International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 04 | Apr-2018 www.irjet.net p-ISSN: 2395-0072

GPS-GSM BASED VEHICLE MONITORING & SMART FUEL MEASUREMENT SYSTEM

Aditya Jadhav[1], Sonali Shirsekar[2], Sahil Sankhe[3] Savita Lade[4]

[1,2,3,4] *Student,Computer Science,Rajiv Gandhi Institute Of Technology,Mumbai,India*

Abstract - *The paper describes the existing fuel gauge techniques being used in automobiles i.e. the traditional fuel gauge system and the smart fuel gauge system and also discusses their operating principle and a comparison is done between the two existing techniques based on performance, complexity and cost of development. Some issues with respect to the existing techniques are identified and so a better alternate sensing technology has been suggested, described and justified.GPS is one of the technologies that are used in a huge number of applications today. One of the applications is tracking your vehicle and keeps regular monitoring on them. This tracking system can inform you the location of the vehicle, and that information can be observed from any phone. It also includes the Automatic Voice responding system that interacts with you for the password verification. This system uses GPS and GSM technologies. The paper includes the hardware part which comprises of GPS, GSM, Atmega microcontroller MAX 232,16x2 LCD, Ultrasonic sensor [1], ISD 1820 module and software part is used for interfacing all the required modules. Main objective is to design a system that can be easily installed and to provide platform for further enhancement.*

Key Words: GPS, GSM, Tracking System, automobile fuel gauge, fuel indicator,capacitive level sensing, ultrasonic

1.INTRODUCTION

A Fuel gauge is an instrument used to indicate the level of fuel contained in a tank. Commonly used in cars, these may also be used for any tank including underground storage tanks. The systems consist of two important circuitry that is for sensing and indication of fuel level. The sensing unit usually uses a float type sensor to measure fuel level while the indicator system measures the amount of electric current flowing through the sensing unit and indicates fuel level. The sensing unit usually uses a float type sensor to measure fuel level while the indicator system measures the amount of electric current flowing through the sensing unit and indicates fuel level. There are various techniques to implement sensing and indicating systems.

2. EXISTING FUEL GAUGE TECHNIQUES

The main reason for stretching a vehicles mileage is the fuel gauge present on the dashboard of the car which makes the driver think that they are running low on fuel while there is plenty of fuel still left. Therefore the traditional system used is notoriously inaccurate; however some embedded systems were incorporated into the traditional systems in order to obtain better accuracy. Presently the most common and traditional fuel indicator system makes use of the resistive float type sensors to measure the level of fuel in the tank and this system consists of two units

1) The ―sender unit responsible to measure the level of fuel in the tank,

2) The gauge unit responsible to display the measured fuel level to the driver [4]. Another technique is known as the Smart fuel gauge system, which is similar to the traditional technique but also makes use of embedded systems such as micro controllers or microprocessors for providing better accuracy.

3.OPERATING PRINCIPLES OF THE EXISTING TECHNIQUES

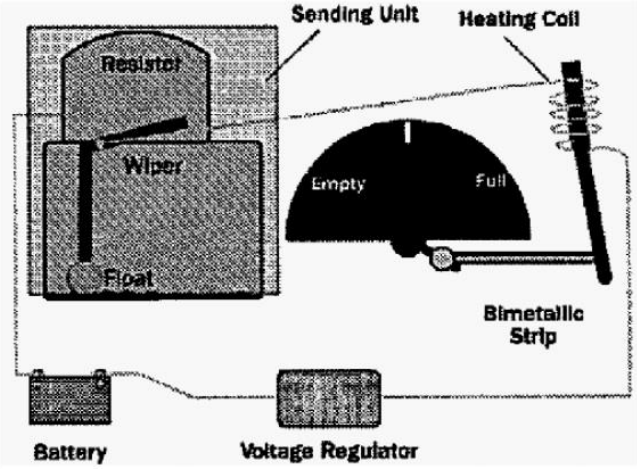


Figure 1. Traditional Fuel Measurement System

As discussed in section 2, the traditional fuel indicator consists of two units i.e. the sending unit and the gauge.

The Fig (1) shows the commonly used traditional fuel measurement system. The sending unit is located in the fuel tank of the car and it consists of afloat, usually made of foam, connected to a thin, metal rod. The end of the metal rod is mounted on a variable resister or potentiometer. The variable resistor consists of a strip of resistive material over it which moves across the variable resistor changing the resistance and flow of current depending on the movement of the float with respect to the level of fuel present in the fuel tank.

The Fig (1) shows that the fuel in the in the fuel tank is almost empty and the float has moved to the bottom of the tank moving the strip on the resistor thus increasing the resistance to maximum and current flow through the resistor becomes minimum thus displaying fuel empty on the gauge[2]. The gauge consists of a bimetallic strip i.e. a strip made of different kinds of metal and whose thermal co-efficient of expansion differs from each other. When resistance is decreases, current increases and thus the strip is heated during which one metal expands less than the other, so the strip curves, and this bending action is what moves the needle move on the fuel gauge. As resistance increases, less current passes through the heating coil, so the bimetallic strip cools. As the strip cools, it straightens out, pulling the gauge from full to empty. The smart fuel gauge system techniques has been implemented in some newer cars in which, instead of sending the current directly to the gauge, an intermediate microprocessor is used to read the output of the resistor and then communicate with the dashboard for displaying the fuel on the gauge corresponding to the read output voltage from the sending unit and these systems actually help improve the accuracy of the gauge.

