Smart Vehicle Security System Using GSM & GPS

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Abstract: *The main motto of the project is to use the wireless technology effectively for the automotive environments by using the GSM Modem used in sending sms in case of theft intimation. The main scope of this project is to stop the engine of an automobile automatically. This can be done whenever a person trying to steal the vehicle, at that time sends an interrupt to a programmable microcontroller of 8051 family that stores owner's number upon a miss call for the first time. When someone tries to steal the car then microcontroller gets an interrupt and orders GSM Modem to send the sms, the owner receives a SMS that his car is being stolen then the owner sends back the SMS to the GSM modem to 'STOP', while the vehicle will be stopped. The control instruction is given to the microcontroller through interface, the output from which activates a relay driver to trip the relay that disconnects the ignition of the automobile resulting in stopping the vehicle.*

Keywords: GSM technology, GPS technology, Vibration sensor, Relay

1. INTRODUCTION

This Project presents an automotive localization system using GPS and GSM services. The system permits localization of the automobile and transmitting the Position to the owner on his /her mobile phone as a short message (SMS) at his/her request. In case of vehicle theft situations the owner can know the vehicles current location and based on that he/she can stop the vehicle by sending a predefined SMS message to this system. After receiving SMS message from owner this system automatically stops the ignition system hence the vehicle will not function any more. From the Figure1 we can understand the main process of the system.

Figure 1: Main out look of the system

2. RELATED TECHNOLOGY

2.1 Power supply

We need a 5V DC supply as the operating voltage for the microcontroller unit, GSM modem and GPS module. A 230V AC voltage from a transformer is converted into 12V DC voltage using a power regulator. A 7805 IC is used as a voltage regulator which gives 5V DC from 12V DC voltage.

2.2 GPS Technology

The Global Positioning System(GPS) is a system based on global navigation satellite system(GNSS) that provide reliable location and time information at all time in any whether condition on earth. It is composed of a network of 24 satellites of the United States which are previously used in military services, and later allowed for commercial use. The satellite emit radio signal of short pulses to GPS receiver periodically. A GPS receiver receives the signal from at least four satellites to compute its three dimension position that is latitude, longitude and altitude. Therefore GPS is a key technology for finding a device location. We used SIM 908 combine module of GPS and GSM shown in Figure 2.

2.3 GSM Technology

A GSM MODEM is a special type of modem that accepts a SIM card and operates over a subscription to a mobile

operator just like as a mobile phone. GSM modem is a wireless modem which sends and receives data through radio waves. A GSM modem requires a SIM card from a wireless carrier in order to operate Just like as a GSM mobile phone. GSM modem support standard AT commands as well as extended set of AT commands. With the standard AT commands and

extended AT commands, you can do things like:
• Sending SMS message
• Reading, Writing and Deleting SMS massage
• Monitoring the signal strength
• Reading, Writing and Searching phonebook entries
• Real time clock

Figure 2: GSM and GPS combine module

2.4 Vibration sensor

A vibration sensor is capable of measuring vibration. When somebody or any obstacle hits the vehicle, the sensor sends a signal indicating the intensity of motion. We use this sensor as for security of rider. It senses the vibration, send signal to the microcontroller and microcontroller send the message to the contact number stored in the controller.

2.5 Microcontroller unit

In microcontroller unit we use AT89C51 microcontroller.
This is the main part of the project. Every command or an instruction to the system is given by this unit. It receives the signals from sensor and GPS and sends message alert to owner.

2.6 Relay

The relay we are using in this is an electromechanical relay.
The excitation voltage that is required is +12V DC. It is driven using the relay driver IC ULN2003 /VLN 2003A. The device is connected to the electro mechanical relay. When the relay is excited by applying the 12V DC the relay gets activated and in the process turns ON the engine and when the excited voltage is stopped, the relay gets deactivated and in the process turns OFF the engine.

[About Relay: Real time vehicle locking and tracking system using GSM and GPS technology-An anti-theft system

(IJTES), About vibration sensor: Two wheeler security system (IJESET), About SIM 908: Accident alarm system using GSM, GPS and Accelerometer (IJIRCCE)]

3. PRESENTATION OF THE MAIN WORK

In present life, we all people can't live without transportation service for proper and perfect communication. We also know that the own vehicle play an important role in today's life. So owner not want to loss that, because of this security issues we presented this system. The block diagram of system shown in the Figure 3. There are certain functions accomplished by

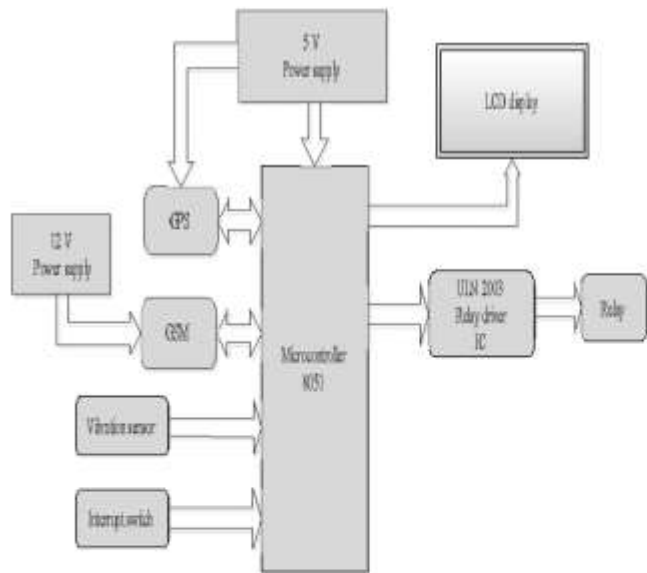these blocks. The descriptions of these blocks are as follows.

