



Monitoring and Controlling of the Non FC Vehicle using GSM and GPS Technology

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Abstract: The objective of our project is to design and develop automatic FC monitoring system for automobile. The system make use of the embedded system and Global System for Mobile communication (GSM) technology. Using the GSM and (GPS) Global Positioning system technology, it is able to find where the vehicle is located and exact place where it is moving. The GPS gives the longitude and latitude position of the vehicle. By this we can inform to the nearby police station to stop the non FC vehicle. It is quite tedious to identify all such vehicles without a system proposed here. Once a vehicle is registered, all its registration details are fed into the system for identification purpose. The vehicles are tracked based on the data. The system comprises of a transmission and a reception unit. The transmission unit sends the vehicle identification which is used by the other for tracking with the help of GPRS. All the data transfer between the transceivers is implemented using GSM. By reducing the non FC vehicle some of the major accidents could be avoided in the cities. The main concept in this design is introducing the mobile communication into an embedded system. The designed unit is very simple & low cost. The entire designed unit is on a single chip.

Index terms: Global Positioning System (GPS), Global System for Mobile communication (GSM), Fitness Certification (FC).

I. INTRODUCTION

Normally, the motor vehicles are registered in the corresponding transport offices. The registration period is restricted to particular time period, after which the vehicle registration has to be renewed. The registration details include registration number, vehicle model, registration timestamp and the period of expiry and few more information about the vehicle.

The system consists of transmitter and receiver unit. The transmitter unit is placed at the RTO office which consists CPU and GSM Module and the receiver unit consists of GSM module, Microcontroller, Driver circuit, Motor, Buzzer & LCD Display which is placed at the vehicle. It is punishable and not advisable to use vehicles on road without renewal of registration. Yet people tend to use vehicles with expired registration. It is quite tedious to identify all such vehicles without a system proposed here. In this system model, communication protocols are implemented to identify such vehicles. Once a vehicle is registered, all its registration details are fed into the system for identification purpose.

The vehicles are tracked based on the fed data. The system comprises of a transmission and a reception unit. The transmission unit sends the vehicle identification which is used by the other for tracking with the help of GPRS. All the data transfer between the transceivers is implemented using GSM. Once the vehicle is registered all its details are fed to the system in the RTO office. When the FC validity of the vehicle is expired an intimation message will be sent to the receiver unit. If they doesn't respond, the SMS will be sent. After reading the SMS, the microcontroller would sent the signal to Driver circuit to stop the engine. The main aim of the project is to design and develop an advanced monitoring and controlling of the non FC vehicle using GPS and GSM technology. Once the fitness certification is out of date a message is being sent to the owner of the vehicle, both to his phone and the receiver kit.

The receiver even also contain a GPS tracking device by which the longitude and latitude of the vehicle moving will be known. By which the exact location of vehicle is obtained there by we can inform to the nearby police station and they can take the vehicle into their custody until the payment due amount of the FC with fine. The RTO officer can control the vehicle to stop the engine by cutting the fuel line off. The RTO officer can lock and unlock the vehicle fuel line by the simple SMS (Short Message Service) also the vehicle can be tracked with the exact location using GPS module. Accidents can be reduced.

BLOCK DIAGRAM TRANSMITTER UNIT:

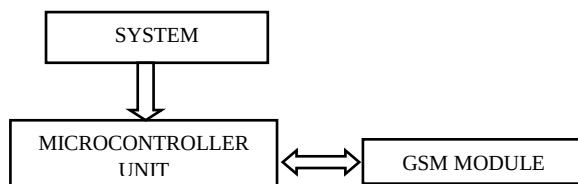


Figure 1

RECEIVER UNIT

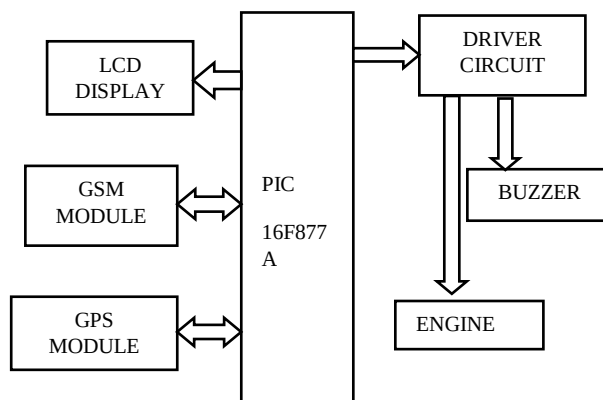


Figure 2

Figure 2: A PIC16F877A Microcontroller will be interfaced to GSM module, GPS Receiver and also to the vehicle locking system. Microcontroller will keep listening to the New SMS arrival. If a sms arrived, it will read the GPS location and will send it to the RTO office in the form of sms. This will extract the sms information from GSM modem or cell phone, and it will plot the latitudes and longitudes on the Google maps. Also, the vehicle can be locked/unlocked by sending a message to the system. The working is done in the process i.e. the drivers RS232 from GPS and GSM modems are connected to drivers (RS232) of the microcontroller.

