"Development of Onboard Digital Fuel Gauge"

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Abstract **-Today in this digitalized world, if the fuel indicator in the automobiles is also made digital it will help to know the exact amount of fuel available in the fuel tank. A potentiometer transducer is used to find out the fuel level which is economic and also accurate. This project mainly concentrates about the indication of fuel level in irregular tanks (two wheeler and four wheeler tanks). By using this digital fuel level indicator device the amount of fuel available in the tank at any position of the vehicle is predicted. The float arrangement is shows the initial level of fuel in fuel tank and The Hall Effect flow measurement sensor sense the amount of fuel transferred to engine & output from both measurement sensor send to the microcontroller. And flow measurement sensor output subtracted from indicating initial fuel level. Microcontroller further processes digital signals obtain from ADC. Thus the combination of both displayed the numeric form i.e. in percentage.**

Keywords - Microcontroller, Hall Effect Sensor, ADC, Fuel Tank, LCD Display.

1.INTRODUCTION

Automobile vehicles uses fuel as a basic source of energy. Earlier the amount of fuel was indicated in analog form, which many times failed to give exact idea of amount of fuel present in the tank thus it is necessary to indicate correct level of fuel in tank to know the exact distance travel with the remaining fuel. We are going to introduce digital fuel level indicator which gives the correct amount of fuel in the fuel tank. Digital Fuel Level Indicator (DFLI) is suitable for all types of fuel tank and it can be installed externally.

2.OBJECTIVE

- To increase the accuracy of the system.
- To overcome the fuel theft on petrol pumps.
- To keep an account on the use of fuel in commercial vehicles.
- To improve the dash board (aesthetic) so that it becomes easy for the driver to monitor the fuel usage.

3.CONFIGURATIONAL DETAILS

1. Float Arrangement
2. Hall Effect Sensor
3. Microcontroller
4. LCD
5. LED
6. Battery
7. Buzzer

1.Float Arrangement :

Float arrangement is used to sense the amount of fuel level present in tank. Float arrangement is also called as sensing unit. Float is connected to the resister. At initial level tank is empty and hence resistance of the resister is maximum and current is minimum, result shows low fuel level. The output of the float is connected to the microcontroller.

Fig. Float Arrangement

2. Hall Effect Sensor :

Hall effect sensor is used to measure the rate of fuel supply to the engine. The output of the sensor is electrical pulse with every revolution. The three wires mainly used for this sensor are red, black and yellow. The red wire is connected to the +5volt supply, black wire is connected to the GND and yellow wire is connected to the PWM output.

Flow Rate (L/H) = (Pulse Frequency * 60 min)/7.5

Features :

Working voltage	5 to 18 volt
Sensor type	Hall effect
Accuracy	+_ 10 %
Working flow rate	1 to 25 lpm
Pulse per litre	450

Fig. Hall Effect Sensor

3. Microcontroller :

In this project Arduino Uno microcontroller are used. Arduino works on 5 volt input supply. On microcontroller various input, output pins are available. It is the heart of the system. It is low power controller support for high speed communications, with the ability to be programmed using different commands. The cost of the microcontroller is very less.

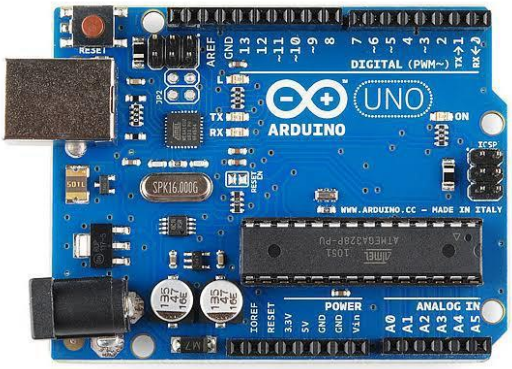

Fig. Microcontroller

4. LCD :

LCD are used for the display purpose. 16*2 display is used. 16*2 means 16 character and 2 lines. The first line show the fuel level in fuel tank and second line shows the trip of the vehicle. Interfacing between micro-controller and the LCD is required for displaying the fuel level in fuel tank.

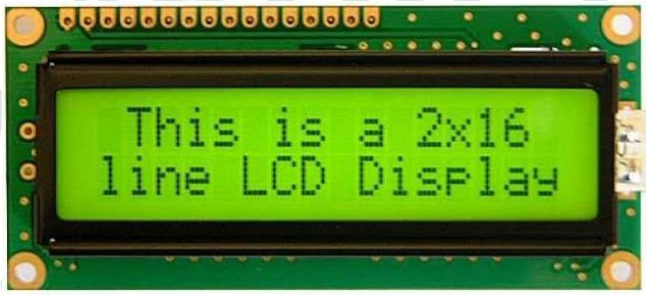

Fig. LCD

5. LED :

LED indicator is used to indicate the low level of fuel in fuel tank. At reserve condition led blinks for indication of low fuel level in the tank.

Fig. LED

6. Battery :

Battery is used to supply constant power to the microcontroller required for its working.

