

# Intelligent Vehicle Technology and Combustion Fuel Alert Using IOT

M. Kavitha, D. Atchaya, S. Pavithra

**Abstract---** Transportation is one of the major part of human growth. A life without Transportation is difficult. Due to increase in population the usage of Vehicle is also increased. So, this paper proposes Intelligent Vehicle Technology and Combustion fuel alert using IOT. Using this technology accident and fuel theft can be detected. The movement of vehicle is continuously monitored with the help of GPS and the information is given to web server through IOT. This technology also uses a brake sensor which detects the failure of the brake and hence major accidents are prevented. In case of any accident, the location of the victim is detected. Therefore rescue operation is being carried out. Fuel is monitored using flow sensor to avoid fraud at petrol pumps. Day by day petrol rate is updated in the LCD display, to alert the user.

**Keywords---** Microcontroller, Flow Sensor, Brake Failure Sensor, Vibration Sensor, GPS, Buzzer.

## I. INTRODUCTION

Transportation is one of the major part of human growth. Due to increase in population the usage of vehicle is also increased. There are various methods the fuel level, to detect accident location using IOT. Cloud computing is an emerging Technology in which central sever is used to maintain information and some of the important records. IOT is a technology which connects different devices with the help of Internet [1]-[2].

To avoid the financial loss in terms of fuel consumption in vehicles the fuel monitoring and tracking system is implemented [3]. The Reed switch which is used in this system, which works on the principle of hall effect. The flow sensor will be activated when the fuel starts to flow. It works till the flow ends. Once the fuel flow is stopped, it will start to calculate the value. Then the amount of fuel is sent to the mobile. Otherwise the data is stored in cloud.

This system is implemented for wheeler especially for car. In this system [4] the user can able to understand their vehicle efficiency in the graphical manner. The fuel consumption will be more when there is a increase in speed, worst road conditions during traffic all these factors. with the help of speed sensor and terrain sensor the mileage of the vehicle will be tracked. By tracking mileage of the vehicle the user can maintain their vehicle easily.

In [5] fuel monitoring in a vehicle to reduce economic loss by using IOT is proposed. The hall effect sensor is used to measure the quantity of fuel. This will be provided to the ESP8266 Wi-Fi chip. This Wi-Fi will provide data to the

server then from the server the information will be sent to the users android app. To avoid economic loss in terms of fuel consumption this system is implemented. S.Kumar Reddy mallidi [6], proposed a system to detect accident in a early time and also to prevent theft by using IOT devices and Raspberry pi and GPS. It uses machine learning based image classification. The Raspberry pi will capture the image and the data will be sent to the Authority. The GPS used to locate the accident place. To reduce no of thefts and severe injuries in accident this SVMS is implemented.

Abinayaa Balasundaram [7], proposed a technology to measure the emission of vehicles. This method is to monitor air pollution in surrounding area with the help of IOT and Gas sensor. The system very useful especially in urban areas. The amount & level of toxic wastes will be sent to the vehicles owner via message and also to the agencies of National Environments. To reduce the Air pollution level this system is implemented.

Manaswami sharma [8] proposed to prevent the accidents in Industries, houses due to gas leakages by using IOT and Embedded system. To ensure safety in terms of gas leakages this system is implemented. Javier Rochar [9] proposed as Drowsy Driving warning using IOT. With the help of Digital Image processing Technique and smartphone which will help to detect the drivers fatigue. The ultrasonic sensor will detects the obstacle in traffic collision warns the driver. To avoid accidents in traffic this system is implemented.

Emir Husni [10] implemented a method to reduce fuel consumption efficiency in a car rental company. With the help of IOT fuel consumption can be monitored in the mobile application. The car engine data is scanned by OBDII and send through Bluetooth to the Raspberry pi. The data is stored in the server then the stored data can be accessed through MQTT. So like this the VIScar system implemented successfully for rental company.

## II. EXISTING SYSTEM

Fig.1 shows the block diagram of existing system. The flow sensor is used to measure the fuel. The amount of fuel is displayed in the LCD.

