EMBEDED BASED VEHICLE SAFETY SYSTEM USING GSM TECHNOLOGY

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Abstract – This paper work is an attempt to design an advanced vehicle safety system that uses GSM to prevent theft and to determine the location of vehicle. Today theft is happening on the parking or in some insecure places. The developed instrument is an embedded system based on GSM technology. The instrument is installed in the engine of the vehicle. When someone tries to steal the bike 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. The proposed embedded system can be considered on a single chip microcontroller with low cost.

Index terms : GSM (Global system for mobile communication), Micro controller (PIC 16F877A), CID (cell ID finder),Helmet, Theft Protection

I. INTRODUCTION

II. These days' vehicle robbery cases are higher than any other time; it has got to be fundamental to give a vehicle a superb security with the main solid hostile to burglary gadget. Vehicle focal locking framework guarantees the best ensure to secure your vehicle form various types of burglary cases. It is a vehicle security gadget that offers secure insurance to the vehicle. However this framework couldn't demonstrate to give complete security to the vehicle in the event from burglary. So a more created framework makes utilization of an inserted framework focused around GSM innovation. A vehicle is stolen every

III. six minutes in India. It is known that millions of people lose their vehicles due to theft in addition to that there are many people lose their lives due to accidents on the roads. Most cases of theft have been caused by the lack of remote control system. It is known that, traditional systems used to monitor the vehicles, which depends mainly on alarm signal. It has failed to perform its function for alarm can't be heard from distant places and the signal can be disabled. Many other vehicles have the same alarm signal To resolve such problems, it is decided to design this system to avoid vehicle theft and to know the current location of the vehicle using at any time. Using GSM technology whereas this system also enhances personal safety of individuals. The main aim of the present research is to design and develop an advance and robust security system for vehicle that can prevent theft and provides information on robberies. The system being developed through the present work uses GSM system and can be made affordable so that it can be used in low cost vehicle even in two wheelers. A lot of researches have been done for vehicle safety system depend mainly on GPS.

SYSTEM DESIGN

This paper proposes a vehicle safety system that consists of two main units: (1) vehicle unit (2) monitor unit. The main components of vehicle unit are microcontroller, RF transmitter, RF receiver, liquid crystal display (LCD). This unit is responsible for determining the current position of the vehicle via cell ID finder through GSM, connected to the microcontroller and continuously sends this information to the monitor unit via the RF transceiver. Another function of this unit is that it can turn off vehicle engine as a response to a signal received from the monitor unit, if the vehicle was theft. The second unit is the monitor unit which consists of a GSM module. This unit continuously receives messages from the vehicle unit. It processes and analysis these messages directly without any delays and displays the current position of the vehicle. When the vehicle is theft, the monitor unit makes a call to the owner and it allows to control the engine of the vehicle by sending ON and OFF commands to the GSM module. In this method, an IR sensor is used to detect the helmet. When the helmet is detected, the information is transmitted to the microcontroller by RF transmitter and received by RF receiver.

Working of the module:

The entire system is installed in the engine along with GSM modem. After giving the power supply and checking the status of the GSM, we enter the 4 digit password using 4x3 keypad, if the entered password matches the default password ("xxxx"), an SMS ("correct password, give confirmation") is sent to the owners mobile. On receiving the confirmation ("OK"), MCU starts the engine and vehicle moves forward. Else if the password is incorrect, buzzer is turned on and SMS ("incorrect password") is sent to mobile. After 3 such wrong attempts, the entire system turns off. If the status of the GSM is off, then we can operate the entire system with a switch. We can also access the kit by other mobiles, this can be done by entering 1234 on the keypad, now by sending SMS("OK") from the desired mobile to the GSM,the engine can be started.


GPS & GSM based vehicle tracking system
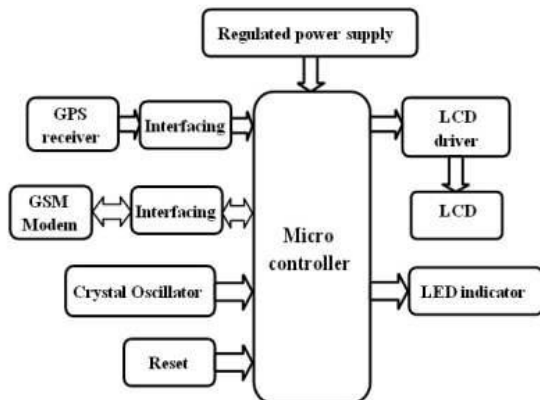
1.RF Transmitter in vehicle safety system:

A delay time has been given to wear the helmet. If the helmet is not weared with in a delay time, then the engine will be OFF automatically. If the owner sends "ON" MESSAGE then the information will be passed to the microcontroller through GSM. So that the relay will ON the engine part. If an "OFF" MESSAGE is sent, then the relay will turn OFF the engine.

