SYSTEM FOR VEHICLES USING CAN PROTOCOL FOR AUTOMATIC FUEL LEVEL INDICATOR AND TYRE PRESSURE MONITORING

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ABSRACT

This opined methodology has been designed to measure the fuel level automatically and inspect the tire pressure. Engineering and science have blessed humans with the invention of the automobile. Fuels for transportation, such as gasoline, diesel, etc., are sources of energy that power a variety of transportation devices, typically internal combustion engines. These transportation fuels are becoming more expensive. Recently, bunker fraud has been a common topic of conversation. The majority of gas stations today have modified the pumps so that they show the amount as entered, even though the amount of fuel actually put in the customer's tank is much less than the value shown. The owner of the bunker benefits from these kinds of manipulations. The petrol bunkers make enormous profits as a result, but the customers are also taken advantage of. Since most of the vehicles have analog meters, it is difficult to accurately determine how much fuel is currently in the vehicle or to double-check how much fuel is in the fuel tank. Normally, we gauge the fuel level using analog meters or the level indicator; however, these measurements are inaccurate. It can solve this issue by utilizing load cells. There is currently no feedback system in place for the fuel measuring system to prevent fraud. This approach enables us to solicit input from the tank. To prevent the cheating that took place in the fuel bunk, this device shows how much fuel was added to the previous batch. It notifies the user via voice output when petrol is nearby because people often forget to fill up in their busy lives. In this project, we concentrate on developing a digital display of the precise fuel level in the vehicle's tank, which also aids in verifying the fuel level filled at the petrol station. Additionally, there is no device to check tire pressure in the current system. The tire pressure value affects how safe and comfortable a vehicle is to drive. The tire pressure is continuously monitored by us. In this project, load cells are being used to gauge the fuel level in the tank. The precise amount of fuel will be detected by the load cell and serially transmitted to the microcontroller, which will then process it,

determine the quantity of fuel in the tank, and show the result on the LCD. Additionally, when the fuel tank is in reserve, it produces voice output. The amount of fuel in the engine is also shown. To warn of low pressure, a pressure sensor will be fitted to the tire.

INTRODUCTION

Automating is essential for all framework types. It is made possible by the installed structure, which frequently combines mechanical and PC frameworks and includes ongoing processing requirements. Nowadays, the majority of devices are typically controlled by robotization because it enhances the product by reducing the size and cost of the item while increasing its dependability and performance. The applications of implanted frameworks, which rely on microcontrollers, range from small devices to extremely complex structures. Digital technology is now being developed and used in many different industries, including computer, mobile, and controller technology. One of its applications is the fuel indicator in automobiles, which will help to know the exact the amount of fuel available in the fuel tank and tyre pressure monitoring system for vehicles is intended to be a tool that enshrines the balance performances of the vehicle. Therefore, this work paper's main objective is to accurately indicate the fuel's availability in the tank and monitor tire pressure digitally. An integrated system of hardware and software products called a fuel level indicator and tyre pressure monitoring system keeps track of both the fuel level and the pressure in any kind of vehicle. In a fuel level monitoring system, a load cell is used to determine the fuel level. This fuel level indicator has the added feature of alerting the user via voice output when fuel is approaching the reserve condition. People are currently taken advantage of by a few petrol bunkers who don't fill the fuel properly. To address this issue, a solution is offered in which the user can see how much fuel is still in the tank and how much has been added by the bunker. The behavior of a vehicle, such as its stability and fuel consumption, is directly impacted by tire pressure. Low tire pressure frequently causes tire damage and, as a result, can be fatal in some situations. This condition is regularly monitored with the pressure sensors. Load cells will measure the precise amount of fuel, pressure sensors will measure tire pressure, and temperature sensors will measure engine temperature. Data from these sensors will be sent to the CAN transceiver, which will then send the data in serial form to the microcontroller, which will then process the data, calculate the data, and display it on the LCD. As a result, the LCD shows the temperature, pressure, and amount of fuel in the tank. Additionally, when the fuel tank is in reserve, a voice output is produced.

LITERATURE SURVEY

1. THE SAMRT FUEL LEVEL INDICATION SYSTEM, Manadar Milind Gijre, Arjun Mane, Ramchandra Gadde, and Swati Gandhi focuses on developing a digital display of the precise amount of fuel contained in the vehicle's tank. It also helps in cross-checking the amount of fuel filled at the petrol station, determining the bike's mileage, and displaying the closest using GPS when the fuel tank enters reserve mode utilizing GPS, Hall Effect, Proteus, Ultrasonic Sensor, and Serial Transmission technologies.

