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Research · March 2020

DOI: 10.13140/RG.2.2.30670.00325

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# A Review On :Digital Fuel Level and Battery Life Indicator

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## ABSTRACT

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.

## ARTICLE INFO

### Article History

Received: 28<sup>th</sup> March 2020

Received in revised form :  
28<sup>th</sup> March 2020

Accepted: 31<sup>st</sup> March 2020

### Published online :

31<sup>st</sup> March 2020

## 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. Nowadays 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 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 vehicle tank 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 two-wheeler 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. M. Omamageswari, "Embedded system based intelligent digital fuel Gauge", IJES International Journal Of Electronics & Communication (Ijec), 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. Let 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 Pungalila, 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 systems. Measurement 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, 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."

Rahul Gogawale, Sumit Sonawane, Om Swami, Prof. S.S. Nikam, "Petrol Level Detection Using Ultrasonic Sensor", International Engineering Research Journal (IERJ) Volume 2 Issue 2 Page 848-850, 2016, "Nowadays, at many of the petrol pumps, we don't get the exact amount of petrol as shown by the filling machine. The amount of petrol we get is somewhat less than the amount we should actually get. In today's modern and digital world, if the fuel indicator in the vehicles is made digital, then it will help us to know the exact amount of fuel available/filled in the tank. The above fact is considered in our project. The exact amount of fuel available in the tank will be displayed digitally by making the use of Ultrasonic sensor. The ultrasonic sensor is a non-contact sensor, with low power requirement and good accuracy. It overcomes the problems faced by other gauges and is suitable for the non-contact measurement of the fuel inside the tank. This project mainly concentrates on the digital indication of fuel in vehicle's tank."

Choudhary Saurabh, Barapatre Shubham, Bhong Kiran, Sarawale R.K., "smart digital fuel indicator system", International Engineering Research Journal (IERJ), Volume 2 Issue 9 Page 3552-3554, 2017, "Today in this digitized world, if the fuel marker in the vehicles is additionally made advanced. It will know the correct measure of fuel accessible in the fuel tank. Here, we are showing the measure of fuel in the tank in liters. This incentive in liters will be in numerical digits (ex: 1.2, 1.3 and 1.4). This project predominantly focuses about the sign of fuel level in bike tanks and predicting the user location by using latitude and longitude value which is sent by GPS to the system. This project evades a great deal of issues like fuel bunks at fuel stations, fuel burglary and keeps us from getting into circumstances where we need to push our vehicles because of suppositions of the level of fuel. These days the fuel pointer framework for the bikes are computerized yet they don't show the correct measure of fuel which is available in the tank i.e. they demonstrate the measure of fuel as far as bars and not in numbers or digits like liters or milliliter. So this issue is contemplated for our work of building up the computerized (numeric) fuel pointer

framework for bikes which indicates correct measure of fuel regarding Liters (L) or Milliliters (ml)."

J Vignesh, V Nijanthan, J Venkateshwaran, K Suresh Kumar, Mrs B. Vidhya, "Digital Fuel Level Indicator for Motor Bikes using Arduino Microcontroller", SSRG International Journal of Electronics and Communication Engineering (SSRG-IJECE) – Volume 4 Issue 3 – March 2017 "The precision is always being wholeheartedly welcomed by the people all over the world. It has an important application in the field of automobiles to measure and verify the fuel present in the vehicle with high degree of precision. The previous techniques use analog strip or capacitive sensor which is either inefficient to measure or too costly to install. In the proposed method, two Flow sensors are placed linearly, one sensor to measure the amount of fuel entering the tank and another sensor to measure the amount of fuel leaving the tank to the carburetor. The difference between the above measures gives us the amount of fuel present in the tank and it is stored in the arduino Uno microcontroller. It actively keeps the record of the fuel entering the tank and the fuel present in the tank at any given time in the dynamic memory of the arduino and is displayed using LCD display. If the fuel is low, the system suggests the commuter to refuel as soon as possible. If the fuel gets critically low, the system alarms the commuter to refuel immediately. The system has a solenoid valve which replicates the working of a carburetor of the automobile. This proposed method can identify petrol theft and is useful to people who opt for long rides. This system is designed to cut down the cost and increase the level of accuracy."

### III. SUMMARY/FINDINGS OF THE LITERATURE

In the above section extensive literature review has been carried out to understand current status of digitalized fuel level indicator from the literature review it appears that

1. Most of the research in this area is focused on the indication of digital fuel level, Mileage and Distance covered by vehicle.
2. There is no or little information available on to indicate both the parameter i.e. fuel level and battery health. The fuel level indicates by using non contact type fuel level sensor in terms of milliliter and battery health in terms of percentage.

### IV. STATEMENT OF PROBLEM

To design digital fuel level indicator and battery life indicator with the help of non contact type fuel level sensor and voltage sensor the reading which shows on LCD display in terms of liter/milliliter and percentage.

#### Scope of the work:

The literature mentioned above and the findings depicts that the scope of the work is confined to the following:-

1. This work aims to design digital metering system that indicate both the parameter simultaneously i.e. fuel level and battery health. In case of kick less motor bike.
2. To avoid fuel theft cases and leakage problem.
3. To avoid chances of sudden battery discharge in case of kick less motor bike.

**Objective of this work:**

The objective is to design digital fuel level and battery life indicator which would the following:-

1. Selecting appropriate automotive application (motor bike/car) for carrying out this study to indicate fuel level and battery health.
2. To design the circuit diagram and make correct connection of each electrical component by using classical approach design available in literature.
3. To make the program using Arduino IDE software of both fuel and battery level
4. Because of flat bottom section of fuel tank and using single ultrasonic sensor at top of fuel tank there is less chances of error in running of programming.
5. To check accuracy of output result by practically measuring the quantity of fuel by pouring and removing from tank.

**V. CONCLUSION**

The proposed idea consists of ultrasonic technique for fuel measurement that acquires the measured fuel level and sends 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 calculating the 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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Websites:

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