



Web Based Fuel Statistic Monitoring for Automobiles

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Abstract:

The purpose of this system is to develop or monitoring the fuel. In today's world, actual record of fuel filled and fuel consumption in vehicles is not maintained. This Web Based Fuel Statistic Monitoring system is often used for maintain the fuel records. Transportation, traveling is the biggest business in all over the world. For that purpose this real time system is used. In a travel agencies, owner having all real time information about the fuel records as well as fuel tracking in the vehicles by using the Magnetic Reed Relay sensor. This Magnetic Reed Relay sensor which works according to the principle of Hall Effect for sensing the amount of fuel filled in the vehicle and amount of fuel consumed. Then this record is stored in the system memory. This system stores the record for several logs. Real Time Clock (RTC) is also provided to keep the track of time. These records get updated after 30 seconds so real time information is shown to the authorized person. Only the authorized person used this system so another person cannot get the details about vehicles. So this system is used in travel agencies vehicles like buses, car, and truck as well as in government buses. Also this system is useful in the college buses, school buses etc.

Keywords: Internet of Things; Micro-controller; Magnetic Reed Relay Switch.

I. INTRODUCTION

Fuel management system are used to maintain, control and monitor fuel consumption and stock in any type of industry that use transport, including rail, road water and air, as a means of business. Fuel management system using the web-based system for development of automatic dissemination of Data and Report, enabling scheduled report and more intelligent supervisory function[1]. Now a day, fuel is used in all over the world widely. The amount of fuel also decreases in all over world, that why corruption of fuel rapidly increases. So basically this system is used to control the corruption of fuel in vehicle[13]. Fuel management system is establishment of a fuel consumption monitoring system is required. Fuel monitoring system, a system which was capable of precisely monitoring and calculating the fuel consumption was designed. Fuel management system can be used to monitor the level of fuel using the sensor (magnetic reed relay switch), which works on the Hall Effect[1,13]. Some common features of Web Based Fuel Monitoring system include Driver Monitoring.

Driver Monitoring: The basic goal of this system is to monitoring the behavior of driver. Owner can be observing the consumption of fuel. He/she can also observe misbehavior of the driver.

II. WEB BASED VEHICLE SYSTEM

In this case vehicle tracking and the fuel level tracking system can be observed using the dynamic web page. This system is very beneficial for the transportation business using that system owner of transportation section that can be observe his vehicle using web side. Owner can be view the fuel level of vehicle using the web page and this system is very beneficial to observed the fuel level, on which track vehicle are goes, and monitor the behavior of the driver using that system. If driver can be fraud or consumption of fuel in that case so much loss of the owner[7].

III. SENSOR MODULE

Sensor is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument. A thermocouple converts temperature to an Output voltage which can be read by a voltmeter. For accuracy, most sensors can be calibrated against known standards[13].

A. Study on Automotive Fuel Sensors:

The main types of fuel level indicative sensors are:

1. Wire wound
2. Thick Film Resistor
3. Tubular with wire resistance
4. Tubular with Reed Switch
5. Capacitance

B. Benefits:

1. Contacts hermetically sealed.
2. Most economic non touch switching solutions
3. Various methods of actuation principles
4. Magnetic and electric pole independent
5. Various sensitivity ranges available

C. Applications:

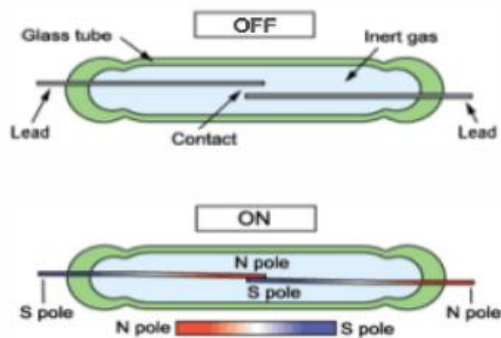
1. Four Wheelers
2. Two Wheelers

D. Fuel Level Sensor - Using Reed Switch:

A Fuel level sensor incorporates a reed switch in a stem. An external float with a magnetic inside passes and actuates the Reed switch depending on the liquid level.

