

Real Time Fuel Estimation using Micro Controller and Android App

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Abstract - Today's world is the real time that requires digital. Therefore, the fuel meters that were present in past and in present are of analog in nature. In this system we are implementing Fuel gauge in smart digital way using hardware and software for easy interpretation of fuel and to get appropriate knowledge of fuel present inside the vehicle and how far the vehicle can go using that Fuel will be displayed on google map. The fuel are going to be measured digitally which is Present in fuel tank i.e. 1.0, 1.5, 2.0, 2.5 liters etc. stealing of fuel may be a larger drawback in today's world. Level suddenly gets reduce from 2-wheeler vehicles then the Alert can be sending to the owner of motorcycle and at the same time the buzzer

1. INTRODUCTION

Now a days the world is dealing with real time system. But at present stage, digital fuel meters are implemented in recent vehicles. In this vehicles system the actual amount of fuel present in the fuel tank cannot be interpret properly because of analog meter consisting of deflecting needles or it shows fuel in form of bars. These deflecting needles display quantity of fuel in fuel tank as empty, low or high. So the people don't come to know the exact fuel present in the fuel tank and how far their vehicle will go using fuel present in tank. To solve this issue, this system implements the fuel meter using microcontroller and sensor which will show the exact amount of fuel present in fuel tank in digital format that is in liters in custom Android application. Fuel stealing is also an major problem, when the customers fills the fuel from petrol pump, the customers doesn't know the exact amount of fuel in fuel tank, so the customers will be easily cheated. if the theft is occurred when fuel goes down suddenly, the buzzer will turn on to aware the owner of two wheeler vehicle and simultaneously the notification will be send to the owner of two wheeler vehicle through Application. This system will also indicate amount of fuel present in tank, how far vehicle will go using that fuel when that vehicle going to stop. It will also show the nearby petrol pumps of last destination.

2. EXISTING WORK

In paper [1] system have used the level sensor which indicates the fuel in the form of digital bars in display which is not accurate and difficult to interpret by user

In paper [2] system have used solenoid and this becomes the limitations for their project because solenoid is having disadvantage of precision limit which is usually only switch

two states, in only two Limits positions and solenoid is not continuously adjustable and also can be breakable.

In paper [3] system have used fuel float sensor which is a Indicator unit measuring and displaying the amount of electric current flowing through the sending unit. When fuel present in tank and maximum current is flowing that means tank is full, the needle points to "F" indicating a full tank. When the tank has least current is flowing or tank is empty the needle points to "E" indicting an empty tank.

In paper [4] system have not used the buzzer and alert system is not present, only indication of fuel theft will come to know with help of LCD display, no buzzer or alert systems are used for alerting the owner of bike that fuel theft has been occurred.

In paper [5] system have used the level sensor which indications only three states for fuel indications that is empty middle and full, it will not show the accurate readings of the fuel filled.

3. PROPOSED BLOCK DIAGRAM

In present scenario, user cannot find the how much distance their vehicle will cover This project will provide the visual representation of distance on google map that can cover their vehicle using remaining fuel and will also provide information about fuel station in between distance so that user can refuel their vehicle. Project uses both Micro Controller and Android application.

3.1 Sensor

Sensor will detect the actual amount of fuel present in tank and send data to micro controller for analysis.

3.2 Microcontroller

With the help of sensor micro controller will get how much fuel vehicle contains. It will perform calculation and provide the result to android application Via Bluetooth module.

3.3 Android Application

Our Android application will get Data as input and perform some computation and with the help of google map API library it will display the estimate route on google map. It will also indicate how much fuel vehicle contains in liters

