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# Gasoline Fraud Buster

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**Abstract: -** In today's world, the actual record of fuel filled and fuel consumption in vehicles is not maintained. It results in a financial loss. To quantify the actual amount of fuel into the tank we implement the system using the Internet of things. The system uses the flow sensor which calculates the amount of fuel runtime while filling the tank. The ultrasonic sensor continuously monitors the level of fuel in the tank. If suddenly the level fuel goes low then the system rings the beep and notifies the owner of car or bike. The system also provides the reporting function in which the fraud is directly reported to the higher authority or government officials. The system also stores the historical data for future use.

**Keywords: -** Flow Sensor, Ultrasonic Sensor, Raspberry Pi Introduction.

## 1. Introduction

The flow sensor is typically the output of pulses proportional to the instantaneous flow rate which means that to interpret them it is necessary to implement simple frequency counter. Since this project uses a fuel flow sensor containing a Hall Effect senses that output and pulse rate proportional to flow rate, so not only it is a useful project in its own right but it also demonstrates a very useful technique that you can be used in a wide range of projects that need to measure the rate at which something happens (an electronic wind instrument, for example). Flow rate can be determined by different techniques like the change in velocity or kinetic energy. Here we have determined flow rate by the change in velocity of fuel. Velocity depends on the pressure that forces the through pipelines. As the pipes cross-sectional area is known and remains constant, the average velocity is an indication of the flow rate. The basic relationship for determining the liquid flow rate in such cases is Q=V x A, where Q is flow rate/total flow of fuel through the pipe, V is average velocity of the flow and A is the cross-sectional area of the pipe (viscosity, density and the friction of the liquid in contact with the pipe also influence the flow rate of fuel ). Fuel quantity is one of the undetermined factors in two-wheelers. As far as now fuel level in two-wheelers are indicated by analog gauge. The analog gauge cannot provide an accurate value of the fuel in the tank. It affects the driver who is 24VDC power), black (ground) and yellow (Hall Effect pulse output). By counting the pulses from the output of the sensor, you can calculate water flow. Each pulse is approximately 2.25 milliliters. The pulse signal is a simple square wave so it is quite going on long drives. Normally finding fuel station on a highway is difficult. During such cases without knowing the fuel level, it will be difficult for the driver to travel with an assumption about the fuel present inside the tank. Another drawback is that there are possibilities for petrol theft in the petrol bunks which is highly difficult to measure without proper instruments.

There is a model proposed to find out the amount of petrol injected into the tank with a digital meter using float sensors but float sensors cannot produce accurate values when there is wobbling. And there is another proposed method that is used to find fuel level in airplanes using the capacitance-level sensor which produces values with high accuracy. The main drawback of capacitance level sensor is its high cost which is not affordable when used by the two-wheeler users. The device has to be affordable without compromising on the accuracy of measurement. The sensor fitted has to be chemical resistant, should not vary with physical orientation, independent of shape and size of the tank. Basic methodological errors of liquid level measurement are caused by changes in physical orientation and mechanical forces when the liquid level does not correspond to fuel volume. Additional methodological errors are mainly caused by temperature influence on measured fuel.

## 2. Literature review

Optimal Energy and Catalyst Temperature Management of Plug-in Hybrid Electric Vehicles for Minimum Fuel Consumption and Tail-Pipe Emissions. In this paper, they develop a method to synthesize a supervisory power-train controller (SPC) that achieves near-optimal fuel economy and tailpipe emissions under known travel distances. We first and the globally optimal solution using the dynamic programming (DP) technique, which provides an optimal control policy and state trajectories. Based on the analysis of the optimal state trajectories, a new variable energy-to- distance ratio (EDR), is introduced to quantify the level of a battery, state-of-charge (SOC) relative to the remaining distance. This variable plays an important role in adjusting both energy and catalyst thermal management strategies for PHEVs. A novel extraction method is developed to extract adjustable engine on gear-shift, and power-split strategies from the DP control policy over the entire state space. Based on the extracted results, an adaptive SPC that optimally Adjusts the engine on/o, gear-shift, and power-split strategies under various EDR and catalyst temperature conditions was developed to achieve near-optimal fuel economy and emission performance [2].

