Smart Fuel Meter with Detection of Frauds by SMS

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Abstract: This project mainly deals with the device which will give exact volume of incoming fuel at real time. Some of the petrol pump owners do the modification with petrol machines so it causes to customer cozenage. To avoid this, our system will provide the accurate result of incoming fuel in tank. To design this system we are going to use Flow sensors, LCD display, GSM+GPS kit and Arduino Uno board with battery power. The system will also helpful for commercial vehicles. The GSM of proposed system will send message to the owner of commercial vehicles so it will stop the frauds by drivers of commercial vehicles. The GPS module of this system will detect and update the location of vehicle.

Keywords: GSM,GPS, Arduino Uno,USB

I. INTRODUCTION

Fuel is a commonly used commodity by all people and its use is going on increasing with the advancing growth of vehicles. But the common people seem to be shaken up with the ever increasing prices of these fuels which cause a direct effect on the family budget. But the common man still remains unaware of the fuel frauds which are created while refilling the tank. Even a small per cent of fraud can cause a huge adverse effect on the financial budget and dent the savings of a person. Hence, it becomes the necessary to build a system which measures the exact amount of fuel that goes into the tank of the vehicle. By supplying the correct amount of fuel in the tank, the vehicle can go a longer distance than it might have. This in turn saves money of a common man and enhances his/her budget.

The proposed project work has aim for a feasible accurate fuel measurement technique to measure the quantity of incoming fuel in tank at real time. We can achieve least possible errors and maximum accuracy in the measurement. We are designing a system which digitally displays entering quantity of the fuel inside the tank.

II. RELATED WORK

L Monishas S shubhras Nishanth Kannaa Ramya (Electronics and Communication SRM Institute of Science and Technology Kattankulathur, India) "Smart Fuel Meter Design and Implementation" In countries like India with a lot of vehicles, the consumption of fuel from fuel stations is large. Most of the times, consumers are not satisfied with quantity or quality of fuel, because the consumers get less quantity and are cheated. Smart fuel meter is a microcontroller board which will calibrate the amount of fuel flowing into the fuel tank with the help of a fuel flow sensor. The amount of fuel is measured very accurately and can be viewed in the display provided to the driver of the vehicle. The information regarding the amount of fuel flow is also transferred to the owner's mobile phone through SMS. Flow meters are devices that measure the amount of liquid, gas, or vapor that passes through them. Some flow meters measure flow as the amount of fluid passing through the flow meter for a particular time period (such as 60 litres per minute). Other flow meters measure the total amount of fluid that has passed through the flow meter (such as 100 litres). Smart fuel meters shall be portable / fixed type. It is a battery operated device and is based on a microcontroller. When our fuel meter is implemented in a vehicle it gives complete satisfaction to its users.[1]

G. Kiran Kumar M.Venkat Bharadwaj K. Ashok Reddy (MLR Institute of Technology, Hyd.) "Digital Fuel Meter" Petrol bunk frauds were very common in recent time. Many of the petrol bunks today manipulated pumps such that it displays the amount as entered, but in reality, the quantity of fuel filled in the customer's tank is much lesser than the displayed value. The pumps are cheated for the benefit of the petrol bunk owner. This results in huge profits for the petrol bunks, but at the same time the customers are being cheated. Majority of the two wheeler vehicles in India consist of analog meters which will not help 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 at the petrol bunk. Also in this modern and competitive world, products are being digitized owing to its benefits, user friendliness. So we are conducting a project named "design and

development of a digital fuel level indicator for two wheelers". It consists of creating a digital display for the exact volume of fuel contained in the fuel tank[2].

Prof.J.N.Nandimath, Varsha Alekar, Sayali Joshi, Sonal Bhite, Pradnya Chaudhari. (Department Of Computer Engineering STES, Smt Kashibai Navale College Of Engineering, Pune Savitribai Phule Pune University) "IOT Based Fuel Monitoring for Future Vehicles." In today's world, actual record of fuel filled and fuel consumption in vehicles is not maintained. It results in a financial loss. To avoid this we are implementing an IOT fuel monitoring and tracking system. We can use 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.[3]

III. EXISTING SYSTEM

Sometimes petrol machines are tempered by the owner of petrol pumps. Due to changes in software of petrol machine, sometimes it fills inaccurate quantity of fuel. Most of the times the fuel filled is less than the displayed value these is because of arrangements made in the filling machine which leads to the benefit of owner but even a small change in the incorrect amount of fuel can bump the economy of common people. So overall existing system leads to the customer cozenage. Customer did not get exact benefit of what they are paying. In existing system, there is no such kind of device which can show the exact quantity of incoming fuel on display board.

