IJCAT - International Journal of Computing and Technology, Volume 3, Issue 4, April 2016
ISSN : 2348 - 6090
www.IJCAT.org

Vehicle Anti Theft System Using GSM & Keypad

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Abstract - This system proposes the design and construction of an advanced car security system using GSM. It uses the GSM mobile communication networks to transmit alarm signal the control and communication between the user and the proposed system are achieved through a short message services (SMS) protocol available in the mobile phone. This project is a generally an anti theft alarm device designed for the protection of the vehicles from the any type of theft. In this project whenever a key will be inserted in the vehicle a SMS will be sent to the owner of the vehicle through the GSM module installed in the car. For starting the car the user have to insert a password in the keypad installed in the car. If a wrong password is entered the car will not start and intimate the user regarding the wrong password entered through the SMS. The proposed system consists both hardware and software parts. The hardware components include a ATMega16 microcontroller, a GSM modem, LCD and a keypad. The software part includes a program controller interface. ATMega16 programming language is used for this control system. The GSM is controlled using the AT COMMAND using the microcontroller.

***Keywords* - GSM Modem, Microcontroller, Keypad, LCD.**

1.Introduction

Nowadays, automobile thefts are increasing as well as production of cars in yearly world. So, vehicle theft is universal problem. To solve this problem, most of the vehicle owners have started using the theft protection systems. A wireless vehicle security system which implements mobile communication protocol is proposed. The most popular existing Car security system is car alarm and has a lot disadvantages. They are:

- Distance- Cover Area, the siren cannot be heard over a long distance
- Same sound (siren) for most of the cars
- False Alarm
- Not 100% secure
- Cannot be heard in buildings

This type of security system is less effective if the car is far away from the owner as the alarm cannot be heard by the owner. So, this paper proposes a car security system using GSM. This GSM based car security system is an advanced security system. Whenever the key will be inserted in the key slot for starting of the vehicle, the system will send a SMS to the owner and tells the owner that car is getting started. The user need to enter a 4 digit correct password for the ignition of the vehicle, if a wrong password is entered the system will again send a SMS to the owner intimating regarding the entering of the wrong password for the starting up of the vehicle. The user could easily supervise, protect and control their car anywhere at any time. The system is divided into three sections and it was designed using C language. Serial communication is used for data communication between GSM modem and ATMega16. In this system, firstly, check whether a key is inserted or not, when a key is inserted an output signal is generated which arrive at the AtMega16 microcontroller. Atmega16 acts as electric brain or message sending controller that control all of the functionality and interfaced circuit attach to the system. It sends SMS message to the mobile phone via GSM modem. GSM modem sends the signal (SMS) to the user's mobile phone when receive signal from the ATMega16 microcontroller. In this way, the users can protect from being stolen.

2. Proposed system

The developed system makes use of an embedded system based on GSM technology. When an unauthorized person tampers with a vehicle in which an antitheft system is settled up then the microcontroller commands the GSM modem to send a text alert to the vehicle owner. In this system we interfaced ATMega16 microcontroller with SIM-900 modem to decode the received message and do the required action. The protocol used for the communication between the two is AT command. The commands are standard AT. The ATMega16

communicates with the modem and a further piece of equipment using serial protocol.

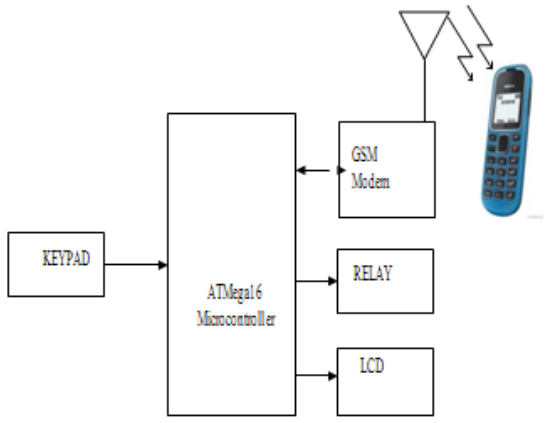

Fig 1: Block Diagram of the Advanced Car Security System Using GSM

The figure shows that the GSM modem is controlled by the microcontroller that sends signals to the GSM to receive and slot, the ATMega16 microcontroller get activated and SMS message will be sent out to the owner's mobile phone immediately and automatically via GSM modem. When receiving a predefined message, the car owner can know that their car is in a danger condition and take an immediate action. The proposed system has the following advantages: low cost, high performance, high security, easy to implement, and strong security control pattern. In this case, the driver can leave the car safely.