The GSM module is used to send the message when the key is missed somewhere. The buzzer will be activated when the fuel is theft by someone. The key detection sensor will give the message to the owner. For the whole system the power supply is 5V. In Existing system, the user has to check the brake and fuel level manually. The brake level cannot be monitored in this system, the user has to check with mechanically.

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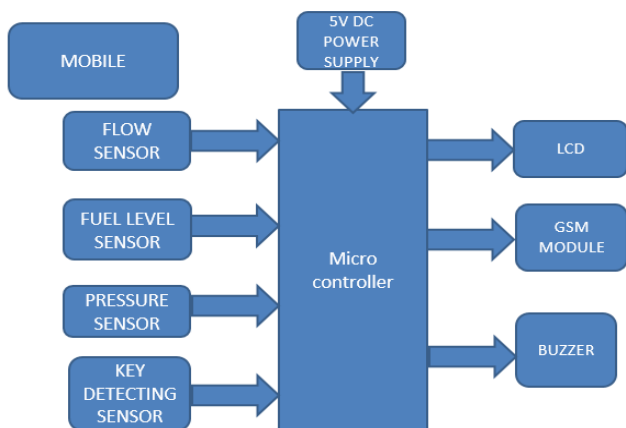


Fig. 1. Block diagram of Existing system

Drawbacks

- The Brake failure cannot be determined and the user will not receive any alert message, serious risk will leads to accident.
- Fuel flow level monitoring is not possible; there is no proper instrument to monitor the fuel flow rate.

We will not have update on petrol price day by day, the system is not updated.

III. PROPOSED WORK

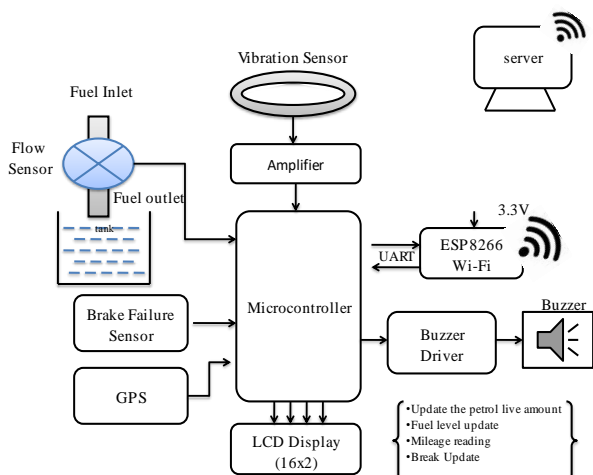


Fig. 2. Block diagram of proposed Intelligent Vehicle Technology

Fig.2 shows the block diagram of the proposed Intelligent Vehicle Technology. The fuel flow sensor which will be placed inside the pipe. So that when the fuel is inserted the flow sensor which gives the amount of fuel in terms of Liter. The Brake failure sensor will be activated when the wire condition is not stable in the vehicle. The vibration sensor will give the signal then the amplifier will amplify the signal and then sent to the Microcontroller. The GPS is used to find the Accident location. The message will be sent through the server.

Fuel Measuring System

In proposed system, the information and details about the bike and fuel can be updated automatically. The fuel flow sensor will detect the fuel flow level when the petrol filling process is taken over, the amount of petrol filled will

displayed on the LCD screen instantly; therefore user can view the amount of petrol filled by the petrol banker.

Brake Failure Alert System

The brake sensor are used to alert the driver when the brake has been failed, it will alert the driver through LCD, when the brake was in failure condition. Also it will display the fuel level before starting our journey.

Fuel Price Updation System

The server will update the day by petrol rate update to the vehicle user via Wi-Fi and it will display on the LCD. The server will send petrol rate information to user mobile as short message.

Accident Location Tracking System

This scheme can be fully automated to find the accident spot using GPS there by helping ambulance to reach the hospital in time. The vibration sensor uses piezoelectric plate which is used to continuously sense vibration of vehicle. When the accident happens, the information will be intimated to emergency contact as short message.

Advantage

- The brake failure can be detected in advance, so accidents can be avoided.
- The fuel flow level can be displayed, so we can avoid the corrupted or fraud petrol pump system.
- Day by day petrol rate is updated to the user.

