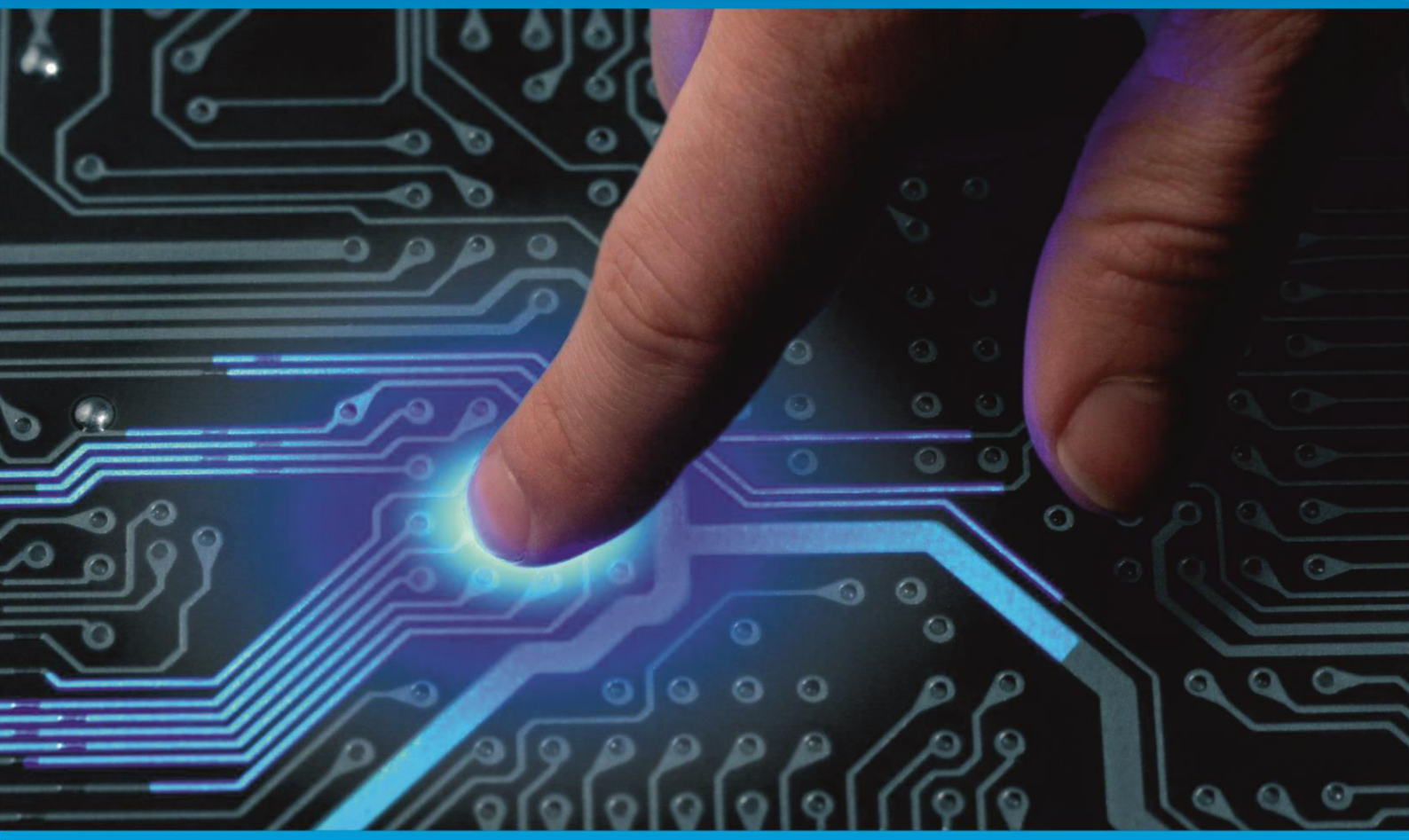
IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 9, Issue 3, March 2021

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

9940 572 462 | 6381 907 438 | ijircce@gmail.com | www.ijircce.com

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 3, March 2021 ||

| DOI: 10.15680/IJIRCCE.2021. 0903118|

IOT Based Fuel Monitoring and Indication Device

Gokulavasan B[1], Anushankari R[2], Dhanasekar A K[3], Dharsini L[4], Jayashree V[5]