Later the local area code (LAC) of the vehicle position will be sent to the owner. Hence by using cell finder, one can find the location of the vehicle.

Vehicle Side
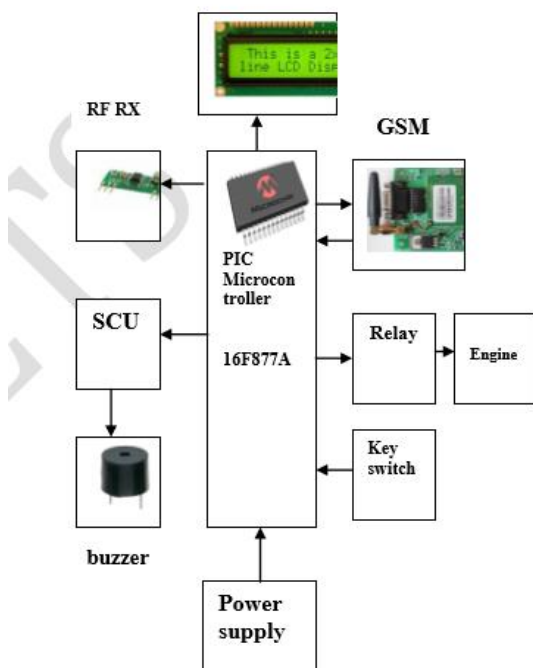
GSM MODULE:

GSM (Global System for Mobile) / GPRS (General Packet Radio Service)

TTL –Modem is SIM900 Quad-band GSM / GPRS device, works on frequencies 850 MHZ, 900 MHZ, 1800 MHZ and 1900 MHZ. It is very compact in size and easy to use as plug in GSM Modem. The Modem is designed with 3V3 and 5V DC TTL interfacing circuitry, which allows the User to directly interface with 5V Microcontrollers (PIC, AVR, Arduino, 8051, etc.) as well as 3V3 Microcontrollers (ARM, ARM Cortex XX, etc.). The baud rate can be configurable from 9600-115200 bps through AT (Attention) commands. This GSM/GPRS TTL Modem has internal TCP/IP stack to enable User to connect with internet through GPRS feature. It is suitable for SMS as well as DATA transfer application in mobile phone to mobile phone interface.

In this paper, GSM is used to alert the owner in case of any robberies. It provides vehicle-user communication. The modem can be interfaced with a Microcontroller using USART (Universal Synchronous Asynchronous Receiver and Transmitter) feature (serial communication).

RESULTS AND DISCUSSIONS

As the current technologies for vehicle safety system such as RFID device are bulky, space occupying, there is a need for designing GSM modem with vibration sensor in order to avoid the theft. The current practices for theft control system possess lengthy delay, are more vulnerable to control vehicular communications. Thus there is a need to improvise the existing system to prevent vehicle attacks. This can be done by providing different users a different access levels on the vehicle

Fig 4. Hardware description of F
receiver

Fig 5. Implementation of RF transmitter

Here, The user authenticates to the immobilizer unit, the immobilizer then queries the local database (to find whether the user has access rights) each model is mutually authenticated with the immobilizer unit and the scheme is applied to the decide whether the vehicle will start or not.

The online based following framework is a framework planned by joining of a few advanced data and communication technology. The framework compresses of vehicle mounted following gadgets and web based application. Through the framework, clients or user will have the facility of checking the area graphically and other important data of the vehicle. The online framework empowers client to such location track on guide through created web application known as cell id finder and communicate with database server for vehicle tracking. The client can find the path of the destination or complete route with directions where he want to go through web application.

CONCLUSION & FUTURE WORK:

This project provides security for all the vehicle users by avoiding vehicle theft using GSM technology & cell ID finder. It also reduces human risk by the strict usage of helmets while driving. The developed system used to display the current position of the tracked vehicle in the cell ID finder application. The system should be placed inside the vehicle in a suitable place so that it would not to be detected by the thief or unauthorized person. When the theft is identified, the vehicle engine can be turned off by sending a message from the monitor unit to the vehicle unit. The simulation of the whole system had been done using MPLAB. The system owns many advantages over others such as represent real time tracking. For future needs it is very easy to add new facilities to the system. In addition to that, the system in the future can support biometric security approach for authentication, such as using finger print, iris, voice or hybrid to distinguish between the owner and the thief.

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