Figure 3: Block diagram of the system

3.1 Description of the system

The system includes GSM modem, GPS receiver, relay, Interrupt switch, Vibration sensor and Microcontroller as shown in Fig. If the Interrupt switch is pressed and start the vehicle then controller will not give any alerting. Because only owner of the vehicle knows the switch location. If the Interrupt switch is not press and vehicle start by other person or theft then controller will give alerting to owner with location through sms via GSM. The owner can stop the engine by sending back sms 'stop' to controller through GSM and by Relay engine will stop. The owner can find the location of the vehicle by sending sms to controller and through GPS the owner can find the exact location of the vehicle.
The Vibration sensor used as an accidental sensor in this system for owner security purpose. If accident occurs at that time information about the accident is send with location via sms to the stored number through GSM.
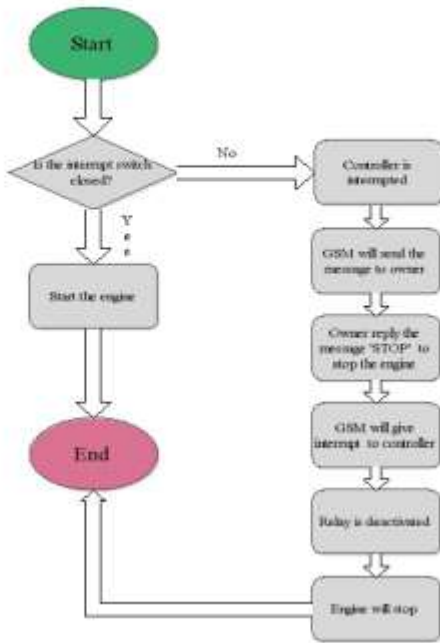
Figure 4: Flow diagram of the system

Figure 7: Hardware part of the system

4. PERFORMANCES AND RESULTS

Shown in the following figures we performed various tasks in the circuit simulation software Proteus 7 .From this software we improved our knowledge in software side.
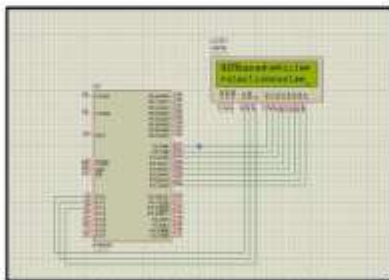

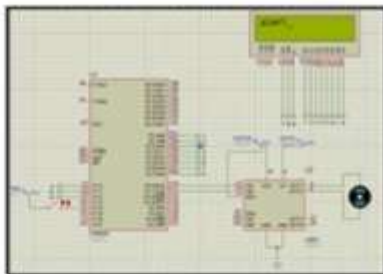**Figure 5: LCD interfacing with the 8051**

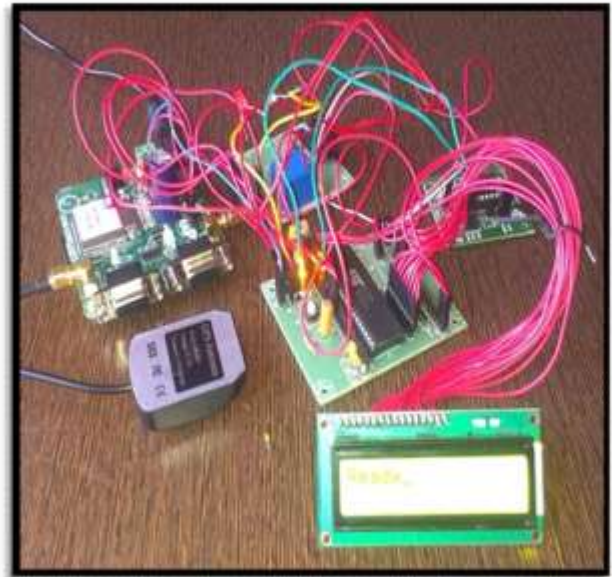**Figure 6: LCD and motor interfacing with the 8051**

Figure 8: GSM and GPS combined interfacing with the 8051

Table 1: AT commands for GSM

AT commands	Description
AT+CMGF=1	Select message format
AT+CMGDA="DEL ALL"	Delete all previous messages
AT+ CMGS="mobile no. "	For sending message
AT+CPMS="SM"	Select storage mode
AT+CMGR=1	for reading the message

[We have understood AT commands for GSM and GPS modules from the SIM 908 command manual.]

5. APPLICATIONS

This is the security system of the vehicle so it secures the vehicle towards the theft but also by this system we can immobilized the engine remotely.
Our system has GPS technology from that we can know about the vehicle location this is not included in the below standard paper. We also used vibration sensor as an accidental sensor because of that we can save the life of the rider.

["GSM based car security system" (IJEIT) Volume: 2, Issue: 4, October 2012, ISSN: 2277-3754.]

6. CONCLUSION

In our project the security system is based on embedded control which provides security against theft. The GSM modem provides information to the user on his request. The owner can access the position of the vehicle at any instant. She/he sends a message in order to lock the vehicle. The GPS receiver on the kit will locate the latitude and longitude of the vehicle using the satellite service. This project deals with the design & development of a theft control system for vehicle as well as protect the life of rider.

7. FUTURE SCOPE

1. Presently only SMS feature is available, we can include the Call feature for ease of operation.
2. Using android application we can also stop the engine.
3. Microphone could be interfaced to the GSM/GPS module so that during theft activity voice call could be established with the owner.

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