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Design & Implementation of Intelligent System for Identification of Fuel Fraudulents and Near By Fuel Stations

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Abstract: ***The increasing frauds in fuel filling process have become a big deal to the society. The pumps in petrol bunks are controlled with the end goal that it shows the fuel filled into vehicle as entered, yet the amount of fuel filled is not exactly shown by the display. The petrol bunk proprietors are making enormous benefits by tricking the clients. This is redressed through estimation of approaching fuel through flow rate sensor and showing it on the LCD display and the measured output is sent as a message by means of global system for mobile communication (GSM) technology to the enlisted user for undeniable record can be made. This would help the proprietors of transportation companies to keep up a record of their vehicles that are run by their paid drivers. if the petrol in the tank is less than threshold value then LED glows continuously until the petrol is filled and it display the distance of the nearby petrol bunks by using the global positioning system (GPS) and is displayed on LCD.***

Keywords: Fuel Level Monitoring, Flow sensor, GPS, LCD Display, Threshold value

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I. INTRODUCTION

Day by day, petrol bunk frauds are increasing. The greater part of the petroleum bunks, has controlled the pumps to such an extent that it shows the measure of fuel filled as entered esteem, yet the measure of fuel filled in the client's tank is a lot lesser than the showed esteem. These outcomes in huge benefits to the oil bunk proprietors and in the meantime the clients are cheated as it is difficult to cross check the measure of fuel filled in tank. This can be redressed by utilizing flow rate sensor and when the fuel in went through this sensor it gauges the measure of fuel filled in the tank. The deliberate esteem is shown on LCD with the goal that the client can know the measure of fuel filled. The deliberate yield is sent as a message by means of worldwide framework for versatile correspondence (GSM) innovation to the enrolled portable with the goal that irrefutable record can be made. This would help the proprietors of transportation organize organizations to keep up a record of their vehicles that are controlled by their paid drivers thus that drivers wouldn't swindle the proprietors by appearing incorrectly charges and guaranteeing for more cash.

The utilized the estimation system dependent on the guideline of fluid dimension-initiated tweak in the strong point of a disparate light beam occurrence on fluid surface. This procedure has favorable circumstances of being a touchy and non-meddlesome method for estimation. The proposed strategy has been tentatively tried with clean water, shaded water, weakened glycerine and unadulterated glycerine by utilizing fluid compartments having 100-,250, and 500-ml limit [1]. Millimeter wave Doppler sensor to see through an objective compartment and measure the fluid dimension dependent on ingestion of millimeter waves in fluid. One of the difficulties is to precisely gauge fluid dimension (inside sub-millimeter blunder) in spite of the innately extensive pillar measurement of the millimeter wave because of diffraction [2]. The capacitive technique is introduced to recognize the fluid dimension. Existing techniques are by and large approximations dependent on the expansive contrast between the dielectric constants of the fluids and the air. The technique proposed is to takes out the impact of air and gives the exact perusing of the fluid dimension in the tank [3]. The PC vision-based noncontact strategy for estimating the dimension of a fluid in a shut compartment utilizing an optical imaging framework combined with a proper arrangement of picture handling calculations [4].

The exact and dynamic ultrasonic separation sensor to quantify the dimension of fluid in jugs for a modern line is portrayed. A methodology to quantify the season of flight dependent on the envelope of the reverberation flag is performed, unravelling for all intents and purposes the issue of the mind boggling signal reflected from the primary surface, meniscus and inner dividers of the bottleneck [5]. An imaged-based estimation framework utilizing a solitary advanced camera and a round buoy to gauge fill levels in fluid[6]. These days all fuel bunks having kinds of computerized shows unit so as to show the estimation of fuel adding to the vehicle. Speedometer which is arranged with the processor, will persistently screen the present speed of vehicle and the count of mileage which connote the lingering kilometer of vehicle will go through, contingent on my present speed [7]. An optical fiber-based system for fluid dimension estimation is proposed. It depends on the power lessening happening in an optical fiber, drenched in a fluid, when the fluid dimension differs [8] In this work, proposed to actualize a framework,

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on the off chance that the petrol in the tank is not exactly the limit esteem, at that point the LED sparkles persistently until oil is filled in the tank and done by using float which is present inside the tank. The fuel level in the tank is estimated utilizing float sensors. The fuel level goes below threshold level, Global Positioning System, will identify the distance of nearby petrol bunks and is displayed on the LCD for rider information and can fill the petrol before the petrol level goes empty.