Figure 2: Here the RS 232 acts as an interface for two way communication from microcontroller to GPS&GSM vice versa. The information which is Available at the RS232 of microcontroller is converted into compatible TTL logic through MAX232..The LCD is to display the location which is Computed by the GPS receiver and also displays the delivery report of messages forwarded and microcontroller is used to 'cut the fuel supply' thereby we lock and unlock the engine of the vehicle. For the programming of microcontroller an embedded C language is given to the microcontroller through DB9. **Fig 1:** Before when the vehicle FC period is expired an intimation message will be sent to the vehicle owner's mobile and LCD display of the receiver unit. If they does not respond, even after the FC expired date an message will be sent to the receiver unit to cut the fuel supply.

Figure 2: Then GSM modem receives the message through the SIM card present in the modem. The GSM forwards this message to microcontroller. At the same time the GPS receiver continuously calculates its location where it was on the earth with the help Of satellite signals from the space and sends this information to microcontroller in the form of longitude and latitude.

Figure 1: When the location is detected then user sends this message as 'cut fuel supply' to lock the engine of the vehicle. This message is forwarded to microcontroller through GSM. Then the microcontroller locks the vehicle engine .After when the vehicle was serviced, sends the message as 'unlock' to the GSM. Then the microcontroller unlock the engine of the vehicle.

PIC16F877A microcontroller

Microcontroller is the heart of our circuit. It acts as an interface between GPS and GSM. In this project we have to use PIC16F877A microcontroller. The PIC16F877 has 8K £ 14-bit words of Flash program memory, 368 bytes of data RAM, 256 bytes of data EEPROM and an 8-level x 13 bit wide hardware stack. The Program Counter (PC) is 13 bits wide, thus making it possible to access all 8K x 14 addresses. It is characterized by a RISC architecture instead of the CISC architecture used, for example, by the Motorola 6809.

GSM Modem

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it may be a mobile phone that provides GSM modem capabilities. A GSM modem could also be a standard

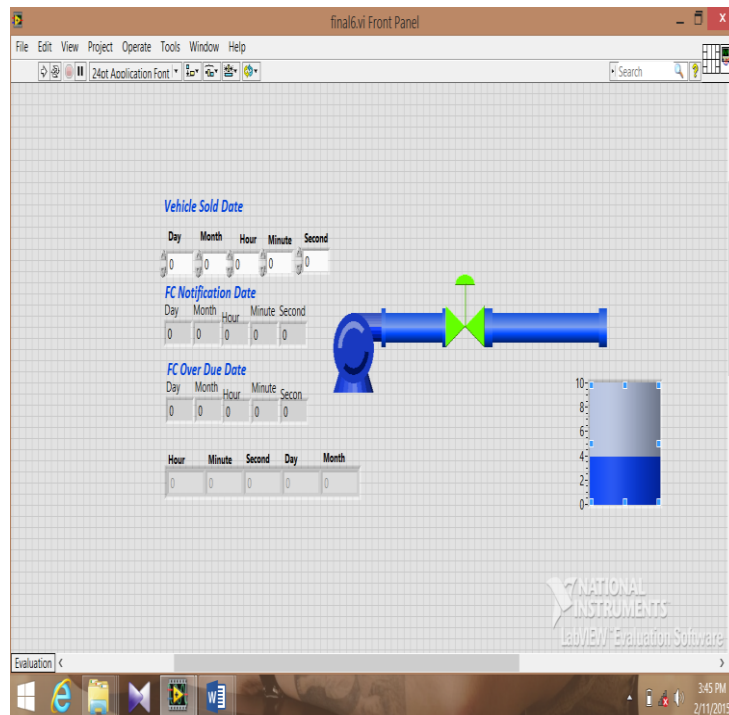


Figure 4

IV. CONCLUSIONS AND FUTURE SCOPE

This project deals with the design & development of a monitoring and controlling of the non FC vehicle. The simulation of the circuit design and its Implementation is done using PROTEUS software. This system is designed to improve vehicle fitness. The GSM modem provides information to the user on his request. The user in the RTO office can access the position of the vehicle at any instant often. They sends a message in order to stop the vehicle engine by cutting the fuel supply. The GPS receiver on the kit will locate the latitude and longitude of the vehicle using the satellite service. This is reliable and efficient system for monitoring and controlling of the NON-FC vehicles through GSM, GPS and serial communication.

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