Wireless sensor network based smart home: Sensor selection, deployment, and monitoring. This paper details the installation and configuration of sensors in an elderly person's house a smart home in the making in a small city in New Zealand. The overall system is envisaged to use machine learning to analyze the data generated by the sensor nodes. The novelty of this system is that instead of setting up an artificial test bed of sensors within the University premises, the sensors have been installed in a subject's home so that data can be collected in a real, not artificial environment.[3]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 the 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 the vehicle by using load sensors. The measurements are taken so the accuracy level is 95% - 98%.[8] The conversion involves quantization of the input, so it necessarily introduces a small amount of error. Furthermore, instead of continuously performing the conversion, an ADC does the conversion periodically, sampling the input. The result is a sequence of digital values that have been converted from a continuous-time and continuous-amplitude analog signal to a discrete-time and discrete amplitude digital signal. An ADC is defined by its bandwidth and its signal-to-noise ratio. The bandwidth of an ADC is characterized primarily by its sampling rate. The dynamic range of an ADC is in fenced by many factors, including the resolution, linearity, and accuracy (how well the quantization levels match the true analog signal), aliasing and jitter. The dynamic range of an ADC is often summarized in terms of its effective number of bits (ENOB), the number of bits of each measure it returns that are on average not noise.[9]

The reed switch which works according to the principle of Hall Effect for sensing the amount of fuel filled in the vehicle. So as soon as agent starts filling petrol in your bike/car, the flow sensor is activated. This flow sensor will be active till flow ends. Once flow ends it will calculate the amount of fuel filled and directly notify on your mobile phone. If the phone is not available then it will store this data on cloud[10]. A method to synthesize a supervisory powertrain controller (SPC) that achieves near-optimal fuel economy and tailpipe emissions under known travel distances. We first find the globally optimal solution using the dynamic programming (DP) technique, which provides an optimal control policy and state trajectories. Based on the analysis of the optimal state trajectories, a new variable energy-to-distance ratio (EDR), is introduced to quantify the level of battery state-of-charge (SOC) relative to the remaining distance. This variable plays an important role in adjusting both energy and catalyst thermal management strategies for PHEVs.

A novel extraction method is developed to extract adjustable engine on/o, gear-shift, and power-split strategies from the DP control policy over the entire state space. Based on the extracted results, an adaptive SPC that optimally adjusts the engine on/off, gear-shift, and power-split strategies under various EDR and catalyst temperature conditions were developed to achieve near-optimal fuel economy and emission performance.[11] Mesh morphing gives the best result among the algorithms we implemented but it requires a significant amount of animator effort in selecting the control pixels. The Thin Plate Spline gives results, which are of comparable quality with very little e ort required from the animator. The feature-based morphing algorithm requires the animator to select a significantly larger number of feature lines to give the same results [12].

# 3. Proposed Work

Float work on the simple principle of placing a buoyant object with a specific gravity intermediate between whose of the process fluid and the headspace vapor into the tank, then attaching a mechanical device to read out the position. The float sinks to the bottom of the headspace vapor and floats on top of the process fluid. Capacitance level sensing in a capacitance fuel level sensing, the capacitive sensors have two conducting terminal electrodes and the gap between the two rods is fixed the fuel level can be found by measuring the capacitance between the two conductors immersed in the fuel. The float moves up and down inside the chamber as the liquid level changes. Float type material are determined by the properties of the liquid being measured. The float contains magnet.

The transparent external indicator tube contains a magnetized indicator which is coupled to the magnet inside the float. The indicator moves up and down the indicator tube as the float moves up and down with liquid level changes level sensing A laser transmitter at the top of a vessel fires a short pulse of light down to the process liquid surface, which reflects it back to the detector. A timing circuit measures the elapsed time and calculates the distance. The demand of sophisticated automated processing system, the need for even-tighter process control, and an increasingly stringent regulatory environment drive process engineers to seek more precise and reliable level measurement system. Improved level measurement accuracy makes it possible to utilize the fuel consumption effectively and minimize the fuel wastage.

