IoT BASED SMART FUEL METER

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Abstract:

Larceny of fuel is a serious issue. Petrol bunk workers may cultivate the ignorance of their customers by filling less fuel than for what they pay. Also car drivers and other institutions and corporate sectors face problems of fuel larceny during long journeys. We are providing solution to the above mentioned problems by developing a compact product with flow meter, Wi-Fi module etc. By which we can eliminate the larceny in petrol bunks and in public places, we can also get the detailed summary about the fuel cost and their corresponding quantity along with the measured quantity.By the usage of the flow meter through which the difference between the actual quantity and the measured quantity by the meter can be viewed. Thus with the help of the above details like quantity of the fuel received the ratings will be provided for the petrol bunks from which the people can come to know about the transparency which results in the complete elimination of the larceny of fuel in the petrol bunk. The Webpage utilizes the THINGSPEAK analytics to analyze the fuel filling to give more detailed description and visualization of the fuel filling statistics. Wi-Fi unit performs IoT operation by sending fuel filling data to the webpage which can be accessed by the customers. This proposed system utilizes an Arduino. The detailed description about the fuel consumption is generated which can be displayed on the webpage through the Wi-Fi module. *Keywords* — **Flow meter, 20*4 LCD Display, Arduino mega Board, ESP 8266 Wi-Fi Module, 4*4 keypad**

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I. INTRODUCTION

Fuel is the most essential thing on Earth; no automobiles can run without fuel. Because of its most essentiality lot of people are trying to fraud by playing some cheap tricks. There are number of petrol bunks that will try to fool us by short fueling or short changing, when you go to fill your vehicle, unless you stay alert. Most of the bunks still don't provide a printed bill. In order to eradicate the fraud you must check the meter reading or you should stay near to him. They never resets the meter to 0, he continues from the existing amount which results to less amount of fuel in our vehicle. From all these our project helps you to know how much fuel has been falling into your fuel tank by showing you the exact point reading through LCD. Here we are implementing an IoT fuel monitoring system. So as soon as agent starts filling petrol in your vehicle, 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 then it will store this data on cloud. The Internet of things (IoT) concept enables us to connect the normal day to day

devices with each other over the internet. The devices connected through IoT concept can be analysed remotely. The IoT concept provides the basic infrastructure and opportunities to form a connection between the physical world and computer based systems. The concept has been gaining importance with more and more wireless devices that are increasing rapidly in the market and hardware devices are connected with each other over the internet. The ESP 8266 Wi-Fi module used in the system provides the connectivity with the internet in the system.

The data from the system is displayed on a webpage which can be accessed by the consumer.

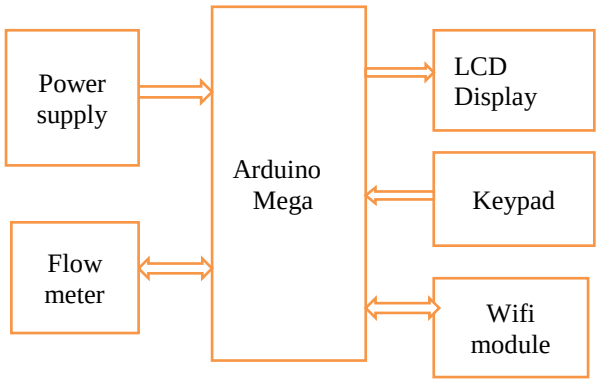
II. LITERATURE SURVEY

In this project we have described such as low cost IoT based smart fuel meter. It will measure the quantity of fuel for the given amount, we can also get the detailed summary about the fuel cost and their corresponding quantity along with the measured quantity by the flow meter through which the difference between the actual quantity and the measured quantity by the meter can be viewed.

III. BLOCK DETAILS

The smart fuel meter using Wi-Fi module can be easily described in two parts. The first part being the physical part and second one being the Webpage. It consists of the Arduino Mega Board, ESP 8266 Wi-Fi module (Node MCU), 20*4 LCD display and power supply.

