Fuel refill level indicator and fraud detection

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Abstract: At the time of petrol filling it is not possible to identify whether exact amount of fuel is filled in the tank by the agent or not. To cheat customers, petrol pumps hiring techniques. They use chip device to reduce the fuels considerable. We know that today's world is digitalized. There are many news and issues regarding to fuel thefting and refilling. So for self-understanding if fuel indicator made digital so we can easily found exact amount of fuel refilled in the fuel tank. In our project we have made digital fuel meter .The value indicate digitally how much amount of fuel present in tank and also after fuel refilling a text message delivered to user's mobile, by using GSM.

Index Terms: Arduino UNO, fuel gauge, LCD Display, GSM.

I. INTRODUCTION

Now day's everything is digitalized but in two wheelers or other vehicle's the level of fuel is displayed in terms of bars not in numbers like 1,1.2,3….. For this reason fuel meter have to make digitalized. Fuel gauge performs important role in our project. Fuel gauge have two main units one is sensing value and second is sending value. The rear sides of the analog fuel indicator has 3 terminals, specifically B-battery, F-float, and G-ground. From these terminals, voltage values are taken from the terminals-FG and resistance value is taken from the terminal-F from zero to 11 liters. The value send by fuel gauge is displayed on LCD in digital number. By using GSM sim900A modem, text message is delivered to user's mobile, so user can easily notify how much fuel refilled in fuel tank.

Recently, according to news 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. According to a news, this is a scam that was recently detected in multiple petrol bunks at Uttar Pradesh. In this scam, an electronic chip reduced the output of the petrol dispensing machines by nearly six per cent. The chip was controlled remotely by a fuel pump attendant. So, for every liter of fuel the customer paid for, he got only 940 ml. The man who sold this chip to petrol bunk owners is said to have sold about 1,000 units of the chip.

II. REVIEW OF LITERATURE

A.Avinashkumar, U.Singaravelan, T.V.Premkumar, K.Gnanaprakash invented "Digital Fuel Level Indicator in two-wheeler along with distance to zero indicator". In this paper they have used the A/D converter with LCD was fitted with the Analog fuel gauge of the two-wheeler and the result was successfully obtained. The A/D converter shows the amount of fuel in fuel tank in exact litres [1].

Anirudha Mule, Ujwal Patil, Anil More, S.R. Kale invented "Study of digital fuel meter and fuel theft detection".In this paper they have made a Digital Fuel Meter, which shows the level of fuel digitally and also theft detection can be done[2].

Nitin Jade, Pranjal Shrimali, Asvin Patel, Sagar Gupta invented "Modified Type Intelligent Digital Fuel Indicator System" .This paper includes the liquid level detector and optimizer play an important role in tanks to indicate the level of liquid of a particular density[3].

Deep Gupta, Brajesh Kr. Singh and Kuldeep Panwar invented "A Prototyping Model for Fuel Level Detector and Optimizer".In this project the main component in Fuel level detector is the load sensor which generates the signal based on the weight of liquid available in tank[4].

J Vignesh, V Nijanthan , J Venkateshwaran, K Suresh Kumar, Mrs B. Vidhya invented "Digital Fuel Level Indicator for Motor Bikes using Arduino Microcontroller". In this paper when the Fuel was Zero, The system displayed, Fuel is Zero with a periodic buzzer. When the fuel started to pour in, only the fuel crossed the minimum reserve level, the Buzzer got switched off while the LCD displaying the exact amount of fuel entering in the tank [5].
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III. SYSTEM ARCHITECTURE / SYSTEM OVERVIEW

The proposed system is designed to find the how much amount of fuel actually refilled in tank using the Arduino. It is application of IoT. In proposed System the main module is Arduino. This system focuses on creating a device which can help to actively display the exact amount of fuel of a motorbike in real time. It involves the making of the system to provide exact level of fuel which is

reliable, easy to read and of dependable/compatible overall design. The system comprises of Fuel tank, Analog fuel gauge, Battery, Arduino with LCD display and GSM sim900A modem.

