Implementation of Automated Fuel Stock Digital Display for Vehicles

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Abstract:
Automation is an integral part of any working mechanism. Automobile industry has seen many automatic systems in the last decade. The use of microcontrollers in automobiles is a popular scenario. There are many ways to determine the fuel stock in a vehicle's tank, there are contact less techniques and there are contact based techniques. Many different techniques are used to day in the automobile industry. 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.

Key words: LCD, Microcontroller, Ultrasonic sensor etc

I. INTRODUCTION

There is a lot of news regarding the petrol pump frauds which leads to corruption. There is difference between the amount of fuel displayed on the meter and the fuel filled in the tank. Most of the times the fuel filled is less than the displayed value. This is because of the arrangements made in the filling machine which leads to the benefit to thrower. In case of analog display user cannot find out the accurate and precise value of the remaining fuel. By considering this fact, we have designed a digital fuel level indicator which will be of great importance to avoid fuels thefts on the petrol. pumps. Although contactless methods are more complicated than contact methods, there are lots of sensors available for the fuel measurement. We have used an Ultrasonic sensor for the calculation of the remaining fuel. From security point of view, fuel level indication and alarm system will be used to indicate fuel level .It gives an audio visual indication to the customer. Whenever fuel level will drop below the reserve level, alarm will be activated.

II. LITERATURE SURVEY

In the present scenario the process uses a hollow bulb to indicate the fuel stock in the vehicle tank, this technique is not very accurate and precise. Hence requires precision. Even if it indicates the amount of fuel left in your tank, it does not alarm in case it goes below reserve. Authors in [1] have explained that with the increase of vehicle usage over the world, fuel necessary has become a tremendous problem. Design and implementation of load cell based fuel measurement measures the accurate level of fuel adding while fuel filling process. There is a large variety of methods for measuring fuel level, ranging from those using mechanical floats and capacitive and optical sensors to ultrasound methods. Nowadays all fuel bunk shaving types of

digital displays unit in order to display the value of fuel adding to the vehicle. But the disadvantage of using load cell is that it can't be used for measurement of highly reactive material such as petrol. So we decided to use ultrasonic technique for petrol level measurement as it is an on –contact type measurement method. Authors in [2] have stated that Contactless methods, such as those for optical and ultrasound sensing, measure liquid level without having to contact the liquid. Most of the companies are very interested to manufacture the sensors to indicate fuel from level and save your money. Digital fuel gauge in used to measure the accurate amount of fuel in the fuel tank compared to the previous method. The previous method consist of dash board in that needles are moved to indicate the amount of fuel but that is not accurate it just show the approximate value Authors in [3] have mentioned about improvement of conventional methods for fuel measuring. The security and accuracy of contactless measuring devices has helped a lot in accurate and error free measuring.

III. PROPOSED SYSTEM

The proposed system will be implemented as hardware with sensing capabilities of the stock using Ultrasonic Sensors. The Ultrasonic sensors will determine the distance from the tank top till the surface of the fuel and display it directly to the LCD on the dash board of the vehicle. Incase if the fuel level reaches below the threshold, the system will automatically alarm and indicate to the driver.

IV. METHODOLOGY
The whole block diagram can be divided into 5 parts.
a)　　　　**Power Supply:** As the input to the microcontroller is 5V, we have used as a voltage regulator which has a fixed voltage of 5V.

b) **Microcontroller**: At mega 16 is a 40-pin wide DIP (**D**ual **in L**ine) package chip. This chip was selected because it is robust, and the DIP package interfaces with prototyping. This same microcontroller is available in a surface mount package.

BLOCK DIAGRAM
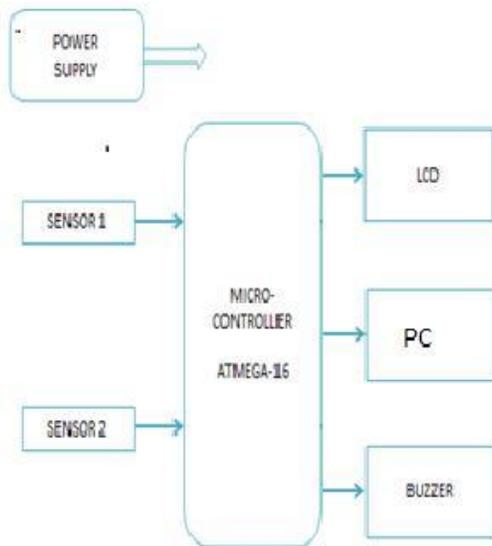
c) Sensor: It is a type of Tran receiver Ultrasonic sensor works on the principle of echo. The ultrasonic waves are sent to an object and the reflected waves are received. Time required for the reflected waves is recorded and accordingly the distance is calculated by knowing the speed of transmitted waves. This principle is used here.

d) Buzzer: When the fuel level in the bike tank or any vehicle tank goes below the threshold value then the buzzer it will start buzzing the audio signal.

V. SYSTEM ARCHITECTURE
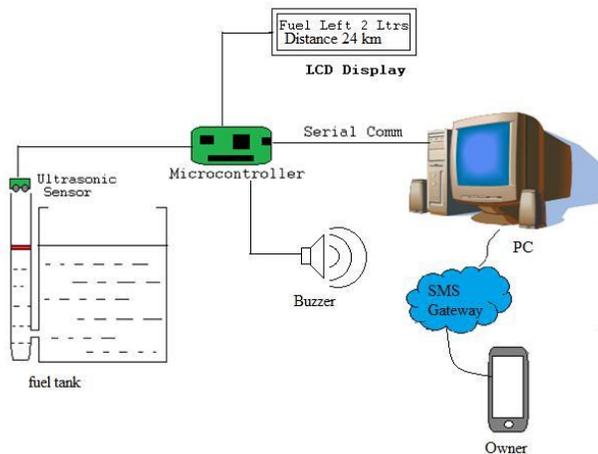
The system contains two Ultrasonic Sensor modules, Liquid Crystal Display (LCD) to show the updates, a micro SD card for data acquisition & data saving and Real Time Clock (RTC) to give accurate time and date. The whole system is controlled by using AVR controller. Ultrasonic sensors are characterized by low-cost and the possibility of being used in environments and situations where it is not possible to use more complex sensors as camera systems and laser devices, optical sensors. In this

work, HC SR-04 which is ultrasonic electric telemeter modules was employed as ultrasonic transmitter and receiver. This module can measure a distance within 0.03-3 mt effectively and transform the data into impulse of different width. At first 5us, pulse is applied through the pin SIG of the module which triggers the transmitter to generate 40 kHz ultra sound signal string. At the moment the receiver catches the reflected wave it generates a high pulse width which corresponds to the time that the signal takes to reflected back. By using this pulse width we can measure the distance as well as the fuel level.

Advantages

- Digital fuel indicator helps to measure a quanty of fuel remaining in fuel tank.
- Knowledge of petrol bunk better than the analog meter.
- This helps to calculate the how fuel remain in tank as well as calculate how much kilometer can travel depend vehicle mileage.

VI. 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 litter value that send to the display unit. If the petrol level suddenly decreases when the bike.The system will help Drivers to continuously keep a watch on the fuel stock and get intimation in case of below reserve level.

VII. REFERENCES

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