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DIGITAL FUEL METER WITH FRAUD DETECTION

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Abstract

Petrol has become an indispensable part of our day-to-day life, and we can't imagine our life without it. But the petrol prices are sky rocketing, and it is eventually going to affect each and everything that we use in our day-to-day life. Poor people are already working hard to earn square meal a day and this hike is definitely going to paralyze these already-burdened people. Within three years petrol price has increased 10 times and is still increasing. It is nothing but adding fuel to the fire. The real-time problem which is now happening in the filling station is the Fuel Level in the fuel tank. Until now the exact measurement of the fuel measurement has not been of great importance. The intension of measuring the fuel level has been to show the information on the system with a fuel meter. In place of accuracy the two most important things have been to neglect sudden changes in the fuel level displayed. This system is not capable to provide the exact value of fuel in the fuel tank. Also, such system cannot prevent us from getting cheated at petrol pumps and this costs more for less amount of fuel so filled. So, it becomes necessary to develop such a system which gives exact value of fuel in fuel tank. All vehicles are having analogy fuel meter. This meter indicates three states of fuel level which are empty, Half and Full. So, we cannot judge the actual fuel present in the fuel tank. we will be able to see analogy meter, which shows the fuel level by using needle. But due to this we do not get proper idea about fuel level present in fuel tank.

1. INTRODUCTION

Fuel Level Manager is characterized by the ability of the system to perform task which detects the fraud at the filling station. Our project is based on real time problem which is now happening in the filling station. When we ask a person to fill the fuel in our vehicle, sometimes we don't know the fuel indicated on the display board will be actually filled in our tank or not. The appliance has a display screen which is used to show the amount of fuel already existing in the tank of the vehicle before filling and after filling the tank it

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shows the total level of fuel in the tank that is already existing plus amount after filling accurately thereby knowing the exact amount of fuel which was filled in the vehicle. The basic relative difference of total amount of the fuel which is already existing in the tank gives the amount of fuel filled is represented as follows. We need an advanced fuel pointer which show the current measure of fuel present in the fuel tank to recognize the distinction between existing fuel and current fuel with the goal that giving the measure of fuel filled in the tank and to give an easy-to-understand interface to the framework particularly for the two-wheeler clients. The present fuel indicator systems in two wheelers are mainly based on analogue strip or the capacitive sensors. The Arduino being open hardware is very popular for various applications. The fuel like petrol is very important factor for developing economies like India.The cost of petrol is varying almost every day as major sources are out of India. The frauds happening at petrol pumps are registered several times. There are several complaints registered against the petrol pump owners for such cases. On the other hand, the theft of the petrol from the tank of the bike often happens and not registered as a serious crime as its market values is small. The analogue displays are showing the level of fuel in tank but the owner of bike will never get exact idea about how much fuel is available in tank. The digital system will be effective to display amount of fuel present in tank with use of sensors for precision in readings. Following figure shows the block diagram for fuel level display.

2. RELATED WORK

The gaps in existing solutions are there is no digital meters to measure the fuel and also, they can`t compute the fuel filled. The existing systems also can`t show the quality of the fuel. In our project we are using ultrasonic sensor and pH sensor to detect the fuel fraud.

3. IMPLEMENTATION

The proposed solution has a digital meter for fuel measurement instead of an analogue meter. The fuel level is calculated using the ultrasonic sensor. The initial and final volumes are subtracted to get the fuel filled in the tank. And the quality check is done based on the pH values. The speed is also calculated using the IR sensors.In India, the fuel prices are increasing day by day and also the frauds at petrol bunks. They show the false readings by manipulating the meters. Even if they fill the correct amount of fuel, they are manipulating by adding kerosene or

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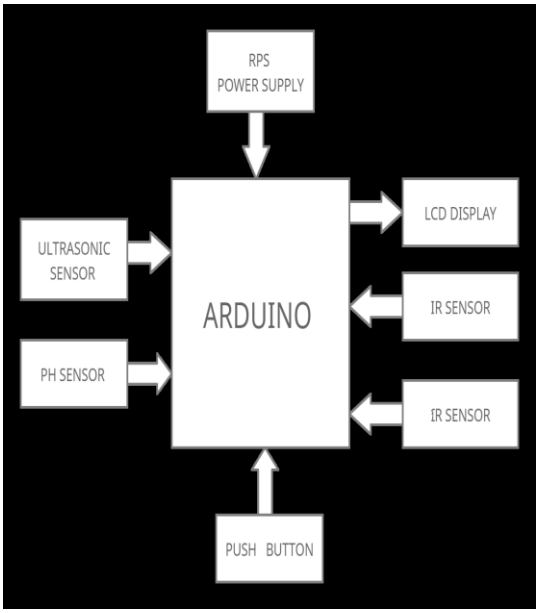
water to it. The analogue displays are showing the level of fuel in tank but the owner of bike will never get exact idea about how much fuel is available in tank. The cheating at the petrol pumps in measuring the petrol with proper precision has registered several times in India. We need to overcome this problem, and stop the fuel frauds. We need to know the precise amount of fuel filled. And also, the quality of the fuel is also to be noticed because it shows impacts on the performance of the vehicle.Due to the rapid increase of fuel prices in India the fuel frauds have also been increased gradually. We need to overcome this problem and help common people. To do that we need a develop a device which helps in detecting the fuel frauds. So, our need is to develop a digital fuel meter which shows the amount of fuel filled in liters based on the initial and final volumes and the also the quality of the fuel which is user friendly, easy usable and cost-efficient.This system is needed because how much fuel left in the tank, is always a point of tension? So before digital world analog meter was invented to keep a check on the fuel. Those meters give rough estimate of the fuel left in the tank and sometime this rough idea created trouble for the driver. Today everyone is in a race of making as much profit as possible therefore many petrol pumps do not inject the paid fuel. So, this project also keeps a track of this theft. This project tells about parameters that indicate the volume of fuel in the tank available for driving the automobile with more precision compared to the existing system. And also displays the quality if any other compositions are mixed. The main motto of our project is to develop digital fuel meter and reduce the fuel frauds and help people not to loss money.