IV. SIMULATION USING PROTEUS

Fuel level measuring

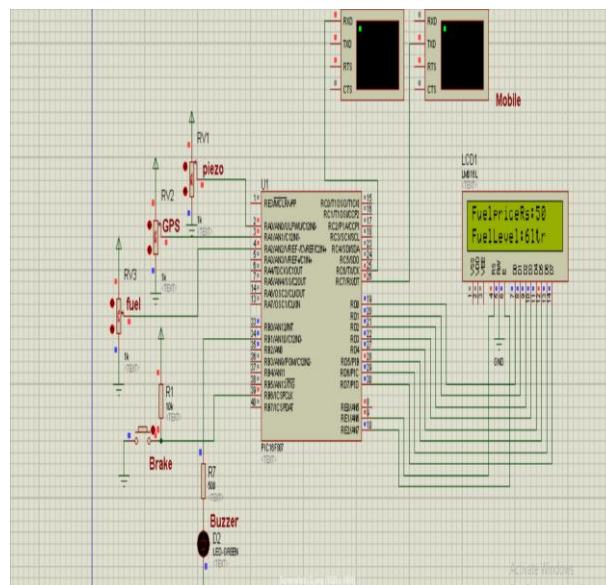
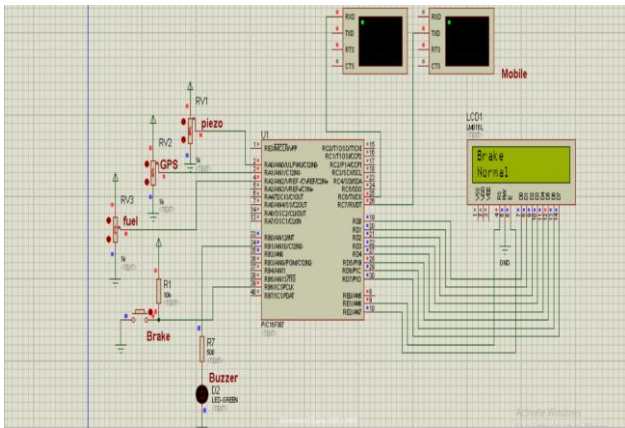


Fig. 3. Simulation of fuel measuring unit

When the fuel is entered into the petrol tank there will be a flow sensor which converts the flow range into electrical signal. So that the fuel level and price will be displayed in the LCD screen. Fig.3 shows the simulation of fuel measuring unit.



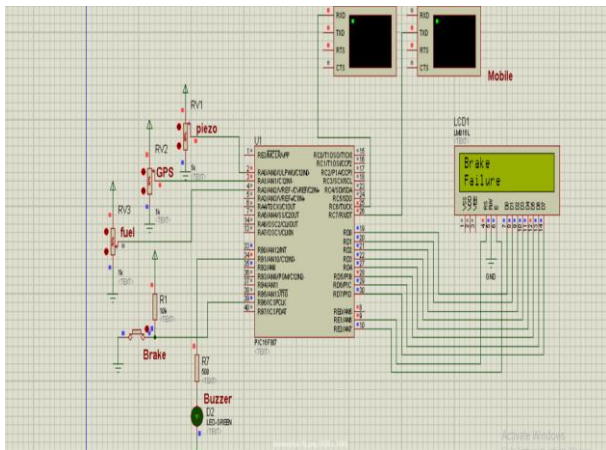
*Brake normal simulation*



**Fig. 4. Simulation of brake condition-normal**

When the brake is in normal condition the LCD will show as brake normal. And the buzzer will not give any alert signal. Fig.4 shows the simulation of brake condition (normal).

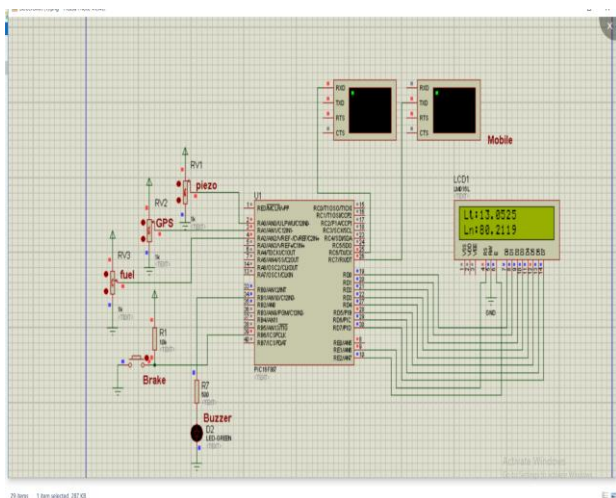
*Brake failure simulation*



**Fig. 5. Simulation of brake failure condition.**

When the brake condition is not good then the LCD will show as brake failure. And also the buzzer will give sound. Fig.5 shows the simulation of brake failure condition.