II. BLOCK DIAGRAM OF PROPOSED SYSTEM

The block diagram of proposed system is shown in figure 1. The primary element of undertaking is flow rate sensor, GSM module, Arduino Uno controller and GPS. The flow sensor is attached with top of the fuel tank. The flow sensor produces computerized yield dependent on the measure of fuel rate. The digital information corresponding to flow rate is converted in to quantity with the assistance of Arduino Uno microcontroller GSM module is utilized to send the message

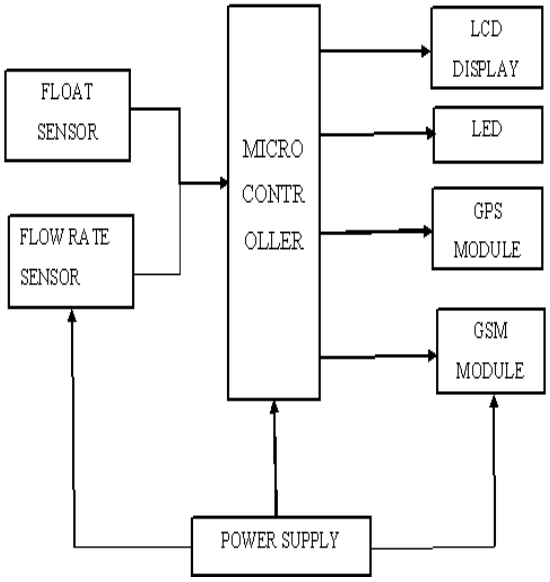

Fig 1: Block Diagram of proposed system

to the enrolled mobile number about the measure of fuel poured in to the tank. The GPS associated in the framework is utilized to recognize the longitude and longitude of the nearby fuel station and the controller will distinguish the separation between current locations to fuel station. The same is displayed on the LCD screen associated on the vehicle. The float sensor appended in the fuel tank is utilized to gauge the fuel level in the tank. If the fuel level goes beneath the limit esteem, LED will flicker persistently demonstrating that fuel is low and the distance of close-by oil bunks is shown on LCD. The flow chart of entire process is shown in figure 2.

