Smart System to Measure Quality and Quantity of Fuel in Vehicle

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Abstract

Vehicles have become an integral part of human life. They are used for transportation of people and cargo. Transportation facilities are improved in the past decade due to innovations in automation. We have already known that motor vehicles display the availability of fuel in the fuel tank by means of some indication like digital bars running through the E [empty] and F [full] indicators. The manufacturer already decides that each bar maps to the corresponding litters of fuel in the fuel tank approximately. To the contrary every one of us might have experienced the problem with improper estimations of the current fuel level in the tank with the existing bars representation system. Now a day in this digitalized world, if the fuel indicator in the automobiles is also made digital with very high accuracy then it will be very helpful to know the exact amount of fuel available in the tank

Index Terms— Fuel adulteration, Petroleum Products, Fuel Quantity Check, Real Time Average Calculation

I. INTRODUCTION

The presented paper is based on the survey to check purity of petroleum. Many consumers complain about the quality and quantity of petroleum products but are not aware of the simple tests which they can demand from every dealer to ensure value for their money. Analog Fuel Meter In all over the world all the vehicle is having an analog fuel meter. This meter indicates three states of fuel level which are empty, half and Full. So, we cannot judge the actual fuel present in the fuel tank. The analog meter, which shows the fuel level by using needle. But due to this we do not get proper idea about fuel level present in fuel tank. Due to improper knowledge of fuel present in the tank we can undergo in trouble due to low fuel. Analog fuel meter as considering previous analog system we are going to implement advanced system. In our system we are doing digital fuel meter.

In present day scenario price of fuel continuously changing and there is lot of fuel adulteration in the fuel quality. So many problems are occurred in vehicles. This project, "Smart System to Measure Quality & Quantity of Fuel in Vehicle" is as an automotive electronic project which involves the use of fuel quality check sensor developed with the help of Light transmitter and the LDR, depending upon the contaminants mixed in the fuel he colors of fuel changes and accordingly the quality of fuel is checked.

This system to overcome the problem of fuel adulteration and also shows how much fuel is filled in the tank at the time of filling fuel at fuel pump. the device can detect bulk kerosene in the base of fuel containing vessels by giving an audio signal. The signal when analyzed will provide information on the integrity of the fuel and the personnel using the product. This project consists of sensors which detects quality of fuel weather it is suitable for vehicle engine as well as it consists of fuel level (quantity) sensor which shows how much fuel is filled in fuel vessel and display on screen in milliliter (ml).

II. AIM & OBJECTIVES

➢ A Public and private transport companies depend upon good fuel quality in power their transportation fleets. Fuel quality monitoring conducted helps avoid problems with engine failure, schedule disruptions, downtime, and costly repairs.
➢ To have a cleaner fuel for efficient, full–power engine performance.
➢ To enhance the durability of automotive engine components.
➢ To monitor the extent of degeneration of diesel fuel in storage tanks.
 Types of Fuel Adulteration
➢ Mixing of kerosene & Ethanol into petrol.
➢ Mixing of kerosene & Ethanol into diesel

III. FUEL ADULTERATION

The crude oil may vary with the place to place and shall have alkanes (straight and branched chain from about C1 to C4) (low boiling fraction), cyclo alkanes or naphthene's, and aromatic hydrocarbons. The main fractions of the petroleum are Gas (52CC−) light Naphtha (795−C°C), medium Naphtha (79°-121°C), heavy Naphtha (121°-191°C), kerosene (191°-277°C), distillate fuel oil (277°-343°C), gas oil or lube stock (343°566°C), residuum (566°C +). Fuel adulteration means introduction of a foreign constituent into petrol and diesel, illegally or unauthorized with the result that the product does not correspond to the requirements and specifications of the Bureau of Indian Standards specifications number IS 2796 and IS 1460 for petrol and diesel respectively or any other requirement notified by the Central Government from time to time. Adulteration involving the addition of organic solvents, such as alkanes that are straight and branched from about C1 to C4, light aliphatic (C4-C8), heavy aliphatic (C13-C15), and aromatic hydrocarbons, especially, benzene, toluene, xylenes, hexane, complex hydrocarbon mixtures, mineral spirits, kerosene, rubber solvent, petrochemical naphtha, diesel, and thinner have been used to carry out the adulteration.