*GPS location simulation*



**Fig. 6. Simulation of GPS location**

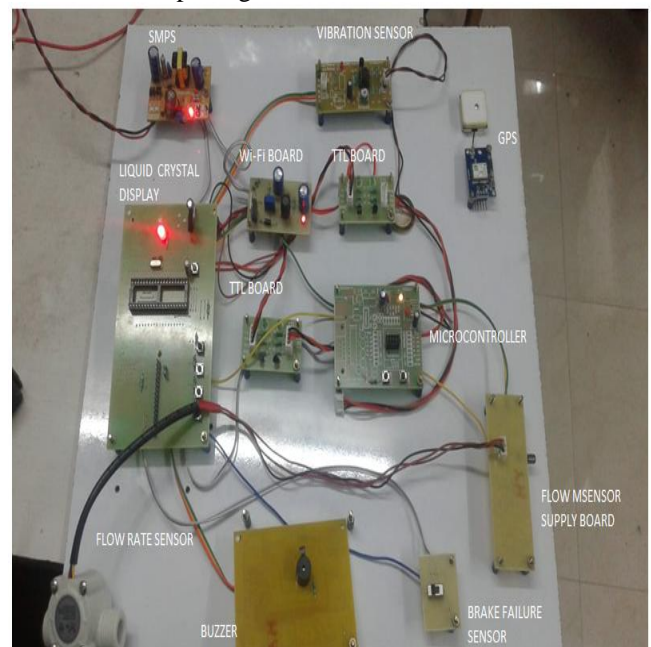
The accident location can be identified by using GPS. The signal which is given to the GPS can be obtained with the help of Vibration sensor and amplifier. The signal which is

obtained from vibration sensor is amplified and then given to the GPS. Fig.6 shows the simulation of GPS location.

**V. HARDWARE IMPLEMENTATION & RESULTS**

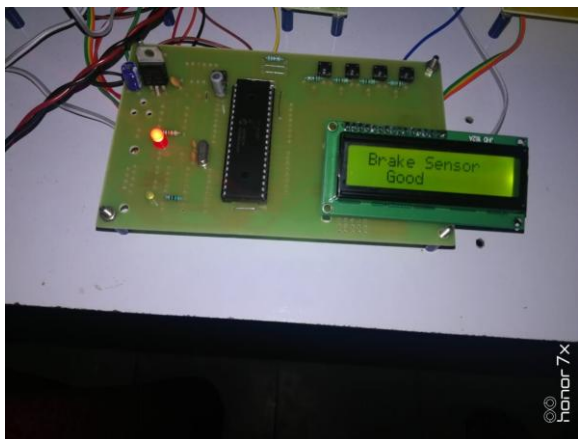
Fig.7 shows the implementation of hardware kit. The SMPS (Switch Mode Power Supply) converts 230V into 12V using rectification process and capacitor supplies power to all components. Here the PIC controller works under the voltage of 5V. The Wi-Fi Board and buzzer works under the voltage level of 3.3V. The Micro controller and the Wi-Fi board interface with one another and stores data into cloud. By using TTL (Transistor-Transistor Logic) board the desired voltage is given to Microcontroller and Wi-Fi board. A vibration sensor is used for accident alert. This sensor detects the accident by sensing the vibration of the vehicle and alert message is displayed in LCD as well as a Buzzer is also activated. In case of accident, GPS detects the location and alert message is given to predefined user which was already stored in the program as well as the message is send to the nearby Hospital, So that Ambulance can reach the location on time to save the victim. The increase in Day by day petrol price is being updated to the user with the help of web server through IOT. When the Brake failure occurs the brake failure sensor will give the alert message in LCD. The main aim is to monitor the petrol level in ml.