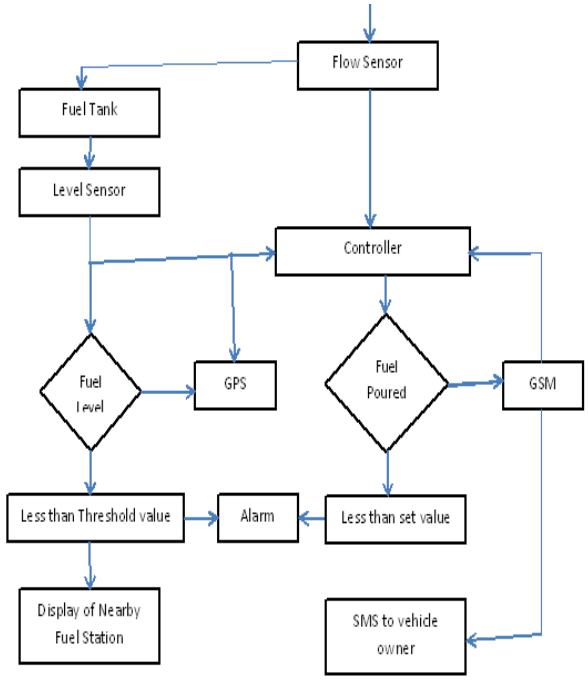

Fig 2: Process Flow chart of proposed system

.III. METHODOLOGY OF PROPOSED SYSTEM

The flow sensor is connected on the inlet of the tank. The fuel from the nozzle will directly fall on to the flow sensor. High precision flow sensor is used to measure the inlet flow of the fuel. The digital output varies according to the flow rate and it is connected to the microcontroller. The flow rate sensor is calibrated with different flow rate and embedded program is loaded in to the controller. The controller will produce the message after the flow rate is stopped for 5 seconds. In case, flow will continue within 5 seconds will be calculated with previous value and end of the fuel pouring will send a message to the registered mobile through GSM and LCD display. Users can easily verify the amount of fuel is poured on the tank. In case of any deviation, complaint can be given to the owner of the fuel stations for remedial measures. Another part of the system is GPS module. It will sense the latitude and longitude of the current vehicle positions and measures the distance between current locations to nearby fuel stations. The distance of nearby fuel station is displayed on the LCD screen. The location of nearby station is calculated by linking the Google map with the controller. The designed system can be used for both petrol and diesel vehicle with slight modifications in controller programming according to the flow rate sensor used in the system.

IV. RESULT & DISCUSSION

The proposed system is implemented with existing fuel tank and tested successfully. The hardware setup of proposed model is shown in figure 8. For verification of operation, 500ml fuel is taken in to bottle and poured through the flow sensor mounted on the top of the tank. The fuel was poured in to the tank through the flow sensor and the amount of fuel poured in the tank is displayed in LCD module.

Fig 3: Hardware Implementation of Proposed System

Obtaining the reading for no fuel is filled

Before fuel poured into the tank it shows 0ml in LCD display labelled as "TOTAL:" indicating that no fuel is filled in the tank. The screen shot of the various results taken are delineated in the figure 4 (a) to 4 (d).

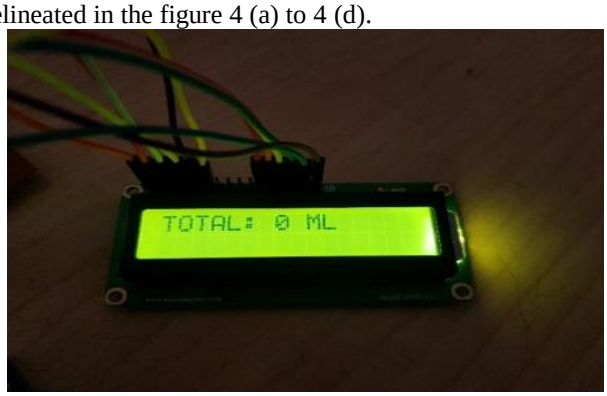

Fig 4(a): Display of no fuel is filled in the tank

Obtaining the reading for fuel is filled on the tank

The fuel filled in the tank is measured through flow sensor and the value is displayed on the LCD present on the dash board. A bottle containing 500 ml petrol is poured on to the tank and is measured as 498ml by the flow rate sensor is shown in figure 4(b). The system was tested with multiple times with different value of fuel level and it gives 99% accuracy. The turbine based flow sensor is used in the project due to the cost effective. If magnetic sensor or Hall Effect sensor is used for measuring the fuel level can increase the accuracy to 100%.

Fig 4(b): Display of amount of fuel poured in to the tank

Message to the registered mobile number

The measured fuel quantity is sent as a message via GSM to the registered mobile numbers to keep the record of fuel poured. This would help the owners of transportation network companies to maintain a record of their vehicles that are run by their paid drivers. Screenshot of message received is shown in Figure 4 (c).

Fig 4 (c): Screenshot of message delivered to the registered mobile numbers.

Location of nearby fuel station displayed on LCD display

.The fuel in the tank is lesser than the threshold value, the GPS used in the system will identify the nearby petrol bunks and it is displayed on the LCD display in the vehicle. So that rider can easily know the nearby petrol bunk and can fill the fuel before it is completely empty. Nearby petrol bunks are displayed on LCD as shown in the figure 4 (d)

Fig 4(d): Display of nearby fuel station

V. CONCLUSION

The proposed framework is to be executed in every one of the bike and four-wheeler vehicles to confirm the measure of fuel poured on to the vehicle. This model will be implemented easily with all existing vehicles with very nominal expenses. This system will help the owner of the vehicle to know the exact amount of fuel poured and nearby fuel stations in case of low value of fuel in the tank. This system provides the alert signal to the drivers continuously until the fuel is poured. Successful implementation of this project in to the vehicle will give an alert to fuel fraudulent to pour correct amount of fuel.

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