IV. SYSTEM ARCHITECTURE
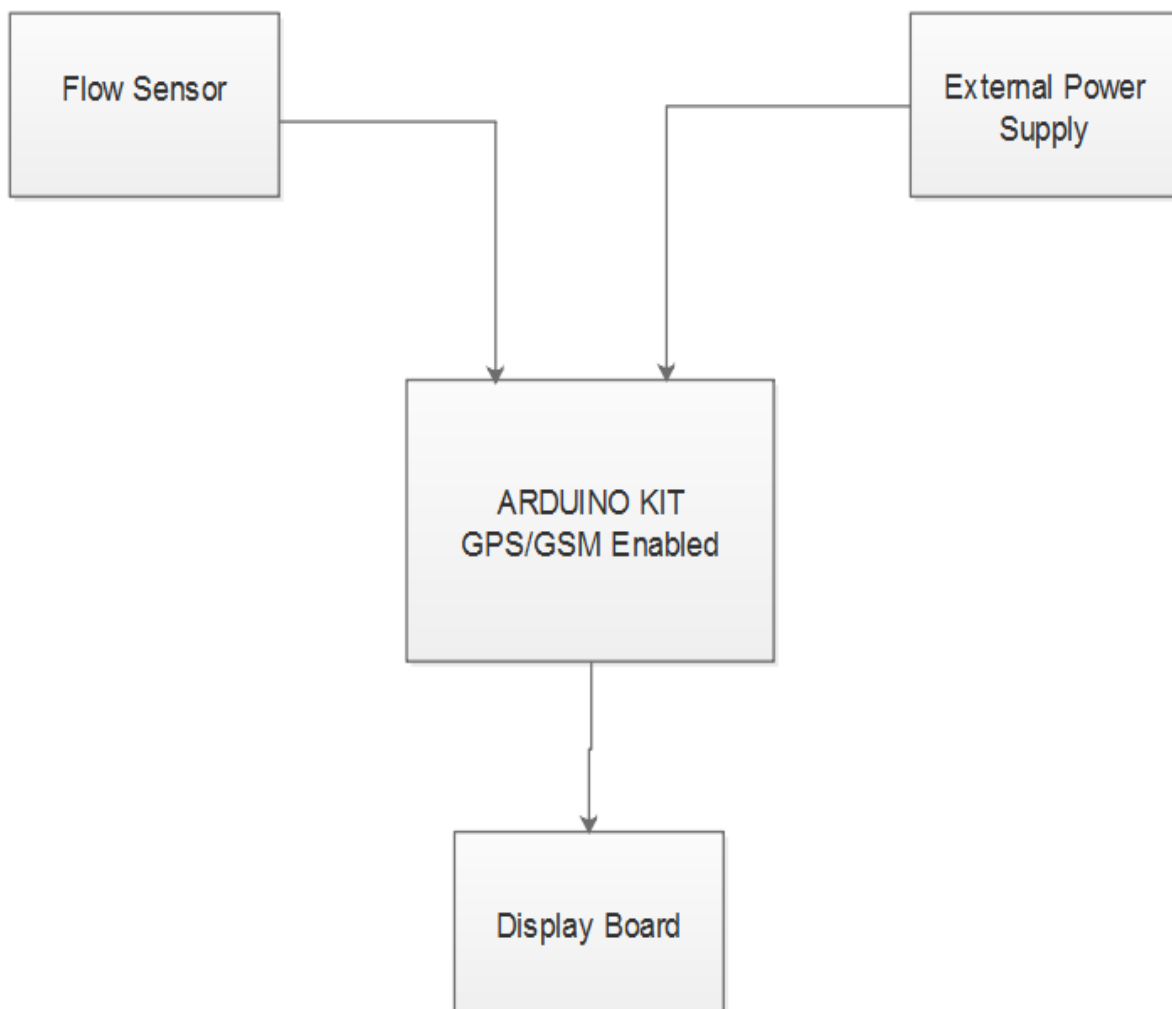
The proposed system has three modules –

1 Module and Their Functionalities:

Microcontroller and sensor Module:

- The Microcontroller module controls all the components. Here we used Arduino AT –mega 2560 as a microcontroller.The microcontroller connected to the display board and sensor. Sensorscene the flow of incoming fuel and it will display the quantity through microcontroller.
- Sensor module sense the flow of incoming fuel.The sensor works on the principle of Hall-Effect. The Hall-Effect sensor outputs the corresponding pulse signal
- Then connection between microcontroller and sensor module helps to display the quantity of fuel on LCD screen.

Display Module:

- Display module will display the exact volume of fuel going into the tank. Here we used the 16*2 LCD display which consist of total 16 pins. The three four pins goes to ground vcc and contrast. Pins from 4-6 used for IC and pins from 7-14 used for data pins which consist 8 bit data.
- By displaying the correct quantity of fuel, customer satisfaction can be achieved

Messaging Module:

- Messaging module will send the message to owner of vehicle. GSM is connected to the microcontroller. Here we are using SIM800A GSM GPRS. GSM module will take the value from microcontroller and sends message to the customer.
- By using message passing mechanism, the frauds by driver of commercial vehicle can be reduced.

