Real Time Tracking System Using Gsm And Gps With Speed, Fuel Indicator And Location

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Abstract- *Vehicle tracking system combines the installation of an electronic device in a vehicle, or fleet of vehicles, with purpose designed microcontroller to enable the owner or a third party to track the vehicle's location, collecting data in the process. Modern vehicle tracking systems commonly use Global Positioning System (GPS) technology for locating the vehicle. For collecting the information by using GSM (Global System for Mobile Communication). Vehicle information can be viewed on LCD (Liquid Crystal Display) via the GSM hardware. A GPS receiver is placed in the vehicle in order to receive the current location and through GSM the signal is transmitted to the receiver at the owner or the third party through PIC microcontroller. Then through the proximity and float sensor we can find the speed of the vehicle and the fuel level in the fuel tank.*

Keywords- Global System for Mobile Communication (GSM) , Liquid Crystal Display (LCD), Global Positioning System (GPS) PIC microcontroller, fuel tank.

I. INTRODUCTION

In this urban life transportation is very common. A lot of mishappenings occur on the road every day. Therefore the need of security and monitoring is developed. To resolve such problems, a system is developed using GPS and GSM technologies.GSM and GPS based vehicle location and tracking system will provide effective, real time vehicle location, mapping and reporting this information value and adds by improving the level of service provided. A GPS-based vehicle tracking system will inform where your vehicle is and where it has been, how long it has been. The system uses geographic position and time information from the Global Positioning Satellites. The system has an "On- Board Module" which resides in the vehicle to be tracked and a Base Station that monitors data from the various vehicles. The On-Board module consists of GPs receiver, a GSM modem.

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is a common European mobile telephone standard for a mobile cellular radio system operating at 900 MHz. In the current work, SIM300 GSM module is used.The SIM300 module is a Triband GSM/GPRS solution in a compact plug in module featuring an industry-standard interface. It delivers voice, data and fax in a small form factor with low power consumption.

II. PROPOSED METHODS

The additional features of displaying the speed and the fuel level of the vehicle. For displaying the speed use proximity sensor used to detect the presence of nearby objects without any physical contacts. For displaying the fuel level of the vehicle use float sensor that is detect level of the fuel in the tank. Here use 20x4 LCD display for displaying the Latitude, Longitude, Speed and Fuel Level of the vehicle in a sequential order. First the GSM module is directly connected to the controller. Then the GSM wait for getting the request from the user once it receive the number from the user it directly connect to the GPS module then the GPS and GSM together produce the latitude and longitude of the vehicle. Finally the GSM send the latitude, longitude, speed, fuel level message to the user.

A. Block Diagram & Circuit Diagram

The block diagram of a Real time tracking system using GSM AND GPS with speed, fuel indicator and location is shown in the Fig. 1. This system consists of various parts such as are PIC16F877a microcontroller, GPS module, GSM module, LCD display, Proximity sensor, Float sensor,+12v power supply. The block diagram and circuit diagram of the system shown in figure 1 and Figure 2.
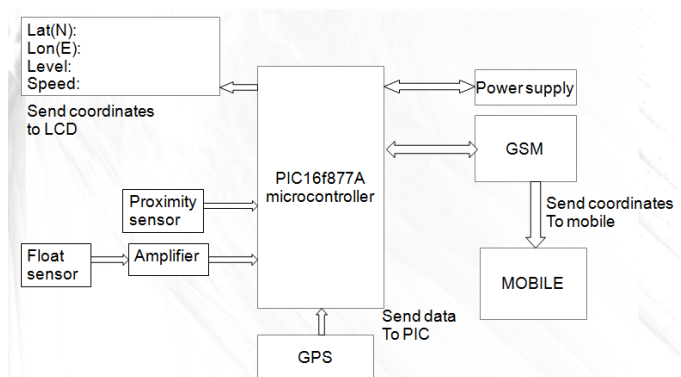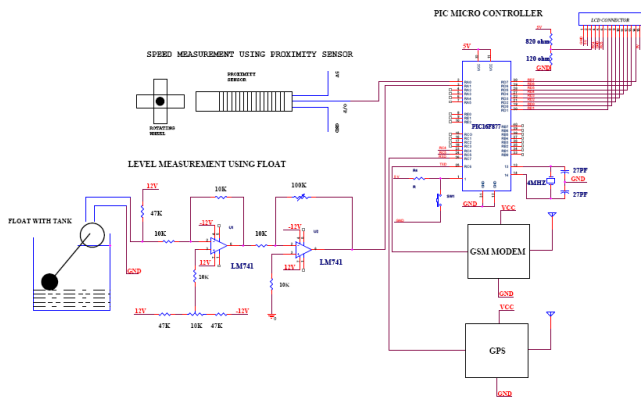

