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Digital Fuel Level and Battery Life Indicator

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ABSTRACT

The The existing fuel indicators installed in vehicles like Honda, Hero, TVS, Yamaha are having the petrol indication in the form of points and analog meters which lead to miscalculations to what distance vehicle can go with present fuel in tank. One of the major problems with the kick less motor vehicles is that once battery gets discharged, the self-start motor will not respond making situation horrible to the user. In recent day's world has become digitized, if we make fuel meter in the vehicle also digital it will help to know exact amount of fuel present in fuel tank. In our Project we have made digital fuel meter. Here is the indication for the amount of fuel present in tank digitally. That value is in numerical digits. In this project a proposal of a digital measurement system which displays the different parameters like fuel quantity and battery health. The fuel indicator which we use gives us 100% accurate result by displaying the quantity of petrol in numerical format i.e. in milliliters. The heart of the project is the microcontroller which takes necessary decision depends on the sensor feeds and displays the results in the digital format. An ultrasonic sensor is interfaced to the Analog to digital controller (ADC) which converts analog voltage output from the sensor to the digital form and feed to microcontroller. Then the microcontroller calculates the level depends on the digital value multiplied with the volume of the tank at that level and

displays the digital numeric value on the screen.

Keywords: Arduino, Ultrasonic Sensor, Battery, Voltage sensor.

I. INTRODUCTION

We are already aware that motor vehicles display the amount of fuel in the fuel tank by means of some indication like bars running through the E (empty) and F(full) indicators. The manufacturer provides the specification that each bar maps to the corresponding liters of fuel 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. 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 tank. An advanced digital Fuel meter is the one which shows the level of Fuel in digital format. In this work, we propose a digital measurement system which constantly displays the different parameters like Fuel quantity and battery health.

Nowaday's everything is digital in all over field. Digital fuel meter is also implemented in two-wheeler, but they do not show the exact fuel level which is present in the tank i.e. they shows the amount of fuel in terms of bars and not in numbers or digits like liter or milliliter. That's why we do not get proper idea about fuel present in our tank. We get only approximate level of fuel. 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 liter or milliliter. This value in liters will be in numerical digits (ex: 1.2 lit, 1.3 lit, 1.4 lit). This project mainly concentrates about the indication of fuel level in two- wheeler tanks. In the recent times we are constantly hearing about petrol theft. Most of the petrol bunks today have fraud the pumps such that it displays the amount as entered but the quantity of fuel filled in the customer's tank is much lesser than the displayed value. Yet the pumps are tampered for the benefit



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of the petrol bunks owner. This results in huge profits for the petrol bunks but at the same time the customers are cheated. All the vehicles in India consist of analog meters hence it is not possible to precisely know the amount of fuel currently in the vehicle and also it is not possible to cross check the quantity of fuel filled in the petrol bunk. In this project we focus on creating a digital display of the exact amount of fuel contained in the vehiclestank and also help in cross checking the quantity of fuel filled at the petrol theft.

The heart of the project is the microcontroller which takes necessary decision depending on the sensor feeds and displays the results in the digital formatted value on the screen. Our digital indicator will indicate the level of Fuel in milliliters. An ultrasonic sensor which is a noncontact type sensor send signal to the arduino uno microcontroller. Then the microcontroller calculates the level depending on the digital value multiplied with the volume of the tank at that level and displays the digital numeric value on the screen. Our digital indicator will indicate the level of Fuel in milliliters. This type of Fuel indicator has not been implemented in any of the two wheelers till now. In this project, we are using many components.

II. LITERATURE SURVEY

A.Avinashkumar, U. Singaravelan, T.V.Premkumar and K.Gnanaprakash, "Digital fuel level indicator in twowheeler along with distance to zero indicator", IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE),e-Issn: 2278-1684,P-Issn: 2320-334x, Volume 11, Issue 2 Ver. III (Mar-Apr. 2014), PP 80-84,"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. The above furnished fact is considered in our project and we found out a proper solution for indicating the exact availability of fuel in the tank digitally. Here, we are indicating the amount of fuel in the tank in liters. This value in liters will be in numerical digits (ex: 1.2, 1.3, 1.4). This project mainly concentrates about the indication of fuel level in two- wheeler tanks. Various other features like the distance 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."