IV. FUEL QUALIT & QUANTITY CHECKING

Figure [1.0]: Block diagram of Quality and quantity checking of fuel.
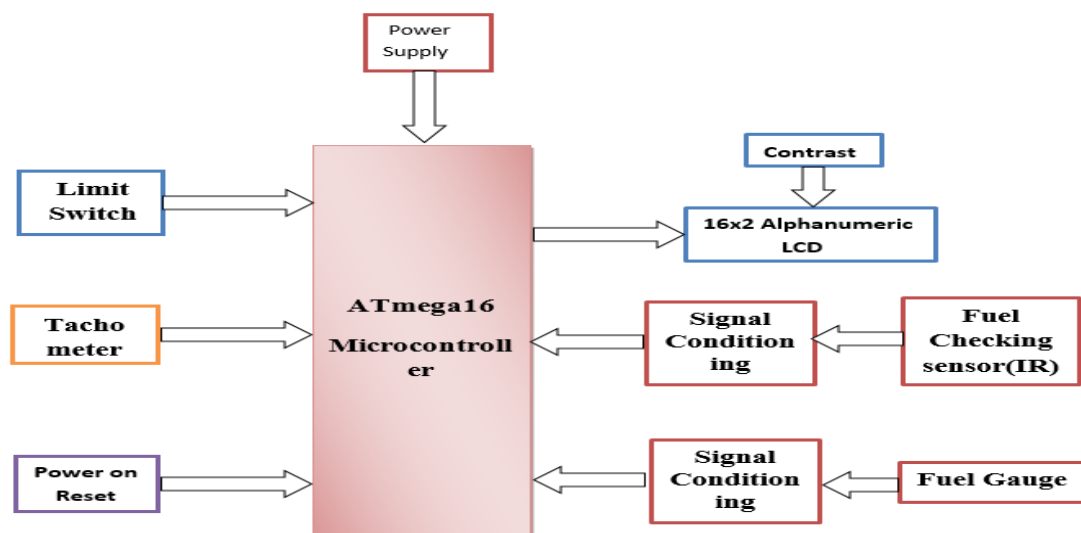
In this project the main blocks are micro controller unit, fuel level sensor, keypad and LCD display unit. The fuel level detection circuit is used to detect the level of the fuel in the tank; here sensors are placed at certain place to find out the fuel level and the signal is sent to the micro

controller unit for further operations. Here sensor is placed at fuel tank to sense the fuel level and the signal from that sensor is sent to the micro controller unit to decide the exact level information. When the fuel level reaches the top-level sensor, which means that the tank is full and this will be indicated to the user by means of maximum tank level and the level information is indicated through LCD. Again, in the run time the quality of the fuel is checked on the basis of the color and the LDR based circuit is used to check the quality of fuel.

Most of the basic display unit will indicate empty, half, full with analog display but the market available digital display units were displays the information in terms of percentage but our proposed method will have displayed in terms of exact fuel level and this information are preprogramed according to the sensor positional values (Resistance-Voltage).

In this project a float type sensor is placed within the fuel tank the variation of the fuel can change the position of variable resistance which is connected with the float. The varied resistance can change the voltage of the analog fuel level indicator to show the approximate value. But the variable resistance from the fuel tank is connected with the analog to digital converter unit to show the exact quantity of fuel in the fuel tank.

At the petrol pumps, through keyboard of vehicle microcontroller kit user can set the tank level to 0 at that time normally the quantity shown in the Petrol pump meter should be equal to the quantity received actually in the vehicle tank. Or the user can enter the value for which he needed the petrol based on the same the display will give the actual quantity that to be received. If there is difference then it's clear that there is some issue in the petrol pump.
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V. SYSTEM OVERVIEW

Sr No	Action	Reaction
1	Quantity Measurement	Measures Quantity of fuel using analog fuel gauges and display in ml
2	Quality Measurement	Measure Quantity of fuel using LDR and display in percentage of purity.
3	Limit Switch	Triggered when we open cap of fuel tank
4	Tachometer	for measuring average of vehicle
5	Power supply	gives required input power to the system

V. SYSTEM FLOW
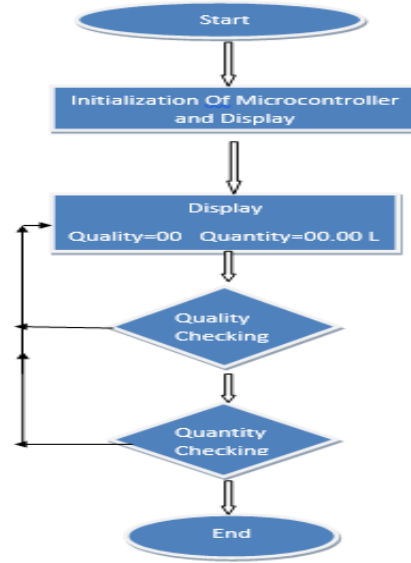

Fig. Actual Prototype

Fig [2.0] Flowchart

VII. ADVANTAGES

➢ Due to digital meter we are getting exact quality of fuel.
➢ By the quality checking of fuel, we easy to decide which petrol pump is having good quality fuel
➢ We are getting exact quantity of fuel. -by this project we getting quantity in litter and ml.
➢ No need of Lab experiment to check quality of fuel-For checking the quality of fuel there is need lab experiment it consume time.
➢ Get result very quickly.

VIII. APPLICATIONS

➢ **Fuel quality determination-**By using this product we can easily determine the quality of fuel and we also determine which petrol pump gives good quality fuel.
➢ **Monitoring compliance with air pollution control program-**By using this we help to get good quality fuel and due to this it controls air pollution
➢ **Fuel quantity determination**-By using this system we can easily determine the quantity of fuel and will get information about the which pump gives the exact amount quantity fuel.
➢ **Improve vehicle performance** –By the help of this product impure fuel avoided and due to this engine performance increases**.**
➢ If our system is used by the vehicles manufacturer then all people getting benefit of pure fuel and exact quantity.

IX RESULT

Here in this system we measure amount of fuel received is directly show on the LCD display in litters and ml. Here is also having quality checking so depending upon quality we get data in some numbers (% of Purity).

X. CONCLUSIONS

Our Project is tried to overcome the various problem of impure fuel and manage the good condition of vehicle.

In this project we are going to improve the Analog fuel meter into Digital meter so exact amount of fuel we get.

By the use of various sensors, we are getting exact quality and quantity of fuel very quickly.

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