelerometer, then stop the vehicle at the same

position and notify the owner instantly about the accidental condition and the vehicle's location.

Microcontroller LPC2148

LPC2141/42/44/46/48 microcontrollers are based on a 16/32-bit ARM7TDMI-S CPU with real time emulation and embedded trace support, that combine the microcontroller with embedded high speed flash memory ranging from 32kB to 512kB. Serial communication interfaces ranging from a USB 2.0 Full speed device, multiple UARTs, SPI, SSP to I2C bus and on chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters soft modems, voice recognition and low end imaging providing both large buffer size and high processing power.

Alcohol Detector

The MQ-303A is a Tin dioxide semiconductor gas sensor which has a high sensitivity to alcohol with quick response speed. This model is suitable for alcohol detection such as portable breath alcohol checker or ignition locking system in automobiles.

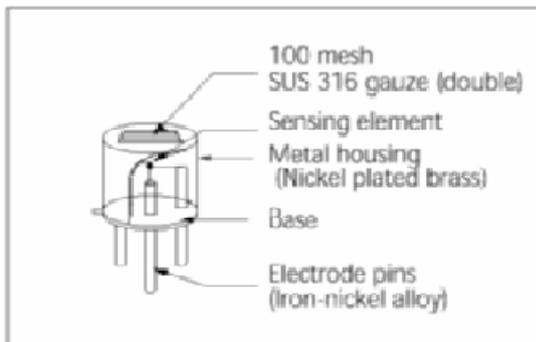


Fig 2. Configuration

Here the system consists of Digital type of Alcohol sensor which has a threshold value

Of 2.5volts. Whenever it senses the alcohol above threshold value buzzer will start.

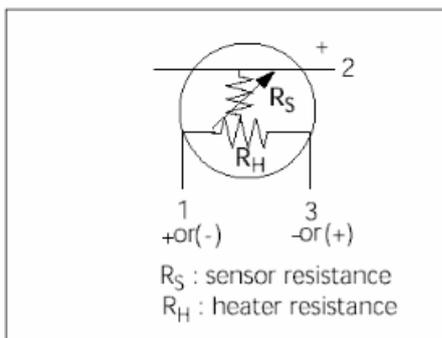


Fig 3. Equivalent Circuits

Accelerometer

The ADXL335 is a small, thin low power, complete three axis accelerometer with signal conditioned voltage outputs. The product measures accelerations with a minimum full scale range of +3g or -3g. It can measure a static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion, shock or vibration. Accelerometers are available that can measure accelerations in one, two or three orthogonal axes.

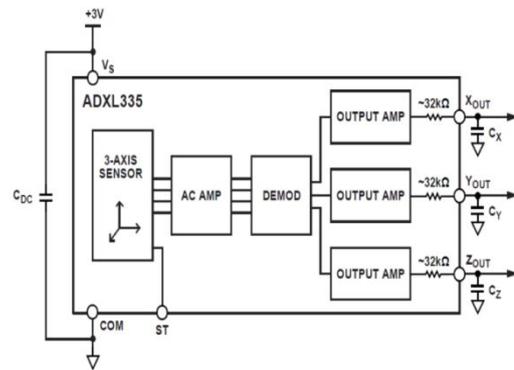


Fig 4. Block Diagram of ADXL335

Three of the axes have 1.65volts respective threshold values, over which the accelerometer will detect the accidental conditions.

Global Positioning System

A GPS Tracking unit is a device, normally carried by a moving vehicle or person, that uses a global positioning system to determine and track its precise location, and hence that of its carrier, at intervals. The recorded location data can be stored within the tracking unit or it may be transmitted to a central location database or internet connected computer, using a cellular (GPRS or SMS), radio or satellite modem embedded in the unit. This allows the asset's location to be displayed against a map backdrop either in a real time or when analyzing the track later, using GPS tracking software. Data tracking software is available for smartphones with GPS capability.

Global System for Mobile communication

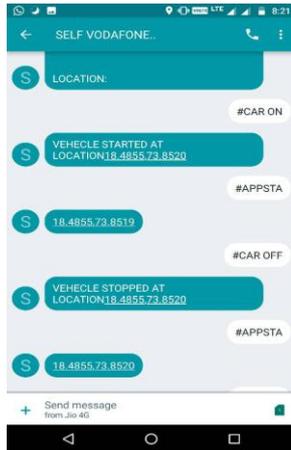
GSM is the heart of the system which helps the communication between Microcontroller and the owner i.e. registered user. GSM modem is a class of wireless modem devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to active communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their Identification. Here, this system uses SIM800 GSM Module.

Following pictures show the messages sent to the vehicle and the response received by owner through the GSM.

1. Alcohol test



2. Car on and off test



3. Accident detection test



V. CONCLUSION

In this proposed system, a novel method of vehicle tracking and security systems used to track the vehicle by using GPS and GSM technology. We can track whatever the position of our vehicle with the GPS system through GSM. With the help of sensors like Alcohol detector and accelerometer we can detect accidental conditions.

VI. REFERENCES

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