

SMART VEHICLE USING WIRELESS TECHNOLOGY

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ABSTRACT: This project inculcates the prevention of purloining of vehicle by unauthorized sources using GSM. The system provides a provision for remote ignition cut-off mechanism. The owner receives an automatically generated message which intimates about any unauthorized entry, thus, he/she sends an SMS which forbids the ignition of the fuel. This project also deals with certain other concerns of vehicle owners such as fuel theft. This can be prevented by using a liquid level sensor where the owner gets notified as soon as there is a steep decline in the fuel level. Here, microcontroller acts as the central processing unit of the whole system. Also, this project has an added feature of alcohol sensor technology might cause cars to shut down if they sense drivers are over the legal blood alcohol limit.

KEYWORDS- GSM Technology, fuel thefting, alcohol sensor.

INTRODUCTION

In today's world almost everyone owns a vehicle and hence vehicle theft is a very common issue faced by the society. In the last few years, the country has developed at a great speed and many companies have been established here bringing a lot of workforce with them. This has led to an increase in the number of vehicles on roads and thus increasing the number of thefts of vehicles as well. So, to controls thefts, this system is proposed to eradicate this problem to the core. The project presents the theft intimation and safety of vehicles using GSM technology. This system deals with theft prevention and rescue device.

A. Vehicle Theft Detection And Control

When someone tries to steal a car then microcontroller gets an interrupt and orders GSM modem to send the SMS on the owner's cell phone. The GSM is attached to the owner's vehicle. The owner receives an SMS that is car is being stolen then the owner sends back the SMS to the GSM modem saying 'Stop engine', 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.

B. Fuel Theft and Control

The other concerns of vehicle owners are fuel theft from stationary vehicles. In this situation we use a liquid level sensor which is set at a threshold. Whenever the liquid drops below the threshold the sensor gives a signal to the microcontroller which sends the SMS to the owner. One question arises here is what if the owner is driving the vehicle, then also the level will drop and microcontroller will receive a signal. To avoid such circumstances a signal is taken from ignition key. Whenever the owner inserts a key into the ignition lock and switches it on the signal is sent to the microcontroller and the fuel level is not monitored in this case. Level sensor is turned on only when the key is removed from the ignition lock.

C. Drunk Driver Control

This system has an added feature of prevention of drunk driving. There is an alcohol sensor attached which is basically a breathalyzer which detects alcohol concentration in your breath. Whenever the driver is drunk beyond threshold the sensor will send a signal to the microcontroller which automatically cut-offs the ignition and the vehicle will not start.

MATERIALS AND METHODS REQUIREMENT

Power supply:

In this project we are converting the ac power supply to dc. For this purpose we are building our own power supply using a step down transformer which is connected with direct AC supply which helps to reduce the frequency of main supply. Then come the bridge rectifier which helps us to give a continuous ac supply. To this we attach a voltage regulator so that we get 5v of regulated power supply. In the end we also connect a led to show the presence of current in the circuit