E. Reed Switch:

It is a small electro mechanical device having two Ferromagnetic reed blades sealed in a glass envelope. When a Magnetic field is brought near to this, reeds will close creating the switching functions.



Figuw.1. Working Mechanism of Reed Switch

F. Working of Reed Switch

This consists of a pair of ferro magnetic reeds, hermetically sealed in a glass tube. The free ends overlap at a very small distance. A magnetic field (from an electromagnet or a permanent magnet) will cause the reeds to get closer, thus closing an electrical circuit. The reeds' hardness causes them to separate, and open the circuit, when the magnetic field increases. Sensitivity is an important quality of a switch; the magnetic amount necessary to actuate it. In ampere-turns, sensitivity is measured, relevant to the coil current which is multiplied by the number of turns. Commercial devices have sensitivities in the 10 to 60 AT range. The lower the AT, the reed switches are more sensitive.

Mathematical Model for Magnetic Reed Relay Switch

$S\{D, B, f1, f2, 0\}$

where,

D = Fuel Level.

B = Binary conversion output.

F1 = Decimal to binary conversion.

F2 = Count function for fuel level.

Mathematical module with functions

S = Magnetic sensor.

F1 = B = D – 4-bit binary number.

F2 = count binary string.

F2 = 0 = Fuel level output.

For calculate area/Volume = $1/2 * \text{length} * \text{height} * \text{breadth}$.

G. Micro-controller

In this system the ATmega328 micro-controller is used. It is a single-chip micro-controller created by Atmel in the mega AVR family [10].

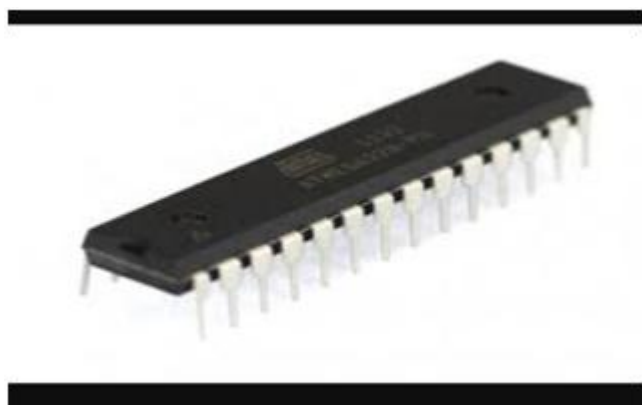


Figure.2. ATmega328 Micro-Controller

The Atmel 8-bit AVR RISC based micro-controller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose Input/Output

lines, 32 general purpose working registers, three flexible timer / counter with compare modes, internal and external interrupts, serial programmable USART, a byte oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLAF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz [10].

Application: ATmega328 is a simple, low powered, low cost micro-controller. Perhaps the most common implementation of this chip is on the popular Arduino development, namely the Arduino Uno and Arduino Nano models [10].

H. MSSQL

MSSQL stands for Microsoft Server Query Language. It is used to store real time data. All the real time data which is sent by micro-controller is stored in mssql for that purpose. RTC (Real Time Clock) is used. This real time information is used for display details on a web page.

IV. RELATED WORK

Yen-Jen Chen et al. describes the system. Fleet Management System (FMS) is a highly applicable system which gets more attention among industrial fields. Recent years, fuel consumption has become a most concerned topic; hence, establishment of a fuel consumption system is required. In this study, based on the FMS, a system which was capable of precisely monitoring the fuel consumption was designed [3]. Nicola Zingirian et al. describe about the Sensor Clouds for Intelligent Truck Monitoring presents a new service for Vehicle Communication Platforms (VCPs), based on the Sensor Cloud concept. According to this service, VCPs make available their components, including vehicle sensors and devices, to vehicle monitoring applications, as virtual resources [13]. Yingjun Ma et al. describe about the Solving the Fuel Transportation Problem Based on the Improved Genetic Algorithm, the model constructed by using the genetic algorithm for fuel transportation problem has a certain reference value for solving similar problems, especially improving the traditional model [1]. J. A. Goundar et al. describe about the Mechatronic Design Solution for Fuel Level Monitoring using a sensor named as Pressure Sensor. This project was able to show that simple available hardware and technology can be used to construct a robust fuel level monitoring system. The system designed and tested in this project presented the robustness of the algorithm and also the low construction cost of the system [11].