The flow sensor gets activated once the petrol bunk agent fill the fuel and the measurement of flow rate is proportional to number of pulses. When fuel is filled, the motor inside the flow sensor operates and converts non electrical signal in to electrical signal. The amount fuel can be calculated Depends on the time and pulse generation.



**Fig. 7. Hardware implementation**

Hardware output for brake normal condition



**Fig. 8. Output of Brake sensor-Normal condition**

The supply for Brake failure is given by SMPS and TTL. If the brake is normal the LCD screen will display as Brake sensor Good. Fig.8 shows the output of brake sensor (normal condition).

Hardware output for Abnormal condition



**Fig. 9. Output of Brake sensor- abnormal condition**

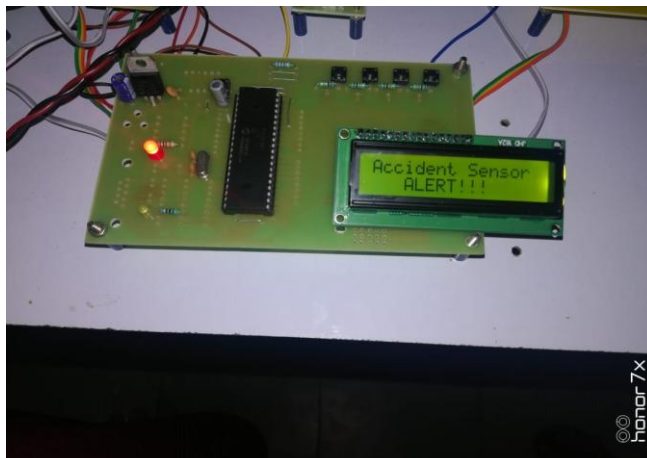
If any wire connection in braking system is not stable then it will display as Brake sensor Not Good. Fig.9 shows the output for Brake sensor (abnormal condition).



**Fig. 10. Output of Fuel measurement display**

At the instant, when fuel flows, the fuel measurement will convert the Non electrical quantity into electrical quantity. Then the amount of fuel and the rate of fuel is displayed on the LCD. Fig.10 shows the output for fuel measurement.

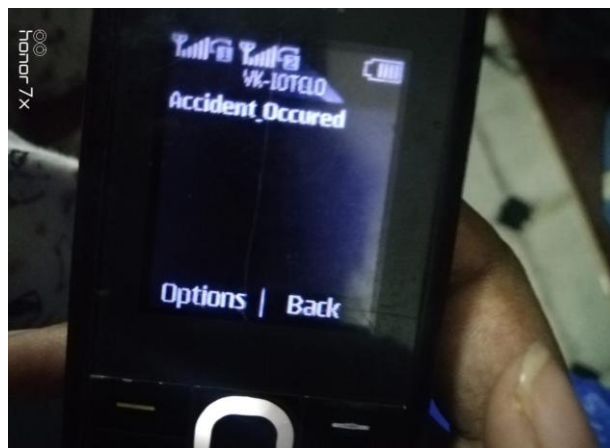
Hardware output for Accident alert system



**Fig. 11. Output of Vibration sensor**

During the accident there will be a vibration. The LCD will display that as Accident Sensor ALERT!!! Fig.11 shows the output of vibration sensor.

Output for Accident system



**Fig. 12. Alert message to the mobile**

The location which is identified by GPS. In server already the person family member and relative contacts are stored. When the accident is happened the message will be sent to those contacts with the location. Fig.12 shows the output for alert message to the mobile in terms of accident.

**VI. CONCLUSION**

An advanced intelligent vehicle technology and Combustion Fuel Alert (CFA) using internet of things has been proposed which is used in piezoelectric plate that sense the hit of vehicles and it will pass the information to the server end via WiFi to proceed further formalities like sending message to near by hospital and tracking ambulance and it will also send message simultaneously to the predefined user number which was already stored in the program. GPS unit is placed to detect the location of the vehicle. Hence, accident location can be detected to rescue the person and it also used to locate the vehicle in case of theft. Day by day petrol price is updated to the user through web server. To avoid the corruption in petrol quantity, a flow sensor is used to measure the petrol flow rate.



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