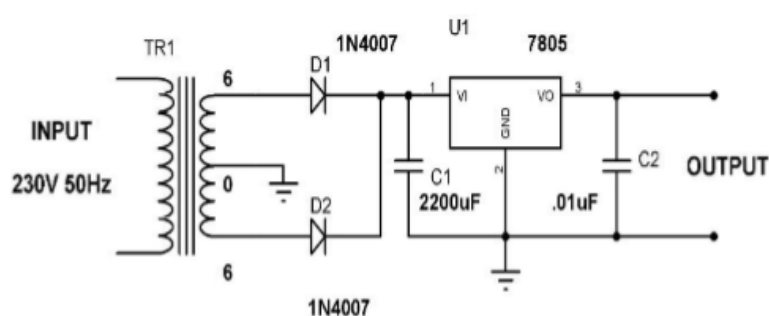


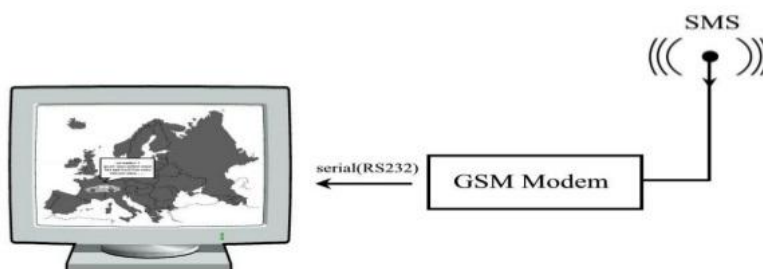
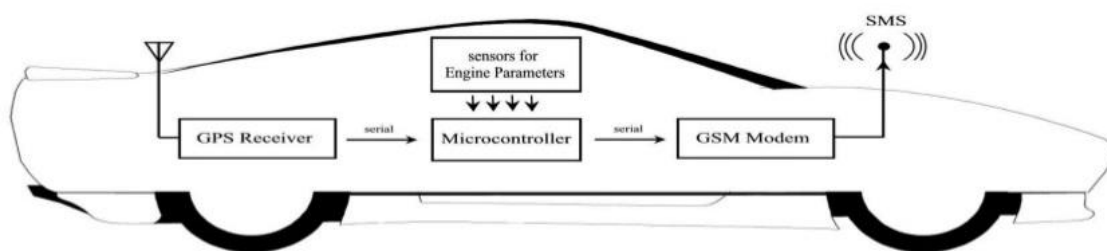
Fig. power supply circuit

8051 microcontroller:

The Intel MCS-51 (commonly termed 8051) is an internally Harvard architecture, complex instruction set computer (CISC) instruction set, single chip microcontroller (μC) series developed by Intel in 1980 for use in embedded systems. This microcontroller requires three connections i.e. +5v supply: This +5v supply is required for the controller to get start which is provided from the power supply section. Crystal Oscillator: A crystal oscillator of 4 MHz is connected to generate the frequency for the controller. Reset section: It consists of a one resistance of 10k connect to +5v and through an s/wconnected to the ground. This section is used to reset the controller connected.

GSM module:

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection. A GSM/GPRS module assembles a GSM/GPRS modem with standard communication interfaces like RS-232 (Serial Port), USB etc., so that it can be easily interfaced with a computer or a microprocessor / microcontroller based system. The power supply circuit is also built in the module that can be activated by using a suitable adaptor. GSM (Global System for Mobile) Modem is SIM900 Quad-band GSM, 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 User to directly interface with 5V Microcontrollers (PIC, AVR, Arduino, 8051, etc.) as well as 3V3 Microcontrollers (ARM, ARM Cortex XX, etc.).



GSM Module

Alcohol sensors:

Alcohol Gas Sensor MQ3 is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO₂, whose conductivity is lower in clean air. Its conductivity increases as the concentration of alcohol gases increases. It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapor and gasoline. This module provides both digital and analog outputs. MQ3 alcohol sensor module can be easily interfaced with Microcontrollers, Arduino Boards, and Raspberry Pi etc.

The alcohol sensor is suitable for detecting alcohol concentration in the breath, just like common breathalyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

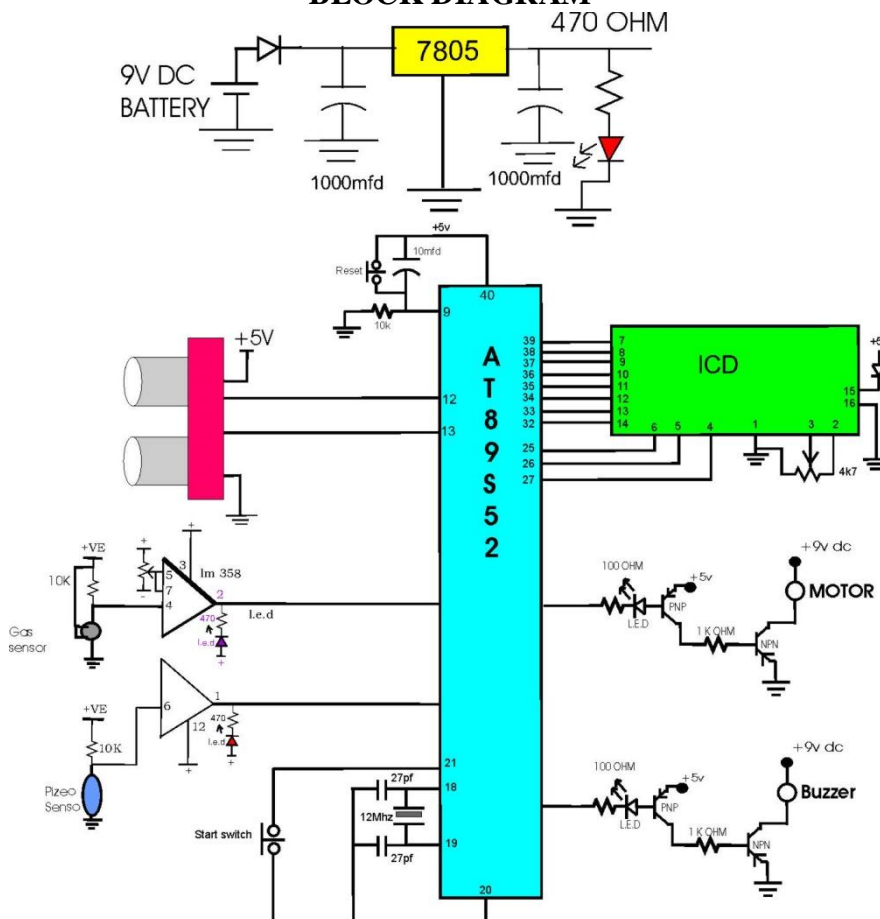
Fuel level sensors:

The ultrasonic fuel level sensor RJ-45 is an intelligent sensor port on base unit powers the sensor. It is compatible with any of the security, probe series units, or the E-sensor 8 expansion modules. We can instantly be alerted should there be any drop below critical levels in the liquid. Advance alerting, including an additional feature that alerts if the tank level is dropping too quickly and protects us from possible liquid leaks or theft.

Piezoelectric sensor:

A piezoelectric sensor is a device that uses the piezoelectric effect, to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge. Based on piezoelectric technology various physical quantities can be measured; the most common are pressure and acceleration. For pressure sensors, a thin membrane and a massive base is used, ensuring that an applied pressure specifically loads the elements in one direction.

BLOCK DIAGRAM



WORKING AND ANALYSIS

The given circuit is provided a power supply from a circuit which consists of a step down transformer ,a bridge rectifier ,a voltage regulator and capacitors as filter.Further various sensors and the GSM module is attached to the microcontroller such that any sudden change sends an immediate information to the owner of the car.

Here, the piezoelectric sensor is required for the purpose of antitheft. As soon as someone will try to unlock or start the vehicle with any other key the piezoelectric sensor will come into play. The original key of car has some threshold value. If we open our car with some other key the threshold value changes. This change in value will tell us that someone else is trying to open our car. Hence we can stop ignition of engine by sending a message through GSM modem. The entire system is first connected to microcontroller and then to GSM module to send or receive output value. Sensors often tend to be sensitive to more than one physical quantity. Pressure sensors show false signal when they are exposed to vibrations. Sophisticated pressure sensors therefore use acceleration compensation elements in addition to the pressure sensing elements. By carefully matching those elements, the acceleration signal (released from the compensation element) is subtracted from the combined signal of pressure and acceleration to derive the true pressure information.

Secondly, the alcohol sensors MQ-3 is being used for the safety purpose of the commuters as well as the car. The breath-based system could measure alcohol molecule in the driver's breath. Alcohol absorbs specific wavelengths light. By measuring the light's intensity, the system can precisely pinpoint the driver's blood alcohol level.

For sensor, if the driver's blood alcohol is higher than .08 - which is the legal limit - the car will stay put.

Thirdly, the Ultrasonic Fuel Level Sensor is a liquid level detector that will monitor the level of level of liquid in a tank and displays this level on the interface and sends alerts accordingly. As there is any drop below critical levels in the tank, the sensor senses it and the buzzer starts to buzz and a message sent to the microcontroller which in turn sends the message to the owner.

CONCLUSION

In this paper, we proposed a method of vehicle tracking and theft controlling systems using GSM. This is a very useful application of GSM. This system is based on wireless communication. This project is used to intimate the owner of the vehicle about any unauthorised entry into the vehicle. instant. This project deals with the design and development of a theft control system for vehicle as well as protect the life of rider.

REFERENCES

1. B Webb "Steering Column Locks and Motor Vehicle Theft: Evaluations from Three Countries" Situational crime prevention: Successful case studies, 1997.
2. Pang-Chieh Wang, Ting-Wei Hou, Jung-Hsuan Wu, and Bo-Chiuan Chen "A Security Module for Car Appliances" International Journal of Aerospace and Mechanical Engineering 2007.
3. H Song, S Zhu, G Cao "A Sensor network based Vehicle" INFOCOM The 27th Conference on Computer Communications 2008.
4. Lili Wan, Tiejun Chen "Automobile Anti-theft System Design based on GSM" International Conference on Advanced Computer Control 2008.
5. H Guo, HS Cheng, YD Wu, JJ Ang "An Automotive Security System for Anti-Theft " International Conference on networks 2009.