V. MODULE PROBLEM STATEMENT

Nowadays the concept of fuel consumption is rapidly increasing as technology advances. Fuel is used all over the world. Basically, a fuel management system is mainly used in the transportation section, bus, government transporting vehicles. So, corruption of fuel is increasing. To overcome this problem, this proposed system is used. The fuel management system includes fuel management using the Hall Effect sensor. Using that sensor, the level of the fuel is controlled, the corruption of the fuel is monitored, and the behavior of the driver is controlled. For that purpose, the sensor is fixed in the fuel tank and the micro-controller calculates the level of fuel. It is converted into a binary pulse, and then all the information can be sent to a web page using the ASP.NET dynamic web page.

This web page can be updated after 30 seconds using the real time clock.

VI PROPOSED SYSTEM

Fuel Management system works on the Internet of Things (IOT). In this system magnetic reed relay sensor can be used. This sensor is fixed in the fuel tank using the pipe that can be measure or monitor the level of the fuel. In that sensor open or close float switch is use, if level of the fuel is rises than float switch is close, if level of the fuel is decrease than float switch is open. Micro-controller is calculating the level of the fuel and convert into binary pulse and then all data goes to the web server. In web server connected the windows application, asp dot net and SQL server. In SQL server store the whole data of the fuel and the location of the fuel and it can be updated after 30 sec using the real time clock.

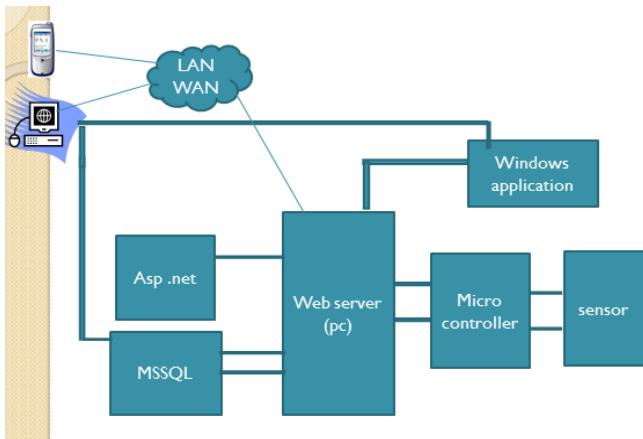


Figure.3. Architecture Block Diagram of Fuel Management System

Asp .net is a design a dynamic web page or stored the data on SQL server, using the mobile phone, personal computer and laptop. Only authorized person can view all the information of vehicle.

PROJECT CONSTRAINTS

There are still some of the challenges which are to be yet overcome by Web Based Fuel Monitoring and Statistic for all the vehicles. This system cannot be used in two wheelers. As the fuel size is different so the size of sensor and micro-controller is also different for different vehicles. So basically size of these sensors is different for different vehicles.

