Fuel Monitoring System using IoT

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Abstract: **In today's fast paced world, monitoring systems are necessary to track the changes in the environment for better understanding of current scenarios and predictions thereof. The same is true for fuel tanks in vehicles as well. By keeping strict track of fuel intake and consumption, vehicles can be made more fuel and cost efficient. This can be done using remote monitoring and data collection systems deployed at the site of the fuel storage tank. This proposed monitoring device is built on Atmega 328 computer that takes fuel tank level information from its sensors and analyses this data at the sensor edge to find patterns using edge analytics technology. These patterns and data are gas stations and formulate better conservation streamed to the internet, either an android app or a website. The design and implementation of an IoT and mobile-based vehicle fuel level activities such as real-time fuel monitoring are covered in this article. Capacitance is used in the suggested IoT gadget to measure the amount of fuelThe driver receives a notification through mobile application when the vehicle's fuel/water reaches a specified level. This paper presents the implementation of such a monitoring system based on Internet of Things (IoT) technology to protect the fuel customers from theft at the strategies. IOT based fuel monitoring for vehicles. When an agent starts filling petrol in your bike/car, the flow sensor is activated. This flow sensor is active till the flow ends. Once flow ends it will calculate the amount of fuel filled and will be notified on the screen. ESP8266 Wi-Fi chip is connected to flow sensor and server ESP8266 wi-fi chip activates the flow sensor and the result is displayed on the server.**

Keyword:, GPS, Ultrasonic Sensor, NodeMCU (ESP8266), Android Application

I.   INTRODUCTION

The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. Fuel-management systems are designed to effectively measure and manage the use of fuel within the transportation and construction industries. This information can be then stored in computerized systems and reports generated with data to inform management practices. This enables consumption control, cost analysis and tax accounting for fuel purchases. Modern vehicle tracking systems commonly use GPS technology for locating the vehicle, but other types of automatic vehicle location technology can also be used.

As fuel cost is rising constantly, people are facing fuel theft at petrol pumps. In that, vehicle owners do not calculate how much quantity of fuel needs in a day or in a week. Time is important for efficient goods transportation system such as real time tracking and reducing financial fuel loss of vehicles is rapidly increased. This can be overcame by using real time tracking vehicle system, such as a system which monitors current amount of fuel via mobile application. The new driver does not know where is the nearest fuel pumps from his current location. This android application helps to find nearest fuel pumps. A driver can easily target the nearby pump fuel and reach there within a few times. Using this approach, a vehicle owner will help the user to monitor and control all of the vehicles from a remote location.

In the present situation, this project plays a vital role in vehicle activities. Nowadays, real time fuel-filled and fuel consumption in vehicles is not maintained. For this kind of problem, when the driver starts filling fuel in the tank, the ultrasonic sensor gets activated and store data on the mobile application. Some of the drivers can drive without asking his vehicle owner. At that time, the driver used the vehicle for rental or personal use. By utilized the

mobile application, the owner can trace all the vehicles in the same period, find very nearest fuel pump from the vehicle location, notify when fuel goes to a certain level.

The proposed vehicle activities monitoring system is reliable, easy to implement and user friendly, which keeps monitoring through the mobile application. Tracking vehicles has always been a problem with transport vehicles or cargo vehicles for big companies dealing. This project is useful for transportation companies. The private car owners also can be benefited from using the project.

II.EXISTING SYSTEM

In existing system 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. 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 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

III.PROPOSED SYSTEM

To proposed system for fuel monitoring. This system measures the amount of fuel filled in the tank more accurately and relays this information to the user's mobile phone app or to a web page. The system would also track the fuel consumption patterns using edge analytics technology to help the consumer figure out better ways of fuel conservation and cost efficiency. This is done by using flow and load sensors in the fuel tank to tack the intake and consumption of fuel. This acquired information is then analyzed on site to determine consumption patterns. The fuel intake data and the analyzed data is then sent to the user's mobile phone app incorporating the edge analytics and Internet of Things (IoT) technology. The flow sensor measures the amount of fuel being poured into the tank and replays this information to the Atmega16 microcontroller. This information is then displayed on the LCD screen on the board. The load sensor present at the bottom of the fuel tank reads the amount of fuel present in the tank at any given point. This information is also sent to the microcontroller. When the fuel is being consumed, it leaves the tank through the outlet where another flow sensor measure the amount of fuel going out (as in fig. 2). The microcontroller collects this information as well and then analyses the fuel being consumed and determines patters based on these consumptions using edge analytics concept. The raw as well as analyzed data is sent to the cloud and user's mobile device though the Wi-Fi module present on site Thus the user gets accurate measurements of fuel intake and usage at the tip of their fingers and can further use this information to make their vehicles fuel and cost efficient for better savings

IV.SIMULATION

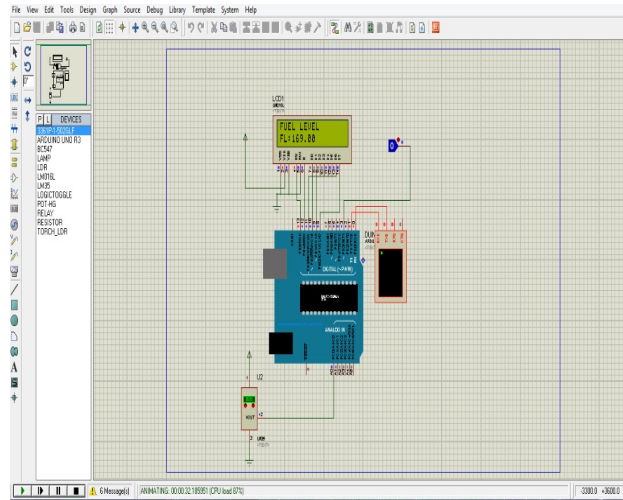MODE 1[SIMULATION DIAGRAM OF PROPOSED SYSTEM]

Fig.2. Simulation diagram

Now code the program into the arduino. If everything goes fine, run the simulation. Increase the value of the sensor which is considered as the fuel by opening the start button. After turning off the off button, open the virtual terminal. Virtual terminal shows the output of petrol already filled in the tank, petrol filling at present and the total petrolfilled in the tank.

Fig.3. Hardware Implementation

V.CONCLUSION

In recent years, technology has advanced at a breakneck pace, making human existence simpler in a variety of ways. The Internet of Things is widely employed in daily objects, and its popularity is growing by the day. The design and implementation of an IoT and mobile-based vehicle fuel level activities such as real-time fuel monitoring are

covered in this article. Capacitance is used in the suggested IoT gadget to measure the amount of fuel. The driver receives a notification through mobile application when the vehicle's fuel/water reaches a specified level.

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