2.1 Keypad

4*3 keypad is used in this security system. It is used for entering of a predefined correct password to start the vehicle. After pressing a 4 digit password through keyboard the button '*' is needed to be pressed to confirm. After entering the password the microcontroller check whether the entered password is correct or not.

2.2 Microcontroller

ATMega16 microcontroller is used here to which are attached to an LCD, Keypad, Relay and GSM modem.

2.3 LCD

A 16x2 LCD is used for displaying the message when the key is inserted on it. Initially it asks for a password for starting up the vehicle. Also tells the user to press '*' to confirm and also tells whether the entered password is correct or incorrect.

2.4 Relay

It is used as a electronic switch to start the vehicle only when a correct password is entered and microcontroller sends a signal.

2.5 GSM Modem

A GSM modem is a specialized type of modem which accepts a subscriber identity module (SIM) card and operates over a subscription to a mobile operator just like a mobile phone. The working of GSM modem is based on commands, the commands always start with AT (which means Attention) and finish with a <CR> character. . In this system, SIM900 GSM modem is used. The GSM module is communicate the microcontroller with mobile phones through UART.

2.6 GSM Technology

It is stands for global system for mobile communication (GSM). It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

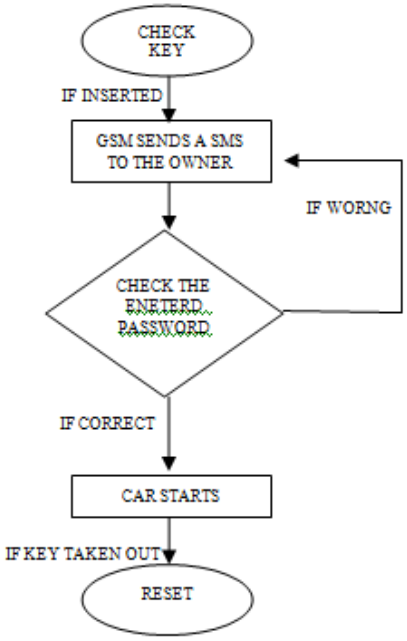

Fig 2: Flowchart of Vehicle Anti Theft System using GSM & Keypad

In this security system, when the key is inserted, the security system is automatically turned ON. Firstly, the system sends a SMS through GSM modem and start

checking for the entered password if correct vehicle get started and if wrong again a SMS is sent to the owner and vehicle will not start.

3. Simulation

Vehicle Anti Theft System using GSM & KEYPAD was simulated using PROTEUS software. And the figure of above mentioned circuit is shown below in the figure.

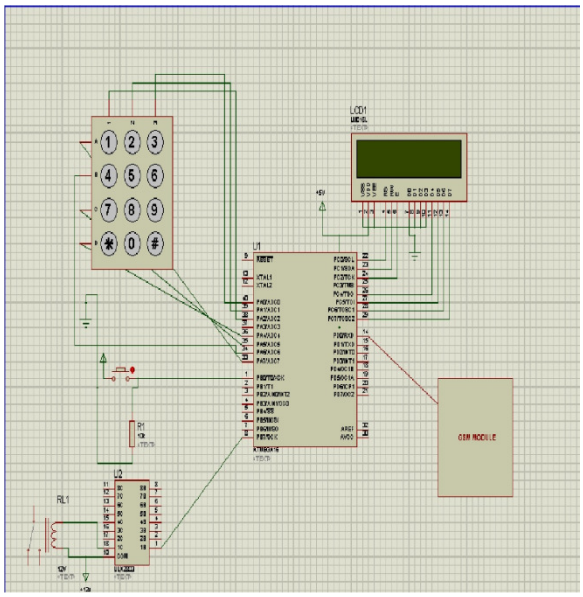

Fig 3: Representation Of Vehicle Anti Theft System

4.Hardware Design

In this section we will be interfacing all the components like ATMega16 microcontroller, GSM modem, keypad, relay, and LCD.