SYSTEM RES ULTS



Figure.4. Log in page

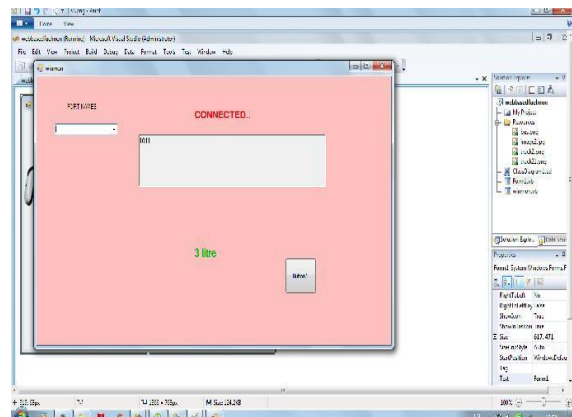


Figure.5. Monitored Fuel Level in Tank of Vehicle

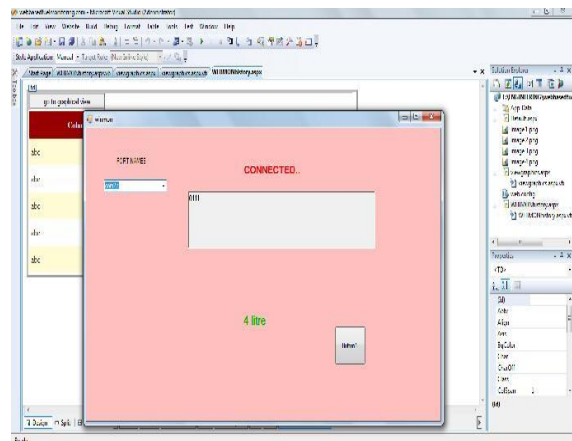


Figure.6. Monitored Fuel Level in Tank of Vehicle

fuel_level	event_occu
4 litre	04-04-2017 13:35:07
4 litre	04-04-2017 13:35:06
4 litre	04-04-2017 13:35:05
4 litre	04-04-2017 13:35:04
0 litre	04-04-2017 13:35:03
4 litre	04-04-2017 13:35:02
4 litre	04-04-2017 13:35:01
4 litre	04-04-2017 13:35:00
4 litre	04-04-2017 13:34:59
4 litre	04-04-2017 13:34:58
4 litre	04-04-2017 13:34:57
0 litre	04-04-2017 13:34:56
0 litre	04-04-2017 13:34:55
4 litre	04-04-2017 13:34:54
4 litre	04-04-2017 13:34:53
4 litre	04-04-2017 13:34:52
4 litre	04-04-2017 13:34:51

Figure.7. Run-Time Fuel Level Record/Entry in Database

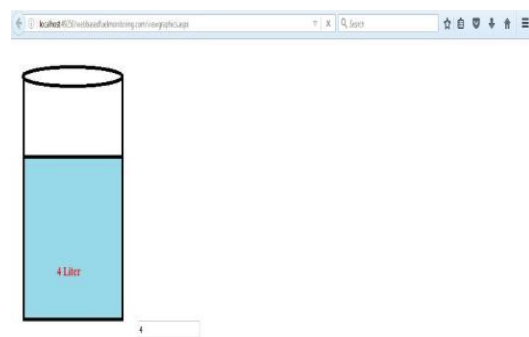


Figure.8. Graphical View of Fuel Level

VII APPLICATION

This proposed system is used in the different sectors of transportations, that includes government as well as private sectors. Some applications of this proposed system are given below:



Figure.9.Travel Agencies



Figure.10.Four Wheelers



Figure.11.Transportation Truck

VIII. CONCLUSION

This paper proposed a new system for observation of fuel level by using sensor. Fuel sensors input has been fed into controller and its output response is analysed for that Magnetic Reed Relay Sensor is used. Input is observed by sensor and calculations take place by micro-controller. All the digital calculation can take place by micro-controller. Information store in the web server i.e. SQL server. For the dynamic web page ASP.net is used by using this server output is display on web side. By using Web-page authorized person can see this information.

IX. FUTURE SCOPE

Location Tracking: This system mostly used in transportation business. For that purpose owner can observe the details of vehicle using location tracking.

Cabin Monitoring: In this we can observe the live driver behavior means is driver drunk, smoking, or how many people's are suffer and watch on them by using CCTV camera. We easily get the runtime situation its help us to take decisions about assigning drivers.

X. ACKNOWLEDGEMENT

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