Assistant Professor, Dept. of ECE, Sri Eshwar College of Engineering, Coimbatore, Tamilnadu, India

Student, Dept. of ECE, Sri Eshwar College of Engineering, Coimbatore, Tamilnadu, India

Student, Dept. of ECE, Sri Eshwar College of Engineering, Coimbatore, Tamilnadu, India

Student, Dept. of ECE, Sri Eshwar College of Engineering, Coimbatore, Tamilnadu, India

Student, Dept. of ECE, Sri Eshwar College of Engineering, Coimbatore, Tamilnadu, India

ABSTRACT: In today's world, actual record of fuel filled and fuel consumption in vehicles is not maintained. By taking this as an advantage, fuel bunkers are stealing fuel and this cannot be noticed by users because we have no control over the machine. To avoid , monitoring machines are carried out via an Internet of Things, a system that aims at reducing the possibility of financial loss.

KEYWORDS: Internet of things; Fuel consumption;Fuel Bunkers;Monitoring Machine; Reduce Financial loss.

I. INTRODUCTION

With the increasing amount of vehicles day by day, the fuel consumption is also increasing. We are already aware that motor vehicles display the amount of fuel in the fuel tank by means of some indication like bars running through the E(empty) and F(full) indicators, this specification that each bar maps to the corresponding liters of fuel approximately. Due to this every one of us might have experienced the problem with the improper estimations of the current fuel level in the tank with the existing bars representation system. As the world is getting digitized, we are representing the fuel level in digitized form. Internet of Things (IOT) is a concept and a paradigm that considers presence in environment of a variety of things that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things to create new applications/services and reach common goals. A world where the real, digital and the virtual are converging to create smart environments that energy, transport, cities.

II. SYSTEM ARCHITECTURE

IOT based totally fuel monitoring and tracking device has carried out to overcome Fraud at petrol-pumps. At an instant, when agents begin filling gas in the car tank the flow sensor gets activated and provides a collection of pulses proportional to immediate waft rate. It converts pulses into liters and ships it to the ESP8266. It works on the Hall-Effect sensor model. ESP8266 is hardware which stores information and ships it to server throws Wi-Fi setup. It is more cost effective than other hardware. The ESP8266 sends the facts to the cloud server. The communication between ESP8266 and cloud servers takes place by HTTP protocol. Different algorithms are used in this communication to increase safety like SHA (secure hashing algorithm) and AES (Advanced Encryption Standard). The stores data and similarly sends it to the application. Since, customers get facts about currently inserted fuel. User application is primarily based on PHP, MYSQL. This project mainly based on focusing fuel efficiency in the world of rising petrol prices.

III. PROBLEM STATEMENT

Petroleum is used extensively in modern day life. India has developed sufficient processing capacity over the years to produce different petroleum products. As result, India is now a net exporter of petroleum products. The export of petroleum products increased from 40.75 MT in 2007-08 to 65.51 MT during 2016-17. The import of petroleum products increased from 22.46 MT in 2007-08 to 36.29 MT during 2016-17. Petroleum is used extensively in Modern day life. Petroleum provides fuel to run vehicles, cook food and generate electricity. Apart from being used as a fuel petroleum has its applications in products that we utilize daily. In today's world, actual record of fuel filled and fuel

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 3, March 2021 ||

| DOI: 10.15680/IJIRCCE.2021. 0903118|

consumption in vehicles is not maintained. It results in a financial loss. To avoid this we are implementing a microcontroller based fuel monitoring and vehicle tracking system.