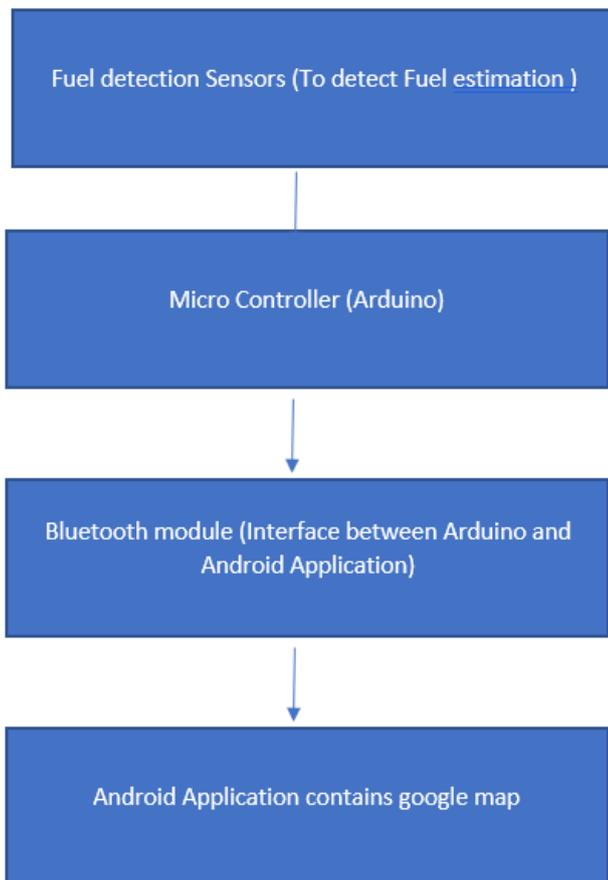


Figure 1: Block diagram of system

4. TECHNOLOGIES USED

In this project following are the technologies used. Global Positioning System, Google Maps API, Arduino.

4.1 GPS Technology

GPS also known as "Global Positioning System." It is a navigation system which uses satellite to determine the position of an object on the surface of the ground. Now a days, Many devices included GPS receivers circuits, such as smartphones, automobiles, Smart watches, 24 satellites contains in GPS Technology which is deployed in space about 12,000 miles (19,300 kilometers) above the earth's surface. Satellites orbit once every 12 hours around the earth at an extremely fast pace. This satellites are spread out evenly so that 4 satellites are accessible via from anywhere on the globe through direct line-of-sight. Each satellite broadcasts its current position, orbit, and exact time. A GPS receiver contains in our device receive that message and calculate its exact position using a process called triangulation. To determine a receiver's location three satellites are required, though four satellites connection are required to get the greater accuracy. For proper working of GPS devices. They must first establish a connection with three or more satellites. This process requires few seconds or minutes depending on the device connection strength.

4.2. Google Maps

Google Maps is developed by Google. Google made this Web Mapping Service to provide street maps, 360° panoramic views of streets (Street View), using satellite. It also provides Real-Time traffic conditions of roads (Google Traffic) using users mobile data, and also provides short route planning for person who is traveling by foot, car, bicycle or public transportation. To get the directions through public transportation, driving, walking, or biking user can use Google Maps. Google Map application is present in Android play store as well as on iPhone. User can also access google map through google map web site. Google Map provides turn by turn navigation, Street View. Now google has also tie up with government of country to get the information of public transport. After the update in June 2012 google also introduce new feature to store the map of certain region on mobile which helps user to access map offline. Recently in 2017 Google introduce new feature of google map for USA which provide information regarding parking spots in city and In India for improvement of traffic accessibility google also provide two wheeler mode.

4.3. Arduino

Arduino Uno based on Microchip ATmega328P. It is open source micro controller. It contains a set of digital input and output pins that may be connected to various sensors and modules or circuits. It has 14 I/O pins and 6 analog I/O pins. Arduino Uno is programmable with Arduino IDE using Type B USB cable. It can be powered by 9 volt battery or usb power cable. Uno communicates using STK00 protocol. FTDI USB to serial driver chip does not used in Uno. Instead of that it uses Atmega 16U2 programmed as USB to serial converter.

5. Implementation

This project consists of hardware and software. Hardware contains Arduino and HC-SR04 ultrasonic sensor, and HC-06 Wireless Bluetooth Transceiver RF Master Module for Arduino.

Software contains Android application which will get data from Arduino and perform operations on that data.

5.1 Module at Arduino

First HC-SR04 Ultra Sonic sensor will measure the distance between the tank surface and sensor and send the readings to Arduino. Where Arduino will perform calculation based on tank height, volume and based on those predefined formula we will find out no of liters of petrol in tank. By using Bluetooth module, we will transmit data from Arduino to android app.

5.2 Android Application

In Android Application we are using google map where user will select the source and destination location where user wants to travel and based on data (number of liters) application will point out the location between source and Destination where vehicle will be out of fuel.

4. CONCLUSION

In this proposed system, stealing of fuel is avoided and the stealing of fuel from petrol pump will come to an end, which will decrease the corruption. Due to this, system will be more reliable. This system will obtain the accurate readings of fuel and provide result in human readable form. This system will also provide approximate distance in google map which vehicle will cover using current fuel present in tank. Ensure the user will ride their vehicle without worrying about how much distance will their bike will cover.

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