7. Buzzer :

It is an electronic device that is commonly used to produce sound. The advantages like light weight, simple construction and low price make it usable in various application.

Fig. Buzzer

4. PROPOSED SYSTEM

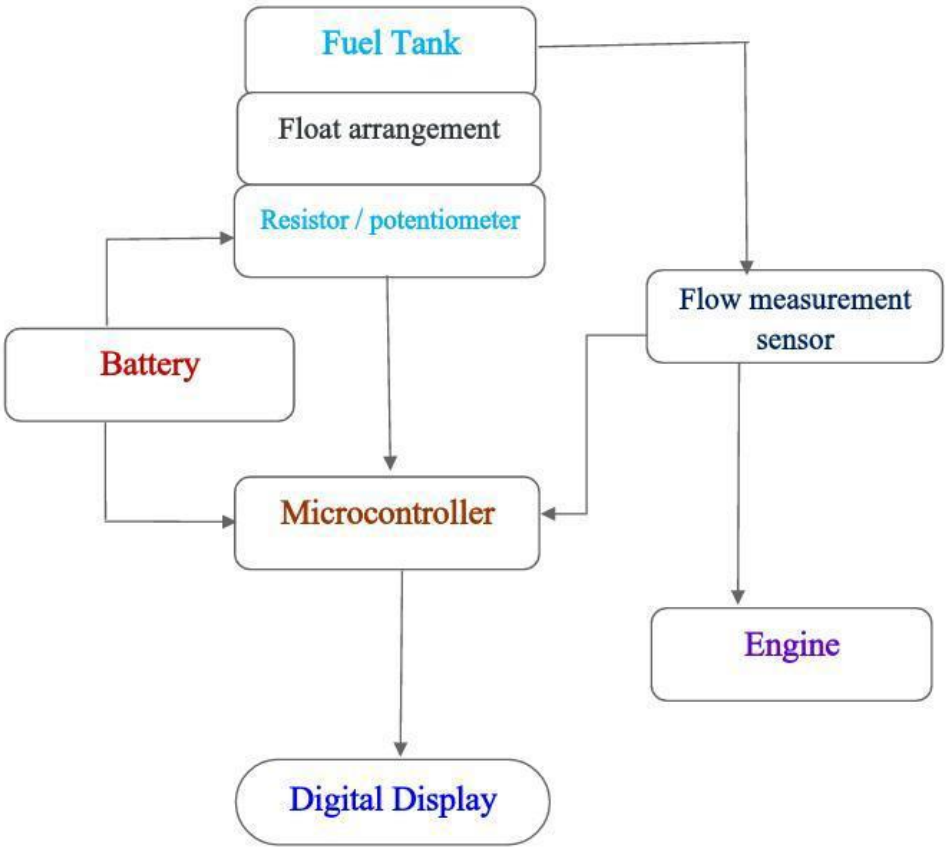

Fig. Proposed system

5.WORKING OF SYSTEM

When float is at its lowest position , rheostat offers maximum resistance and no current passes. As we start filling fuel in tank float starts rising up. Float is attached to a vertical column with fulcrum and supports rheostat. One end of the float is attached to the rheostat, as float rises up results in varying resistance, as resistance decreases flow of current increases. The output current from the rheostat is analog signal which is feed to the analog to digital converter i.e. ADC. Output from ADC send to the microcontroller. The Hall Effect flow measurement sensor sense the amount of fuel transferred to engine & output from flow measurement sensor is send to the microcontroller. And the flow measurement sensor output is subtracting initial fuel level. Thus the combination of both displayed the numeric form i.e. in percentage.

Buzzer & indicator is provided with system, this both are activated when fuel in the tank reaches level of 15%. After periodic buzzer & indicator activates up to zero position.

5.ADAVANTAGESOF SYSTEM

- Simple construction & Easy Installation With LCD Monitoring
- No parallax error
- It is quick response system.
- We can installed it externally on the existing system.
- Also help in detecting petrol theft.

6. FUTURE SCOPE

- In advancement of this system we can add GSM technique through which we get massage alert on theft of fuel from the vehicle.
- We can link the GPS technology to the system which will show the nearest fuel pump when the level of fuel sin the vehicle reaches minimum level.
- The distance that the vehicle can travel also be calculated by programming the microcontroller by taking the input of present mileage with respect to speed of car and fuel level.
- The density of fuel can also be calculated using this system.

7. CONCLUSION

The existing traditional and the microcontroller based float type measurement techniques are far from exact and are on the conservative, however the microcontroller based technique is more accurate compared to the traditional technique. So by using float arrangement gives initial level of fuel and the measure the outlet flow by using hall effect sensor. The initial level minus flow rate is equal to the exact amount of the fuel in fuel tank. The system is more accurate, more reliable, and cheaper than other analog meters, and will allow for added features that benefit both the customer. In the near future, the different vehicle company manufacturers will implement this kind of fuel system which also provides security for the vehicle owners.

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