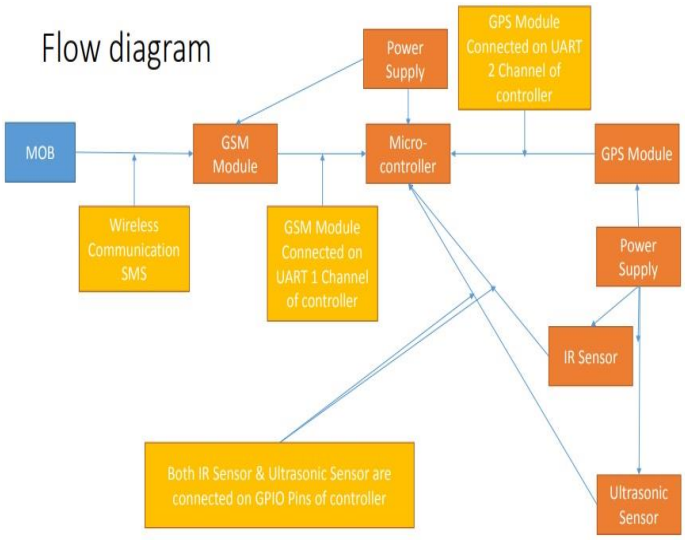
4.PROPOSED SYSTEM

The project goal is to track the exact location of vehicle & measuring the exact quantity of fuel inside fuel tank.

- Product should be able to send the vehicle location, once user will call on the product number & provide authenticate password.
- Product will response to the call on voice based system, which will provide user with different options.
- User call selects those options, after proper selection user will receive the data through SMS.

In this system user will be provided with a product calling number on which user can call, provide the password & user can select the option. After selecting option user will receive response through SMS.

For Vehicle position or location GPS module has used which can interact with micro-controller. Controller will reads the GPS location & provide it GSM module. GSM module sends the response to user. For Fuel measurement will automated system. It will trigger the Microcontroller once fuel inlet gets open, this will detect by IR sensor which is mounted near the inlet. After triggering using ultrasonic sensor controller will measure the fuel and sends it user through SMS.



5. FUEL MEASUREMENT

The system contains Ultrasound Sensor modules, Liquid Crystal Display (LCD) to show the updates. The whole system is controlled by using AVR controller (Ardiuno uno). Ultrasonic sensors are characterized by low-cost [3] and the possibility of being used in environments and situations where it is not possible to use more complex sensors as camera systems and laser devices, optical sensors. In this work, HC SR-04 which is ultrasonic electric telemeter modules was employed as ultrasonic transmitter [1] and receiver. This module can measure a distance within 0.03-3 mt effectively and transform the data into impulse of different width [5]. At first 5us, pulse is applied through the pin SIG of the module which triggers the transmitter to generate 40 kHz ultra sound signal string. At the moment the receiver catches the reflected wave it generates a high pulse width which corresponds to the time that the signal takes to reflected back. By using this pulse width we can measure the distance as well as the fuel level.

6. APPLICATIONS

- Stolen vehicle recovery.
- Field service management.
- This circuit can be used in bike to know the quantity of petrol available in the tank.
- This circuit can also be used for security purpose in bike to avoid the petrol theft.

7. CONCLUSION

Automobile theft and accidents in the transportation systems have caused significant loss of lives, waste of energy, and loss in productivity. To improve the safety, security and efficiency of the transportation systems and enable new mobile services and applications for the traveling public, the project have been developed, which apply rapidly emerging information technologies in vehicles and transportation infrastructures. It is one of the most challenging and critical issues for the industries. The practical model of this paper proved to be very efficient, cheaper, and reliable system for security.

8. ACKNOWLEDGEMENT

We wish to express our sincere gratitude to our guide, Prof. Savita Lade, Department of Computer Engineering for her guidance and also provide positive support throughout our project work. She helped us throughout the project to develop new and innovative ideas which made our project a great success.

REFERENCES

[1] G. Bucci, "Numerical method for transit time measurement in ultrasonic sensor applications," IEEE Trans on Instrumentation and Measurement, vol. 46, no. 6, pp. 1241-1246, 1997.

[2] Betta, G., A. Pietrosanto and A. Scaglione," 1996. A digital liquid level transducer based on opticalfiber", IEEE Trans.

[3] Jaimon Chacko Varghese, Binesh Ellupurayil Balachandran "Low Cost Intelligent Real Time Fuel Mileage Indicator for Motorbikes" (IJITEE), Volume-2, Issue-5, April 2013.

[4] Deep Gupta, Brajesh Kr. Singh and Kuldeep Panwar "A Prototyping Model for Fuel Level Detector and Optimizer" page no 226- 229 - African Journal of Basic & Applied Sciences 4 (6): 226-229, 2012 ISSN 2079-2034.

[5] Lei Chan, Xinmin Dong and Jie Han's Development of Ultrasonic instrument for sealed container's liquid level measurement.