Figure 1.System Block Diagram

Fig.2.System Circuit diagram

B.PIC16F877A Microcontroller

Various microcontrollers offer different kinds of memories. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in pic16F877A is flash technology, so that data is retained even when the power is switched off. Easy Programming and Erasing are other features of PIC 16F877A. The PIC start plus development system from microchip technology provides the product development engineer with a highly flexible low cost microcontroller design tool set for all microchip PIC micro devices. Microcontroller is the heart of the ration materials distribution system. There are used various application such as automatically controlled products, automobile engine control systems, to control medical devices, remote controls, printer, scanner, office machines, appliances, power tools, toys and other embedded systems. The size and cost of the microcontroller are less. The microcontroller circuit diagram is shown in the Figure 3. The 12 MHz crystal oscillator is used to provide the required clock signals to the microcontroller.
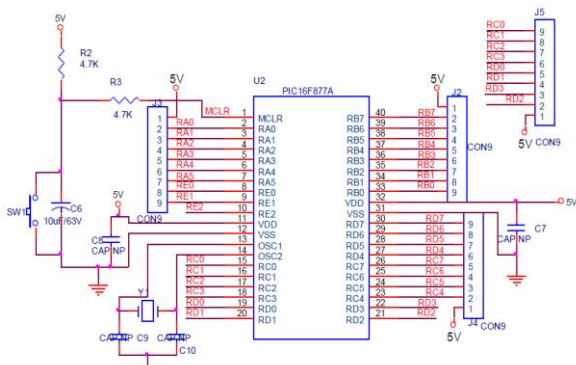

Figure 3. Microcontroller unit

C. GPS Module

A GPS is a space-based radio-navigation system consisting of a constellation of satellites and a network of ground stations used for monitoring and control. Currently 32 GPS satellites orbit the Earth at an altitude of approximately 11,000 miles providing users with accurate information on position, velocity, and time anywhere in the world and in all weather conditions. Initially it was used by the United States military, but now most receivers are in automobiles and smart phones. The satellite data is free and works anywhere in the world.
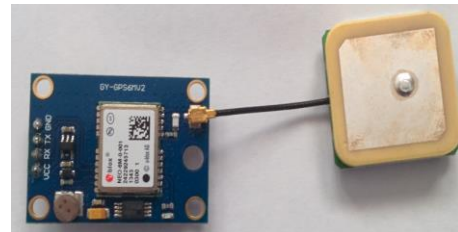

Figure 4. GPS Module

D. GSM Module

The SIM900A is a complete Dual-band GSM/GPRS module in a SMT type which is designed specially for Chinese market, allowing you to benefit from small dimensions and cost effective solutions. Featuring an industry-standard interface, the SIM900A delivers GSM/GPRS 900/1800MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. With a tiny configuration of 24mm x 24mm x 3 mm, SIM900A can fit almost all the space requirements in your applications, especially for slim and compact demand of design.

Figure 5. GSM Module

D. GSM Module

Inductive proximity sensors are widely used in various applications to detect metal devices. They can be used in various environments (industry, workshop, lift shaft...) and need high reliability. Inductive proximity sensors generate an electromagnetic field and detect the eddy current losses induced when the metal target enters the field. The field is generated by a coil, wrapped round a ferrite core, which is used by a transistorized circuit to produce oscillations.

The target, while entering the electromagnetic field produced by the coil, will decrease the oscillations due to eddy currents developed in the target. If the target approaches the sensor within the so-called "sensing range", the oscillations cannot be produced anymore: the detector circuit generates then an output signal controlling a relay or a switch.

Figure 6. Proximity Sensor

F. Float Sensor

A tank unit (sheet metal / aluminum die cast type) is a instrument to indicate level of Fuel in tank . It is used in all kind of vehicles stationary engines which have tank of any kind. It normally consists of Float (NBR type/PU type) with level arm   and Potentiometer.

As the fuel is consumed or emptied in tank the float moves up/down and it increases or decreases the resistance of potentiometer which includes TFR type to indicate the fuel level on the Fuel gauge / Dashboard cluster. It can also be of capacitive type and with integrated suction and return tubes. Among the various options / types, adjustable / universal type tank unit can also be provided for fitment in different fuel tanks, shapes and sizes.
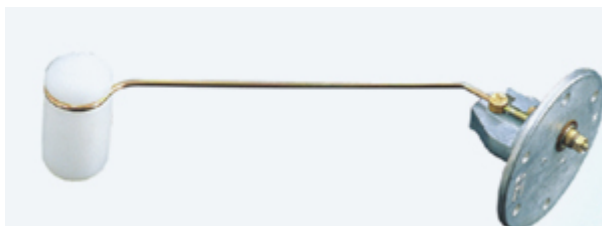