4. EXPERIMENTAL RESULTS

First, we use the ultrasonic sensor to measure the distance of level of fuel in the tank. Accordingly, we compute the volume at that instant. After when the fuel is again filled the ultrasonic sensor again measures the distance of level of fuel in the tank and computes the fuel filled based on the initial

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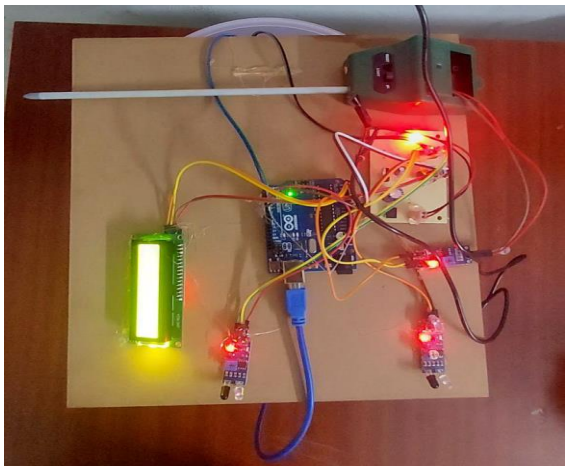
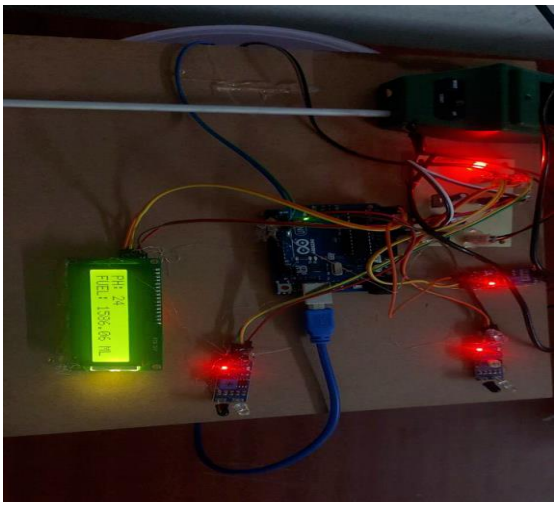
and final readings. The volume is displayed on the LCD screen. The pH sensor measures the pH value of the fuel and then displays it on the LCD screen. If there is a composition of any other liquids the pH value automatically changes so the fraud can be detected by that. The IR sensor are used to compute the speed. The speed is calculated on the basis of how fast the obstacle is detected from first IR sensor to second IR sensor. Accordingly, it will be displayed on the LCD screen.



We have prosposed a digital fuel meter with fraud detection.We have used ultrasonic sensor for measuring the volume in the container. We used the pH senor for measuring the pH of the fuel.The fuel when mixed with water,the pH changes accordingly.

We used the ir sensors for measuring the speed. The time taken for the object when passed through one sensor to the other gives the speed.



On the successful power supply given to the device it gets activated. The ultrasonic sensor gets activated and the level is measured and correspondingly the volume and it gets displayed on the screen. During the fuel filling we need to press the button and start filling the tank. After that it again computes the level and volume correspondingly. The difference gives the fuel filled and it is displayed on the screen. And we can use the pH meter to know the quality of the fuel because if any other compositions exist the pH value will change, we compare it with the original pH value of fuel. And also, by using the IR sensors the speed can be calculated.The number of vehicles registered in India are increasing every year since last decade. The theft of petrol and cheating at the petrol pumps in measuring the petrol with proper precision has registered several times in India. And also, people feel can`t know the fuel level by the analogue meters

which is the main problem. To overcome this problem, we developed a low cost system so that anyone can replace the existing system.

5. CONCLUSION

As the number of vehicles increases, petrol theft becomes very serious problem. Total 65% of total is consumed by two wheelers in India. The theft of petrol is often observed in many parking's. Some of the cases are also registered against the owners of petrol pumps for improper calibration of the petrol injecting pumps. The Arduino application for detection of the petrol in fuel tank of two wheelers will be useful to avoid the theft detection of fuel. The system is cost effective and useful for all the two wheelers in India. As the system is Arduino based the supply of the petrol to the engine can be stopped in case of theft of t vehicle. The current system makes sure that how much amount of fuel is exactly deposited to avoid loss of the amount of money. This system implementation helps to know the exact amount of fuel filled in tank, thereby detecting the fraud using the Ultrasonic sensor, Arduino board, and display sensor. This system assures the 85% accuracy level of fuel that is before filling the petrol and after filling the fuel. It also gives us the variation of initial and final levels. This model highly influences the present scenarios and solves the problem of frauds that are been identified in the gas station. This model improved by changing the ultrasonic sensor to a weight sensor for fuel level monitoring to acquire 99% accuracy. We can implement this model for four-wheeler vehicles which are very helpful to the people. So, it is necessary to implement such designs in order to continue future needs and problems in earlier stages.

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