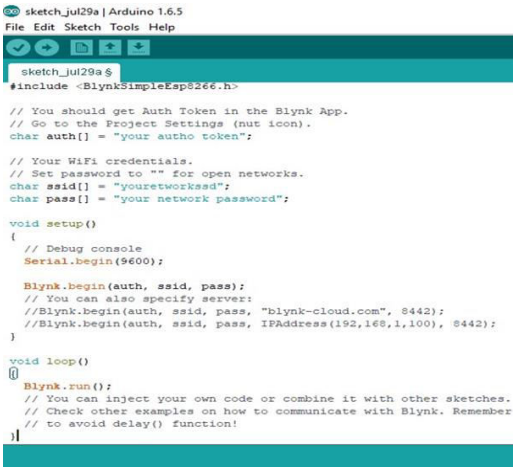


Figure 1. Embedded Code

III SYSTEM SPECIFICATION

1. Node MCU:

Node MCU V3 is an open source IoT stage. It utilizes the Lua scripting dialect. The Lua venture is the premise of board, and based on the ESP8266 SDK 1.4. This utilizes many open sources and continues running on the ESP8266 Wi-Fi Source module where ESP8266 is a straightforward Wi-Fi chip. The term "Node MCU" by default refers to the firmware rather than the dev kits. Node MCU firmware was developed so that AT commands can be replaced with scripting making the life of developers easier. So it would be redundant to use AT commands again in Node MCU. Node MCU v3 is a development board which runs on the ESP8266 with the Espress if Non-OS SDK, and hardware based on the ESP-12 module. The device features 4MB of flash memory, 80MHz of system clock, around 50k of usable RAM and an on chip Wifi Transceiver.

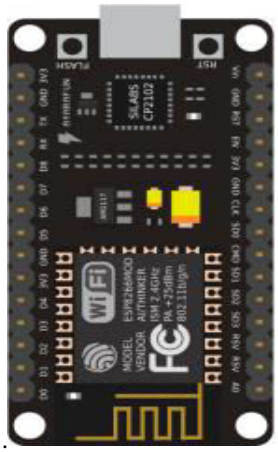


Figure 2. Node MCU

2. Features:

- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 3, March 2021 ||

| DOI: 10.15680/IJIRCCE.2021. 0903118|

- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 Mhz
- Wi-Fi: IEEE 802.11 b/g/n:
- Integrated TR switch, balun, LNA, power amplifier and matching
- network
- WEP or WPA/WPA2 authentication, or open networks

✓ Upload Speed: 115200 – Baud rate and determines the communication speed between the computer and the development board

✓ CPU Frequency: 80 MHz – MCU frequency

✓ Flash Size: 4M (no SPIFFS) – NodeMCU flash size

.

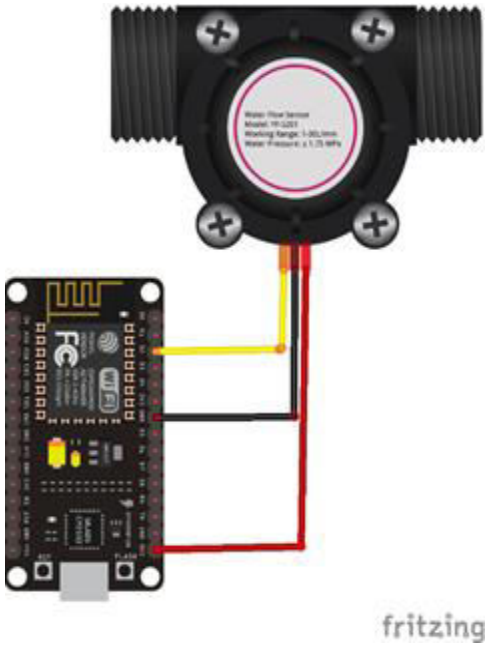


Figure 3. Flow Diagram

3. FLOW SENSOR:

Sensors play a very crucial role in today's automatic systems. Being a small, low cost and reliable device, sensors are easy to embed with larger electronics.

Today we can find various types of sensors in the market. With the advance in technology, sensors are also evolved in their functioning and size. From the early size of cm units, the size of sensors has shrunk to the scale of nm. Sensors have also solved many challenges of electronic and electrical engineering such as finding the intensity of ambient light, determining the temperature in the furnace, calculating humidity of surrounding, etc…. Water flow sensor gives an amazing solution for measuring the flow rate of liquids.Huge industrial plants, commercial and residential buildings require a large amount of water supply. The public water supply system is used to meet this requirement. To monitor the amount of water being supplied and used, the rate of flow of water has to be measured. Water flow sensors are used for this purpose.