Block Diagram



IV. COMPONENTS LIST

1. Fuel Flow Sensor

Accurate flow measurement is an indispensable step both in terms of qualitative and economic points of view. Flow meters are excellent devices for measuring fuel flow. Now it is very easy to build a fuel management system using the renowned fuel flow sensor. This sensor sits in line with the fuel line and contains a pinwheel sensor to measure how much of fuel has moved through it.

2. Arduino Mega board

Arduino is used for building electronics projects. Arduino consists of both physical programmable circuit board and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

Components in Arduino Mega2560

- 16MHZ crystal oscillator
- USB cable port
- Reset button
- Power jack
- ICSP header

3. ESP 8266 Wi-Fi module

The ESP 8266 Wi-Fi module is a low cost component with which manufacturers are making wirelessly networkable microcontroller module. ESP 8266 WiFi module is a system-on-a-chip with capabilities for 2.4GHz range. It employs a 32 bit RISC CPU passing at 80 MHz. It is based on the TCP/IP (Transfer control protocol) [3]. It is the most important component in the system as it performs the IOT operation. It has 64 kb boot ROM, 64 kb instruction RAM, 96 kb data RAM.
Wi-Fi unit performs IOT operation by sending fuel flow meter data to webpage which can be accessed through IP address. The TX, RX pins are connected to the 7 and 8 pins of the Arduino microcontroller.

4. LCD display

LCD (Liquid crystal display) screen is an electronic display module. 20*4 display means it can display

20 characters per line and there are 4 such lines. The 11, 12, 13 and 14 pins of the display are used as data pins for Arduino interfacing. It is used to display the quantity of fuel received and the difference in the quantity measured.

5. Keypad

This 4x4 matrix keypad has 16 built-in pushbutton contacts connected to row and column lines. A microcontroller can scan these lines for a button-pressed state. In the keypad library, the Propeller sets all the column lines to input, and all the row lines to input. Then, it picks a row and sets it high. After that, it checks the column lines one at a time. If the column connection stays low, the button on the row has not been pressed. If it goes high, the microcontroller knows which row (the one it set high), and which column, (the one that was detected high when checked). See the schematic in the "Circuit" section, above, for a visual comment of the keypad layout.

V. PROBLEM STATEMENT

In the present scenario we cannot determine the exact quantity level of fuel without any manual measurement methodologies. The meter reading for the fuel displacement in the petrol bunks can also be tuned and also in petrol bunks there are chances for duplicate billing. All this problems are eradicated by the new innovative idea which assures the customers for paying the exact amount for the exact fuel consumption. The system is more reliable and accurate reading values are collected from flow meter. Live readings of flow meter can be viewed online.

VI. THINGSPEAK GRAPHIC INTERFACE

The Internet of Things provides access to a broad range of embedded devices and web services. THINGSPEAK is an open data platform and API for the IoT that enables you to collect, store, visualize, and act on data from sensors or actuators, such as Arduino and other hardware. For example, with THINGSPEAK you can create sensor-logging applications, location-tracking applications, and a social network of things with status updates. The primary element of THINGSPEAK activity is the channel, which contains data fields, location fields, and a status field. After THINGSPEAK channel is created, you can write data to the channel, process and view the data. The typical THINGSPEAK workflow lets you:

1. Create a Channel and collect data
2. Analyze and visualize the data

VII. CONCLUSION

Smart Fuel meter using IOT is an forward-looking application of internet of things developed to reduce the theft of fuel and view the history of fuel filling over the cloud from anywhere in the world. In the proposed project flow meter is used to measure the fuel quantity and display it on internet using IoT. The system updates the information in every 1 to 2 seconds on the internet using public cloud THINGSPEAK. In the present system, fuel filling is accessed using Wi-Fi. The proposed system will make sure how much amount of fuel is exactly deposited in our fuel tank to avoid loss of amount. We can know that through the external display kit is fitted on our vehicle pour through IoT wi-fi which stores this fuel measurement information so that we can check that information on dispaly and on webpage from anywhere. As agent starts filling fuel in your vehicle, the flow sensor is excited. This flow sensor will be active till flow ends. Once flow ends controller circuit will calculate the amount of fuel filled, then it will store this data on cloud.

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