Mrs. Udayavalli.V., Mrs. М. Omamageswari, "Embedded system based intelligent digital fuel Gauge", Ipasj International Journal Of Electronics & Communication (Iijec), Volume 2, Issue 12, December 2014,"In the recent times we are constantly hearing about petrol bunk frauds. Most of the petrol bunks today have manipulated the pumps such that it displays the amount as entered but the quantity of fuel filled in the customer's tank is much lesser than the displayed value. I.et the pumps are tampered for the benefit of the petrol bunks owner. This results in huge profits for the petrol bunks but at the same time the customers are cheated. All the vehicles in India consist of analog meters hence it is not possible to precisely know the amount of fuel currently in the vehicle and also it is not possible to cross check the quantity of fuel filled in the petrol bunk. In this project we focuses on creating a digital display of the exact amount of fuel contained in the vehicles tank and also help in cross checking the quantity of fuel filled at the petrol bunk. Finally once the fuel is filled at

a bunk the device also sends an SMS to the vehicle owner indicating the amount, quantity, and date, time etc. And also we can find the exact location of the vehicle."

Nitin Jade, "Modified type intelligent digital fuel indicator system", IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-Issn:2278-1684, P-Issn:2320-334x, Pp 20-23, "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 can provide you an exact approximation of quantity as in cars by fuel meters by which we can get an idea of whether tank is full, half full or empty etc. The liquid level detector and optimizer play an important role in tanks to indicate the level of liquid of a particular density. In this paper we have proposed a technique to measure the amount of liquid available in tank also give the knowledge about their chemical composition as well as purity level of fuel & it is the first device which can give the accurate knowledge about of how much the vehicle can run. This device digitally displays the level of liquid inside the tank, fuel composition & running capability of vehicle by using load sensors. The measurements are taken so the accuracy level is of 95% -98%. Thus it is an efficient device made by keeping in mind the petroleum thefts at the various petrol pumps at the time of filling of tanks."

Raj Patel, Hitesh Pungalia, Saurabh Mahajan, "Flow Meter and Arduino Based Fuel Gauge for Automotive Vehicles", IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE), e-Issn: 2278-1684, P-Issn: 2320-334x, Volume 13, Issue 5 Ver.VII (Sep. - Oct. 2016), Pp 85-92,"Design and implementation of digital fuel gauge which measures the accurate level of fuel adding while fuel filling process. Now-a-days all fuel bunks having types of digital displays unit in order to display the value of fuel adding to the vehicle. But we don't know whether they adding accurate value or not. In this paper we have proposed a technique to measure the amount of fuel available in tank during static as well as dynamic condition. This system digitally displays the level of fuel inside the tank by using load sensor, flow meter and vibration sensor and these sensors are interfaced with a development board-arduino. Thus, it is an efficient system to detect the fuel volume in the fuel tank, to get instantaneous reading of fuel volume and to avoid petroleum thefts at the various petrol pumps at the time of filling of tanks."

Stephen A. Dyer, "Survey of Instrumentation and Measurement", Journal Of Information, Knowledge And *Research In Mechanical Engineering*, Issn 0975 – 668x, Nov 15 To Oct 16, Volume - 04, Issue-01,"In this introductory chapter we will examine the architecture of typical measurement systems and discuss how noise, calibration errors, sensor dynamic response and nonlinearity can affect the accuracy, precision and resolution of measurements. We will also discuss the modern, physical and electrical standards used by the U.S. NIST (National Institute of Standards and Technology, formerly the National Bureau of Standards) and discuss how these standards are used to create secondary standards used for practical calibration of Measurement measurement systems. systems are traditionally used to measure physical and electrical quantities, such as mass, temperature, pressure, capacitance and voltage. However, they can also be designed to locate things or events, such as the epicenter of an earthquake,