Water flow sensors are installed at the water source or pipes to measure the rate of flow of water and calculate the amount of water flowed through the pipe. Rate of flow of water is measured as liters per hour or cubic meters.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 3, March 2021 ||

| DOI: 10.15680/IJIRCCE.2021. 0903118|

Water flow sensor consists of a plastic valve from which water can pass. A water rotor along with a hall effect sensor is present to measure the water flow. When water flows through the valve it rotates the rotor. By this, the change can be observed in the speed of the motor. This change is calculated as output as a pulse signal by the hall effect sensor. Thus, the rate of flow of water can be measured. The main working principle behind the working of this sensor is the Hall effect. According to this principle, in this sensor, a voltage difference is induced in the conductor due to the rotation of the rotor. This induced voltage difference is transverse to the electric current. When the moving fan is rotated due to the flow of water, it rotates the rotor which induces the voltage. This induced voltage is measured by the hall effect sensor and displayed on the display.

Q=V*A

Q is flow rate/total flow of fuel through the pipe.
V is average velocity of the flow.
A is the cross-sectional area of the pipe.

Figure 4. FLOW SENSOR

4. POWER SUPPLY:

The potential transformer will step down the power supply voltage (0-203V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op-amp. The advantage of using precision rectifier is it will give peak voltage output as DC, rest of the circuits will give only RMS output.

Applications:

Water flow sensors can measure the rate of flow of water either by measuring velocity or displacement. These sensors can also measure the flow of water like fluids such as measuring milk in a dairy industry etc…

5. EMBEDDED C:

Embedded C Programming Language, which is widely used in the development of Embedded Systems, is an extension of C Program Language. The Embedded C Programming Language uses the same syntax and semantics of the C Programming Language like main function, declaration of datatypes, defining variables, loops, functions, statements, etc. Embedded C based on DSP-C allows the design of fixed-point data types and named address spaces.

SOFTWARE COMPONENTS

The Software used is Java JDK Platform Based Arduino IDE with embedded C programming language with various libraries.

Arduino Integrated Development Environment (IDE)

Arduino IDE is available for Linux, Windows and macOS. The first task to do is to download and install the latest version according to your operating system. Once Arduino IDE is installed, we need to add a set of ESP8266 board definitions. To do that, go to File -> Preferences, then click in the Additional Board Manager URLs button in the Settings tab.

Deploying Actions

- ✓ **Verify** – Check that the sketch code is correct

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 3, March 2021 ||

| DOI: 10.15680/IJIRCCE.2021. 0903118|

- ✓ **Upload** – Deploy the sketch to the board
- ✓ **New** – Create a new sketch
- ✓ **Open** – Open a sketch
- ✓ **Save** – Save the current sketch

IV. LITERATURE SURVEY

1. IoT Based Implementation of Vehicle Monitoring and Tracking System Using Node MCU

Padmaja explains about the Smart Vehicle Tracking System using IOT Technology. In [1] the author proposed a system for vehicle monitoring and tracking systems using the Blynk platform acting as a medium for data transfer and visualization. This system is implemented using Ultrasonic sensor, Gas sensor, IR sensor, Temperature sensor, GPS. The reviewed paper used Blynk for monitoring whereas the proposed system used mobile application for monitoring.

2. GPS Live Tracking of Buses and Fuel Monitoring System Using Arduino
Gullipalli, S., Karri, Y. and Kota, S.explains about the Smart Fuel Monitoring System using IOT. In [2] Author proposed a system to consist of an arduino, GPS, GSM, fuel sensor and speed sensor. It provides the outcomes from the interaction between the system devices, which are on the bus, web application and desktop application. The reviewed paper used GSM for sending data whereas the proposed system used NodeMCU (ESP8266) for sending data and it used a web application to monitor the system whereas the proposed system uses a mobile application to monitor the system.

3. Aiding Navigation for Visually Impaired Persons
C.Priya,C.Ramya,S.Dhanasekar,Swathi.R,Vaishnavi.S,Yugeshwari.G using IoT.The existing system [3] developed was used to detect the obstacles and the system that was proposed is used to detect the people before them.