Components used in Proposed System –

1. **Arduino UNO -**
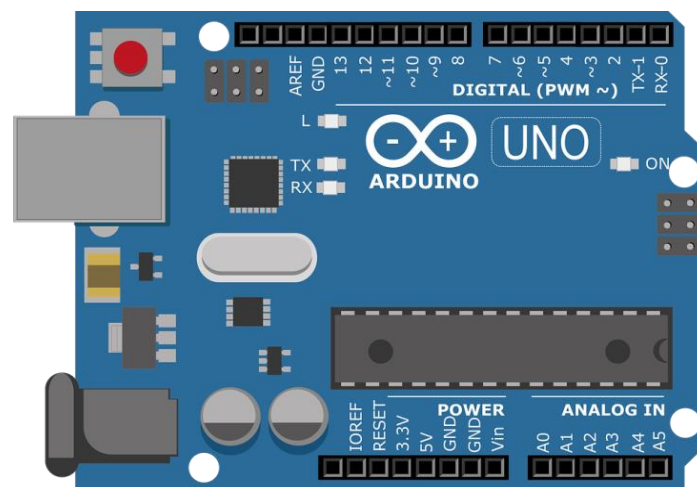
Arduino Uno is a very valuable addition in the electronics that consists of USB interface, 14 digital I/O pins, 6 analog pins, and Atmega328 microcontroller. It also supports serial communication using Tx and Rx pins. It allows the designers to control and sense the external electronic devices in the real world. The Arduino board plays important role because it consist the display module, sensor module, GSM & GPS module.

2.Flow Sensor

A flow meter works by measuring the amount of a liquid, gas, or steam flowing through or around the flow meter sensors. Fuel flow sensor consists of a plastic valve body, a rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. Its speed changes with different rate of flow. Whatever the quantity measured by sensor, that value should be passed to Arduino board and Arduino board will pass that value to the display module.

3. LCD Display

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. A display is made up of millions of pixels. The quality of a display commonly refers to the number of pixels. So display module will take input from Arduino board and display the volume of incoming fuel in the tank.

4. GSM and GPS –
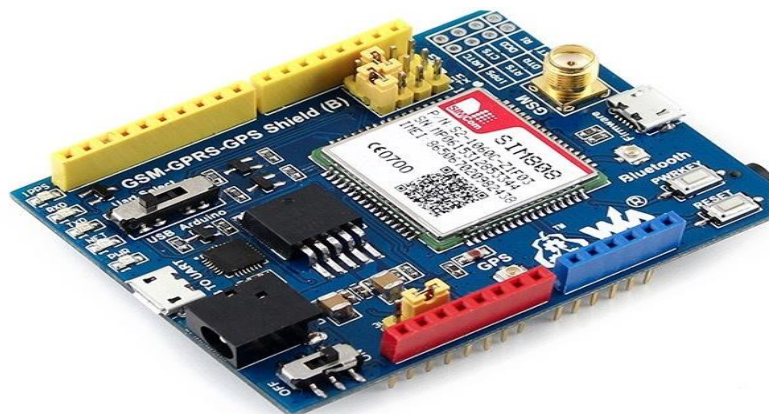
GSM module will play the important role in message passing mechanism. It will pass the message to the owner of vehicle by taking the input from Arduino board. The data of message contains quantity of fuel and total cost of fuel with respect to quantity. GPS will help for updating the location of vehicle

5. Proposed Design
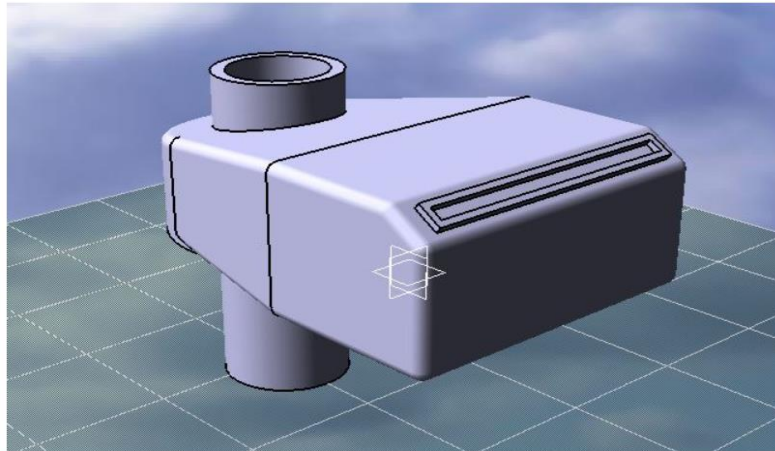
This device will measure exact quantity of incoming fuel in the tank as real time also this device will send text message to the owner of commercial vehicle with location to reduce money frauds of drives of commercial vehicle

V. FUTURE SCOPE

The system is designed for awareness of customer about fuel filling. It includes the feature that provides a message to the owner of vehicle; it will avoid frauds by the petrol pump owner and driver of commercial vehicle. Due to accuracy in this system the common people saves their money. The transparency between common people and owner of petrol pump should be maintained.

VI. CONCLUSION

The smart fuel meter is very accurate device which measures quantity of incoming fuel in the tank. This system provides the message to the owner of vehicle using GSM module. Also it will detect and update the location of vehicle using GPS module. The main advantage of Smart Fuel Meter is reducing the frauds at petrol pumps and cozenage of common people. Use of smart fuel meter will stop the most of Frauds.

VII. ACKNOWLEDGEMENT

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