

Design and Fabrication of Digital Fuel Level Indicator for Two Wheelers

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ABSTRACT

Many Today in this digitized 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 which may be useful for the user. For the design of digital fuel level indicator the set-up is designed by using sine bar mechanism. The experimental set-up is analyzed for various inclinations of the tank, which will be displayed on LED display for the actual value of amount of actual fuel available in the tank. The experimental set-up is fabricated specifically for two wheeler, the same set-up may be design and fabricated for four wheeler also. The only parameter varied during the experimentation is inclination of tank which is taken as up to 35° measured from ground level. This study presents the effect of inclination of the tank on the amount of fuel available in the tank. This paper mainly focuses to find out a proper solution for indicating the exact availability of fuel in the tank digitally.

Keywords: LED, Float Sensor, Microcontroller, Sine Bar Mechanism, Fuel Tank.

I. INTRODUCTION

Fuel mileage in vehicles refers to the relationship between the distances travelled by an automobile to the amount of fuel consumed. Moreover in today's world fuel saving is also an important factor. For a developing country, where people are more obsessed with mileage, manual mathematical calculations are carried out to know the mileage of a particular vehicle. In conventional fuel mileage calculation method, the results are obtained by two successive refueling of the tank and also by the in vehicle parameters. A fuel level detector (fuel gauge) is a device inside of a two wheeler or other vehicle that measures the amount of fuel still in the vehicle.

This project mainly concentrates about the indication of fuel level in two- wheeler tanks. Various other features like the distance that can be travelled to the corresponding fuel, is added with this arrangement

which will explain the clear performance of the vehicle to the corresponding fuel. This project helps to avoid a lot of problems like fuel bunks at fuel stations, fuel theft and prevents us from getting into situations where we have to push our vehicles due to assumptions of the level of fuel. Nowadays the fuel indicator system for the two wheelers are digital but they do not display the exact amount of fuel which is present in the tank i.e. they show the amount of fuel in terms of bars and not in numbers or digits like Litre or Millilitre. So this problem is taken into consideration for our project work of developing the digital (numeric) fuel indicator system for two wheelers which shows exact amount of fuel in terms of Litres(L) or Millilitres (ml). In this project we first surveyed the existing fuel indicator systems and fuel tanks of different two wheeler.

II. LITERATURE REVIEW

Jaimon Chacko Varghese (1) studied Low Cost Intelligent Real Time Fuel Mileage Indicator for Motorbikes . In this competitive world, everyone strives for greater accuracy than the previously proposed ones. In order to increase the accuracy, we have used ultrasonic sensor and flow sensor to display the results of fuel level indication. The experimental analysis of our project yielded us satisfactory results over the conventional methods.

Deep Gupta, Brajesh Kr. Singh and Kuldeep Panwar(2) presents a study on a Prototyping Model for Fuel Level Detector and Optimizer. There are many sensor based techniques available in the market to measure the liquid level and gives you a close idea of quantity of the liquid, however none can provide you an exact approximation of quantity as in cars by fuel meters what we get an idea of whether tank is full, empty, half full etc.

Sarath T.M, SubhaHencyjose P, Danial Furtado,(3) studied Level Measurement Using Pressure Sensor Issued. The purpose of LED is gives and indicates the current level of position in the fuel tank. Sensor is used to find and trace the fuel level in the fuel tank. This concept is mainly useful to the automobile industries.

S. A. Gandhi, (4) studied Smart Fuel Level Indication System. .Until now the accuracy of the fuel level measurement has not been of great importance. The purpose measuring the fuel level has been to present the information on the dashboard with a fuel level meter. Instead of accuracy the two most important things have been to avoid rapid changes in the fuel level displayed and the meter must indicate that the tank is empty when the fuel level is below a predefined level.

III. METHOD AND MATERIAL

The following components are used in the experimental set – up , the details of which are discussed below:

1. 10 k Potentiometer : 15mm Shaft Pot With Nuts And Washers Pots.
Mounting diameter 16mm Middle terminals(wiper) of pots are connected to middle terminals of float sensor.
Right terminal connected to the ground Left terminal connected to the (arduino) & (arduino)to LED display.



Figure 1. Potentiometer

2. Float sensor
Based on Potentiometer for at the time 1litre =15cm .
Mounting diameter is 32mm .
Signal is transfer form middle terminal of float sensor to the Potentiometer.



Figure 2. Float sensor

3. LED screen.
Specification for LED 16*2 display



Figure 3. LED screen.

4. Microcontroller:
Used the (arduino) nano kit with avr AT mega 128 microcontroller.
High – performance ,low power consumed .
Fully static operation .
Operating voltage's
4.5V to 5.5V AT mega 128.
Speed grades
0 to 16 MHz AT mega 128.
VCC Digital supply voltage .
GND Ground .

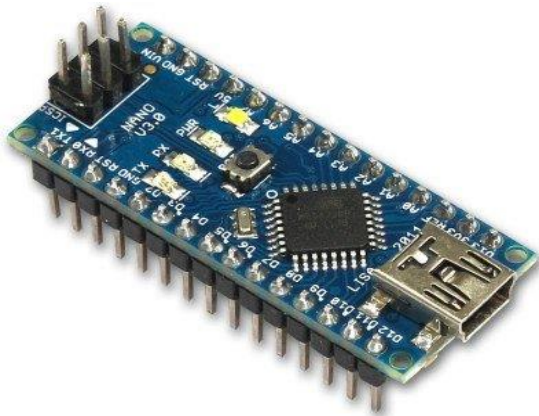


Figure 4. Microcontroller

5. Sine bar mechanism :

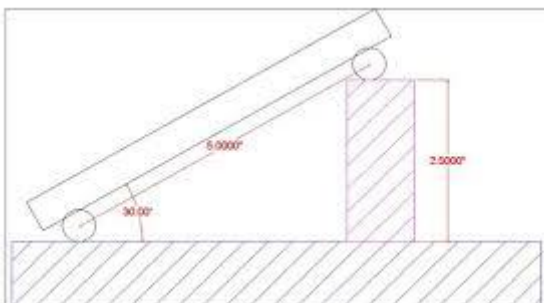


Figure 5. Sine bar mechanism

It is used for check or analyse the actual value shown in the LED display at various angle

IV. RESULTS AND DISCUSSION

The experimental set-up is design and fabricated as per the specification mention above further the experimental set-up is analyse for different inclination of fuel tank and to study its effect on the amount of fuel present in the tank. The LED display is use to show exact amount of fuel in the tank and the distance to be travelled by vehicle. This paper merely present the design and fabrication parts of experimental set-up. Further experimentation can be done for various inclination in later stage.

V. FUTURE ENHANCEMENTS

In future the proposed technique can be improved by adding fuel cells at different places of fuel tank to measure exact fuel levels at different conditions like Banking of road for particular densities at different altitude conditions of vehicle and a buzzer to announce the user about the abnormal conditions like low level, half level and full levels of the fuel tank to refill or warn themselves.

VI. CONCLUSION

This paper is very useful for a common man as it avoids him by getting cheated. This measuring unit should be fixed to the entire vehicle so that we can get an exact quantity of fuel to measure the inflow. Float level sensor is used to measure level of the tanks. This paper presents the study of effect of inclination of tank on the amount of fuel available in the tank.

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