Automation proposed for any mechanical system requires accuracy, reliability and data analysis. This project work proposes a measurement technology that desires the help meet these requirements. In 2014 Nitin Jade, Pranjal Shrimali, Asvin Patel and Sagar Gupta developed "modified type intelligent digital fuel indicator system" and achieved an accuracy level of 95% - 98% in measuring the fuel digitally [1]. In January 2014 Vinay Divakar developed "Fuel gauge sensing technologies for automotive applications" and achieved a smart fuel gauge system [2]. In April 2013 Jaimon Chacko Varghese and Binesh Ellupurayil Balachandran developed "Low cost intelligent real-time fuel mileage indicator for motorbikes" and measured the probable distance that can be traveled by the vehicle corresponding to the amount of fuel in the fuel tank can also be estimated [3]. In 2012 Deep Gupta, Brajesh Kr. Singh and Kuldeep Panwar of H.M.R. institute of technology and management developed "A prototyping model for fuel level detector and optimizer" and achieved the measurement of fuel so the accuracy level was 96.36% - 98%.

# 4. Problem Definition

To overcome the disadvantages of the existing system and implement the efficient and more accurate fuel measuring system. In the existing system, it was not possible to detect the fuel theft from fuel tank as well as the accuracy of the existing system was very low. It was not possible to trace the fraud at the station also the fuel theft is not detected by the existing system. The system will not generate the report of the fuel.

# 5. Proposed System

All the tasks mentioned above will have to be approached in an incremental fashion. With new ideas and feedback, new features will be added in the preceding increment. After the training of the members, they can start creating components and test them as they finish. Using Visual Web developer for testing Web Service is a good choice but does not handle other real-life problems associated with hosting. Thus, it is imperative that we purchase a domain and hosting space to test our service on a real-time basis. Android app can be successfully developed and tested using Android Studio and Android Virtual Device. Designing UI for different screen sizes can be easily done using Visual Studio and can also be tested by different configurations.

 

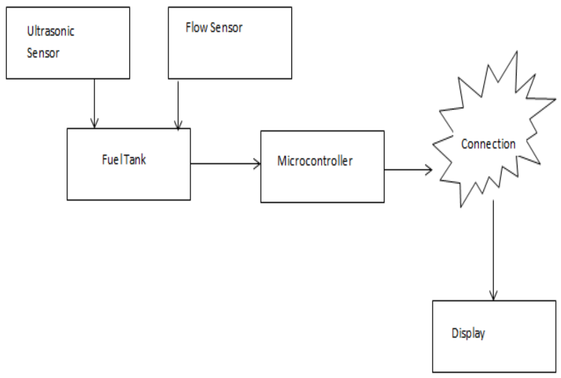


**Figure 1. System Architecture**

## 6. Components of System

**1. Flow Sensor**

Core competencies of First Sensor are the development and production of sensors for measuring mass and volume flow rates. Our flow rate sensors quickly record even the smallest flows with a high degree of accuracy. We offer leading solutions for medical and air conditioning technologies as well as for industrial applications. Flow sensors are used in respiratory devices and inhalers, oxygen concentrators, insufflators and anesthetic devices, to name but a few areas of application. HVAC technology, fuel cells, gas analyzers, low vacuum control, process control, filter monitoring, extraction hoods or gas measuring stations are further applications of these sensors.

**2. Ultrasonic sensor**

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object.

**3. Fuel Tank**

A fuel tank (or petrol tank) is a safe container for flammable fluids. Though any storage tank for fuel may be so called, the term is typically applied to part of an engine system in which the fuel is stored and propelled (fuel pump) or released (pressurized gas) into an engine. Fuel tanks range in size and complexity from the small plastic tank of a butane lighter to the multi-chambered cryogenic Space Shuttle external tank.

**4. Raspberry Pi Micro Controller**

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries.[4][5][6] The original model became far more popular than anticipated,[7] selling outside of its target market for uses such as robotics. Peripherals (including keyboards, mice, and cases) are not included with the Raspberry Pi. Some accessories, however, have been included in several official and unofficial bundles.

**5. Database**

A database is a collection of information that is organized so that it can be easily accessed, managed and updated. Data is organized into rows, columns, and tables, and it is indexed to make it easier to find relevant information. Data gets updated, expanded and deleted as new information is added. Databases process workloads to create and update themselves, querying the data they contain and running applications against it.

## 7. Conclusion

We want to implement the system which quantifies the amount of fuel in the fuel tank in the form of numeric digits more accurately. Thus, to achieve this we develop the system. We also want to detect the fuel theft from the fuel tank by using various sensors. The system also able to judge that how long distance can be traveled by the remaining fuel in the tank. This will also give vivid information of fuel filled at the petrol pumps. We feel that our system serves something good to this world and like to present it before the prosperous world.

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