The system will be placed outside the vehicle. Fuel gauge senses the value and sends them to Arduino board and then the Arduino uploads that values to LCD display after converting them in digital numbers and then by using GSM module, it sends SMS on users moile phone. Authorized user will have access to the information. System architecture in figure shows actual interaction between components. The system will be connected to fuel gauge in the vehicle. Fuel gauge will act as sensor and will sense the petrol refilled. Using our proposed system exact amount of fuel is calculated and SMS will be send to user.
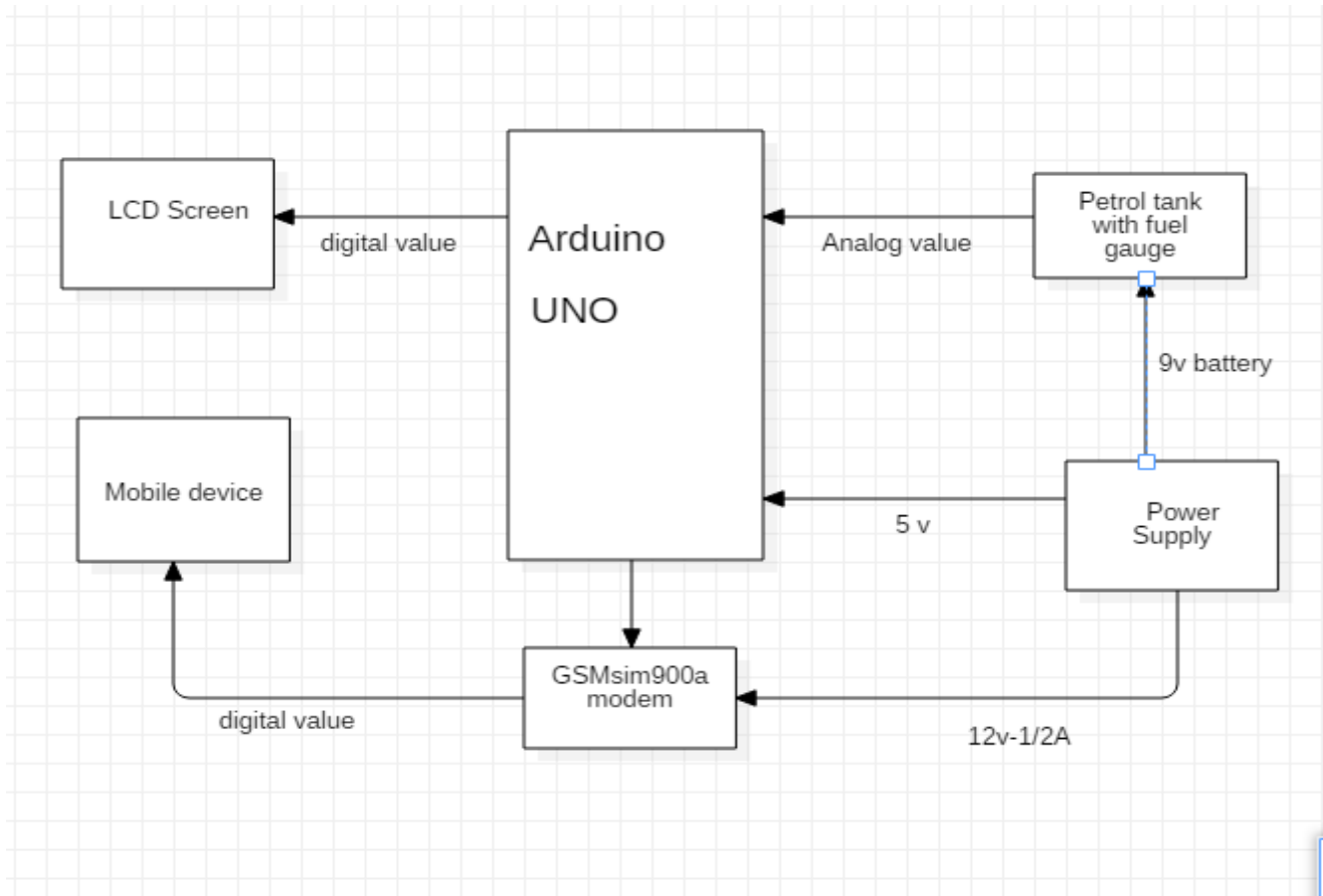

Fig. 1. System Architecture

IV. Mathematical Model:

$$S = \{I, F, O\}$$

Where,

- I=Set of Input: Fuel

- F=Set of Functions: F= { F1, F2 }

Where,
F1=analogRead ();
F2= map (value, fromLow, fromHigh, toLow, toHigh)