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employees in a building, partial discharges in a high voltage power cable, or a land mine. Often, a measurement system is called upon to discriminate and count objects, such as red blood cells, or fish of a certain size swimming past a checkpoint. A measurement system is often made a part of the control system. The old saying 'if you can't measure it, you can't control it' is certainly a valid axiom for both the control engineer as well as the instrumentation engineer. The reader should realize that the fields of instrumentation and measurements are rapidly changing and new standards, sensors and measurement systems are continually being devised and described in journal literature. The IEEE Transactions on Instrumentation and Measurement, the Review of Scientific Instruments, the IEEE Transactions on Biomedical Engineering and the Journal of Scientific Instruments are four of the important periodicals dealing with the design of new measurement systems, instruments and standards."

III. DESIGN



Fig 1. Isometric view



Fig 2. All Views

IV. DESIGN PROCEDURE

This idea was actually formed for the good cause of common people. Petrol rates are hiking every day and it's a burning issue. In the present, all bikes which are available in the market are not having a digital Fuel meter in it. With this the person cannot know how much amount of petrol is there. So if the bike consists of a digital Fuel meter in it, the person will be able to know how much petrol is present in millimeters. So, this concept will be very helpful for a common man. Generally, in the winter season the battery gets drained. Because of this, the vehicle will not start soon. So, it's a problem faced by many people. If the vehicle is consisting of a battery indicator, it shows how much amount of charging is present in it. So, if these two concepts are present in the bike or a car it will be very useful to everyone. This is actually an innovative project. This concept is not present in any of the automobile companies like Benz, BMW, Audi and Ferrari. So, this is just an innovative project and we are implementing this on a 4 stroke two wheeler vehicle by modifying bottom shape of tank.



Fig 3. Hero Honda Fuel Tank

Tank Construction:

a. The original petrol tank is used by modifying the bottom shape of the tank by making it flat instead of the bottom curved shape.

- b. The capacity of the tank is 12 liters.
- c. The tank is of indefinite shape.

d. The ultrasonic sensor is mounted at top surface of fuel tank by making it in two holes.

'PERFORMANCE TESTING: Fuel indicator specifications:

After the prototype is developed many observations are done on the Fuel indicator. Checking had been done by pouring selected amount Fuel and noting down the reading shown inLCD display. So by checking variations in the indication the total observations were performed.



Fig 4. Fuel level indicator

Battery indicator specifications:

VIII. CONCLUSION

The observations of the battery indicator are performed, by keeping the bike constant. So, if the bike is still for long period the battery gets discharged. When we again start the bike, ignition gets activated and so the battery gets charged when it is in movement.





Fig 5. Battery level indicator (*Battery Level varying from* 080% to 70%)

V. ADVANTAGES

- Digital fuel indicator helps to give measure of exact quantity of fuel left in the tank.
- It's also indicating the percentage of charge left in the battery in case of kick less bike.
- Exterminate petrol theft cases.
- The capacity of modified fuel tank would be improved.

VI. DISADVANTAGES

- Cost is relatively high than analog meters.
- High maintenance required.
- It is robust in construction

VII.APPLICATIONS

- To produce a numeric readout of the amount of fuel left in the tank.
- Capable of being in the dash of the vehicle, thus needed to minimum modifications.
- This project is adaptable to all types of vehicles, to indicate the amount of fuel in fuel tank.

The proposed idea consists of ultrasonic technique forfuel measurement that acquires the measured fuel level andsends to the display unit which is present on the dash board.

The data acquired from the sensor is given to the microcontroller. The processor processes the data by calculatingthe liter value that send to the display unit. At the same time voltage sensor which is connected in between the battery and arduino uno microcontroller gives we reading on display unit of the percentage of charge are left in the battery.

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