Figure 7.Float Sensor

G. Power Supply Circuit Diagram

The power supply most important for electronic circuits, which is provide the required power to microcontroller and other electronics devices. The power supply circuit diagram is shown in the Fig.8
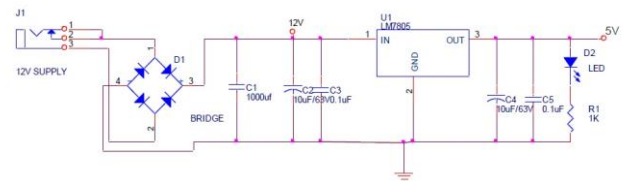

Figure 8. Power Supply

H.LCD Display

A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. The LCD is used in a wide range of applications including computer monitors, televisions, instrument, aircraft cockpit displays, and signage. The most common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones, and have replaced cathode ray tube (CRT) displays in most applications. The LCD screen is more energy efficient than a CRT. The power consumption is very low while compare with other devices. The LCD circuit diagram is shown in the Fig.9
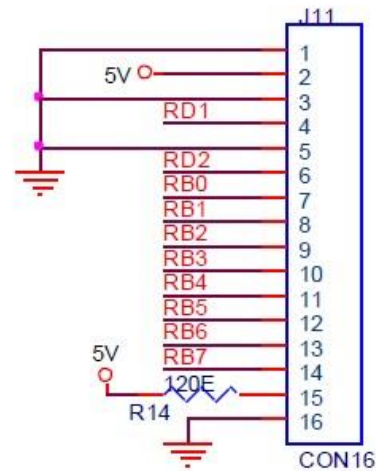

Figure 9. LCD Display Circuit

I. DEBUGGING AND TESTING PROCESS

An advanced vehicle system based on embedded system is a complicated process that involves hardware and software interfacing. The design of an advanced vehicle system based on embedded require more skill to use debugging and testing tools to hand. The debugging and testing of advanced vehicle system based on embedded divided into two groups: software and hardware tool parts. A software simulator is a used for program running on a self-

determining hardware and simulates the embedded c programs. Simulators offer the small cost of development tools for micro controller based systems and many companies provide free simulator programs.

The software program is written in assembly language program or c program, which is compiled using Keil software. The hex code is generate with help of compiler, and stored in the computer. The hex code of the program is loaded into the AT89C52 microcontroller by using Universal programmer.

A. Hardware Assembling and Testing:

The First step of hardware assembly needs to make PCB layout for the given advanced vehicle system circuit using Orcad. After completed the PCB work then the following process is necessary to complete the project implementation.

1. Assemble all the components on the PCB board based on the given circuit. Transmitter and Receiver section of the modem is connected to pins 13 and 14 of MAX 232, and put in a valid SIM in the GSM modem.
2. GPS module Connected according to the circuit diagram.
3. This project successfully implemented and tested by us.
4. This system is useful and safe for car owners.

III. CONCLUSION

Vehicle tracking system is becoming increasingly important in large cities and it is more secured than other systems. Now a day's vehicle thefting is rapidly increasing, with this we can have a good control in it. Now days the cost of the vehicles is increasing they will not step back to offord it. This setup can be made more interactive by adding a display to show some basic information about the vehicle. This system solves the issue of navigation. Navigation can be done by using the GPS module is described .This method is better than the available methods.

REFERENCE

[1] Sumit S. Dukare,Dattatray A. Patil,Kantilal P. Rane,"Vehicle Tracking, Monitoring and Alerting System", International Journal of Computer Applications (0975 – 8887) Volume 119 – No.10, June 2015 .

[2] Sarika R. Gujar,Prof. A. R. Itkikar,"Advanced Embedded System of Vehicle Accident Detection and Tracking System", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 5, Issue 2, February 2015.

[3] Md. Syedul Amin, Jubayer Jalil, M. B. I. Reaz," Accident Detection and Reporting System using GPS,GPRS and GSM Technology", 2012 IEEE International Conference on Informatics, Electronics & Vision.

[4] Zhigang Liu, Anqi Zhang and Shaojun Li," Vehicle Anti-theft Tracking System Based on Internet of Things", 2013 IEEE of School of Computer and Communication Engineering Northeast University at Qinhuangdao.

[5] E. Ceuca, A. Tulbure, A. Taut, O. Pop, I. Farkas," Embedded System for Remote Monitoring of OBD Bus", 2013 IEEE 36th Int. Spring Seminar on Electronics Technology.

[6] Ashutosh U. Jadhav, N.M. Wagdarikar ," A Review: Control Area Network (CAN) based Intel-ligent Vehicle System for Driver Assistance using Advanced RISC Machines (ARM) ", 2015 International Conference on Pervasive Computing.