- O=Set of Output: Text Message

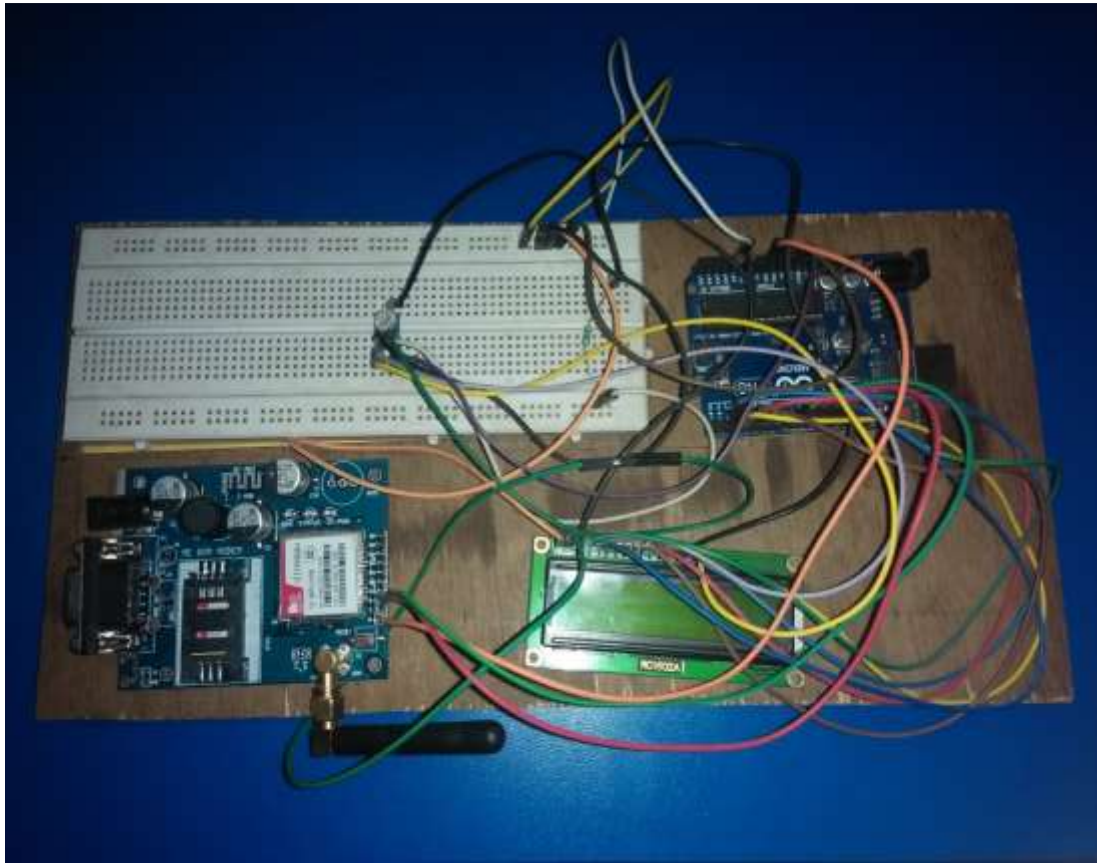**V. Hardware/Software Requirements**

Hardware Requirement:

- Fuel Gauge.

- Battery (9 volt).

- Arduino UNO 3B Kit.

- 16*2 LCD Display.

- GSM module

- 12V-1A adaptor.

- Transistors and Registers.

Software Requirement:

- Arduino UNO Software.

- Embedded C Program Coding.

VI. SCREENSHOTS

VII. CONCLUSION

 In real life human being are facing many problems about scams happened on petrol pumps in India, and proposed a technique namely "Fuel refill level indicator and fraud detection". This system is very useful to verify exact amount of fuel refilled in the tank during refilling. This project successfully implemented real time fuel refiled in tank using Arduino. Fuel gauge senses the fuel refilled in analog values. Fuel gauge sends analog values to Arduino kit. This values are converted into digital values. And then LCD displays how much amount of fuel refilled in tank. Using GSM module Arduino sends SMS to user's mobile phone. The accuracy of this system is approximately to 95% - 98

VII. ACKNOWLEDGMENT

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