4. Countourlet transform based adaptive nonlinear diffusion filtering for speckle noise removal in ultrasound images
L.Jubairahamed.,S.Satheeshkumaran.,and C.Venkatesan. This [4] scheme improves the speckle noise removal using contour let transform based multiresolution analysis combined with anistropic diffusion filtering.These papers focus on home automation,raspberry pi identification and security compared to current work.It keeps the users relaxed and easy.

5. Simulation and implementation design of multi-mode decoder for WiMAX and WLAN applications
M.K.Roberts. By exploring [5] the properties of the layered decoding scheme, an enhanced quasi-cyclic low-density parity-check (QC-LDPC) code with sub-matrix re-ordering and layered decoding scheme is employed to offer adequate flexibility for parallel degree optimization and convergence speed.
6. Real Time GPS Vehicle Tracking System

Alshamisi, H. and Kepuska, V. explains about the Real Time GPS Vehicle Tracking System. In [6]the author proposed a system to track the vehicle by using GPS and GSM technology. The GPS and a GSM modem with an Arduino MEGA2560 which is attached to the vehicle. The reviewed paper used GSM to send data whereas proposed system use NodeMCU (ESP8266) which has built in WiFi chip to send data in database.
.

V. CONCLUSION

The proposed system will provide an accurate and real-time fuel monitoring system. This is a suitable and practical solution for fuel monitoring and location tracking. Therefore this system can be implemented in every vehicle to avoid facing fuel theft, finding the nearest fuel pump and vehicle location. The authors used a central monitoring system to control all vehicles by using the mobile application. Embedded C Programming Language, which is widely used in the development of Embedded Systems, is an extension of C Program Language. The Embedded C Programming Language uses the same syntax and semantics of the C Programming Language like main function, declaration of data types, defining variables, loops, functions, statements, etc. Embedded C based on DSP-C allows the design of fixed point data types and named address spaces. At that instant, the information of fuel transactions can be stored in the database of the system. This system overcomes the disadvantage of the existing system by calculating current filled fuel. The system application is developed on android smartphones; it can also give information of current location. As

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 3, March 2021 ||

| DOI: 10.15680/IJIRCCE.2021. 0903118|

the price of fuel varies at different locations. In the existing system there is use of Raspberry-pi which is more Costlier than ESP8266. There are also limitations in this system. Due to slow internet speed, there may be delay in information transformation and representation of web-application. In future further there will be enhancement of this application. Enhancing the system security from unauthorized access is also an open issue to develop.

REFERENCES

[1] Padmaja, B.V., et al. (2019) IoT Based Implementation of Vehicle Monitoring and Tracking System Using Node MCU. International Journal of Innovative Technology and Exploring Engineering, 8, 446-450.

[2] Gullipalli, S., Karri, Y. and Kota, S. (2018) GPS Live Tracking of Buses and Fuel Monitoring System Using Arduino. International Journal for Research in Applied Science & Engineering Technology 2278-2285.

[3]C.Priya,C.Ramya,S.Dhanasekar,Swathi.R,Vaishnavi.S,Yugeshwari.G using IoT," Aiding Navigation for VisuallyImpairedPersons". https://www.academia.edu/42118410/Aiding_Navigation_for_Visually_Impaired_Persons

[4]L.Jubairahamed.,S.Satheeshkumaran.,and C.Venkatesan,"Countourlet transform based adaptive nonlinear diffusion filtering for speckle noise removal in ultrasound images". https://www.semanticscholar.org/paper/Contourlet-transform-based-adaptive-nonlinear-for-Jubairahmed-Satheeskumaran/ae9d6bbe8d8ca56a9c80eb181277bbd1f4b03dfe

[5] M.K.Roberts.,"Simulation and implementation design of multi-mode decoder for WiMAX and WLAN applications". 2019/1/1,Journal:Measurement,Volume 131.
https://doi.org/10.1016/j.measurement.2018.08.051

[6] Alshamisi, H. and Kepuska, V. explains about the Real Time GPS Vehicle Tracking System," Real Time GPS Vehicle Tracking System". International Journal of Advanced Research in Electronics and Communication Engineering, 6,.

.

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor:
7.488

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर
NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details