Fig 4: Complete Project

Fig 5: Display Asking Password

Fig 6: Display When Wrong Password Entered

Fig 7 Display When Right Password Entered

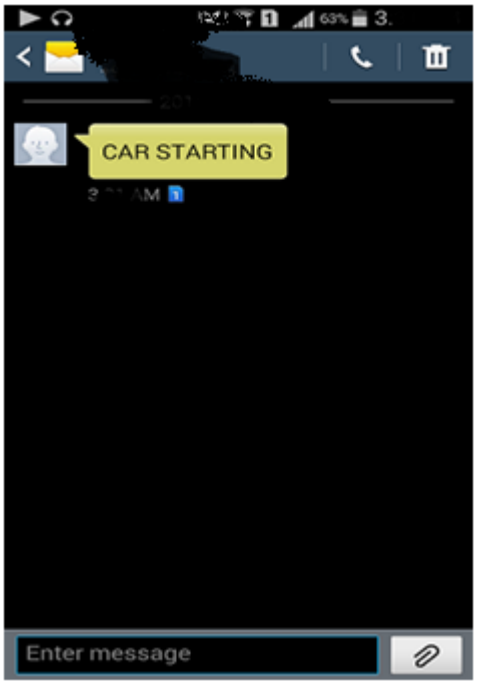

Fig 8: Screenshot Of Message Received When Key Inserted

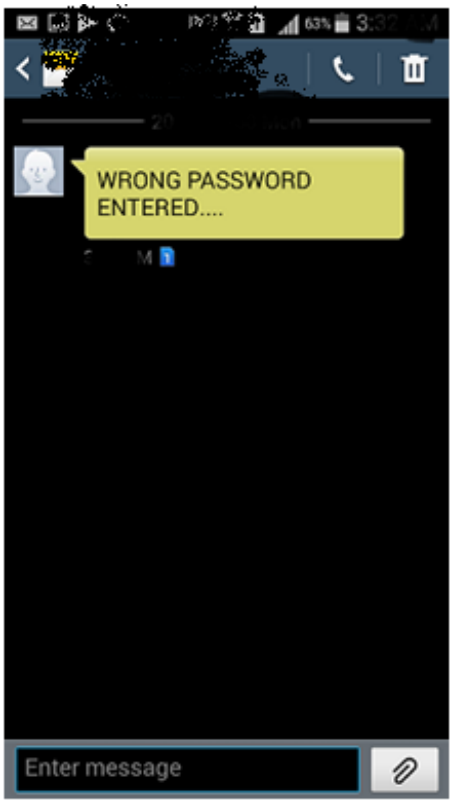

Fig 9: Screenshot of Message Received When A Wrong Password Entered

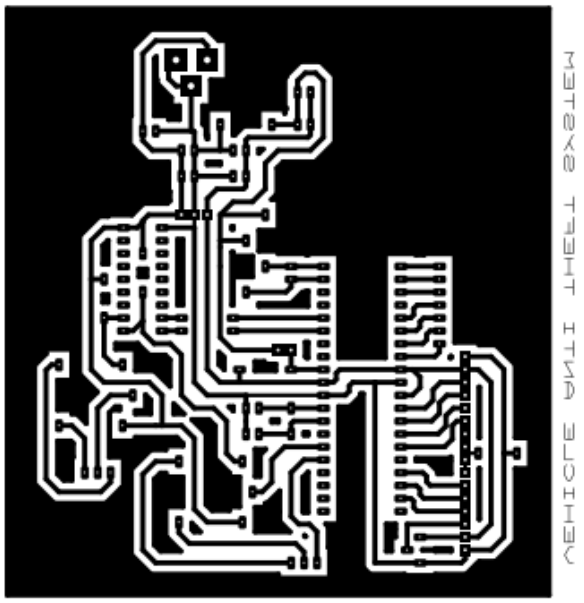

Fig 10: PCB Layout

5. Conclusion

The project titled 'Vehicle Ant-Theft System' is a model for a high security password vehicle ignition system with a facility to warn the user about vehicle getting started. Also warns in case of wrong password entered. It also helps in tracking of the vehicle in case of any miss happening like vehicle theft. Vehicle Tracking System resulted in improving overall productivity with better fleet management that in turn offers better return on your investments. Better scheduling or route planning can enable you handle larger jobs loads within a particular time. Vehicle tracking both in case of personal as well as business purpose improves safety and security, communication medium, performance monitoring and increases productivity. So in the coming year, it is going to play a major role in our day-to-day living. We have completed the project as per the requirements of our project. Finally the aim of the project i.e. to secure the vehicle is successfully achieved.

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