2. **THE AUTOMATIC PREVENTION OF FUEL THEFT BY DRIVERS** is the focus of the Automatic Fuel Monitoring System, which was put forth by Rajesh Krishnasamy, Ramkumar Aathi, Booma

Jayapalan, K. Karthikeyen, and Mohamed Nowfal. It also provides a solution for how precisely the fuel bunk is filling the fuel for vehicles. Fuel indication system is present. Whenever the liquid level changes, it will send out an alarm signal using microcontroller, float sensor, fuel tank, GSM module, theft detector, alert system, and IC 741 technologies.

3. B. Anuradha, B. Priyadharsini, A. Yuvasri, and M. Yamuna's proposal for a **FUEL LEVEL INDICATION AND MILEAGE CALCULATOR USING IOT** focuses on implementing a digital way to view fuel target in a vehicle. Checking whether the fuel put into the vehicle is appropriate for the price stated. The float sensor is used to calculate the fuel level. Integrating level detection and mileage calculation. It estimates how far the vehicle will travel by using the distance.

4. Researchers Lukman Medriavin Silalahi, Mudrik Alaydrus, Agus Dendi Rochendi, and Muhtar Muhtar proposed a method to combine a **tire pressure monitoring system (TPMS) and a pressure sensor base (PSB)** with a specific reaction needed to fill tires automatically.

5. Tian Xiangjun's proposed TIRE PRESSURE MONITORING SYSTEM DESIGN AND RESEARCH. In this paper, a type of tire pressure monitoring system for automobiles is proposed.

COMPONENTS

1. key 1
2. key 2
3. Load cell (strain gauge)
4. Speaker
5. Voice kit
6. Arm7-lpc2148
7. Amplifier
8. Aurdino- uno
9. Temperature sensor
10. CAN transceiver
11. Pressure sensor
12. LCD

PROPOSED METHODOLOGY

The hardware and software components are both part of the suggested system. Using a combination of hardware and software products, this system primarily monitors the vehicle sensors and displays the fuel level, tire pressure, and engine temperature. The block diagram of the system is depicted in Figure 1 and the circuit diagram in Figure 2.

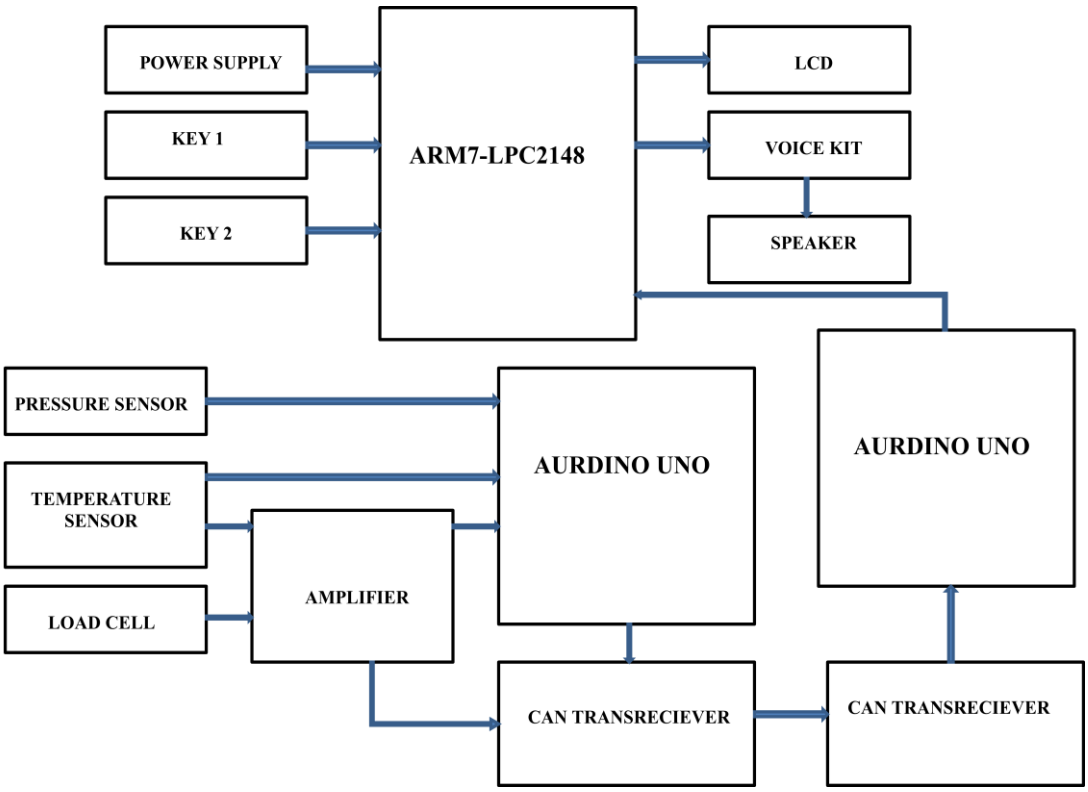

Figure1: Block diagram for suggested model

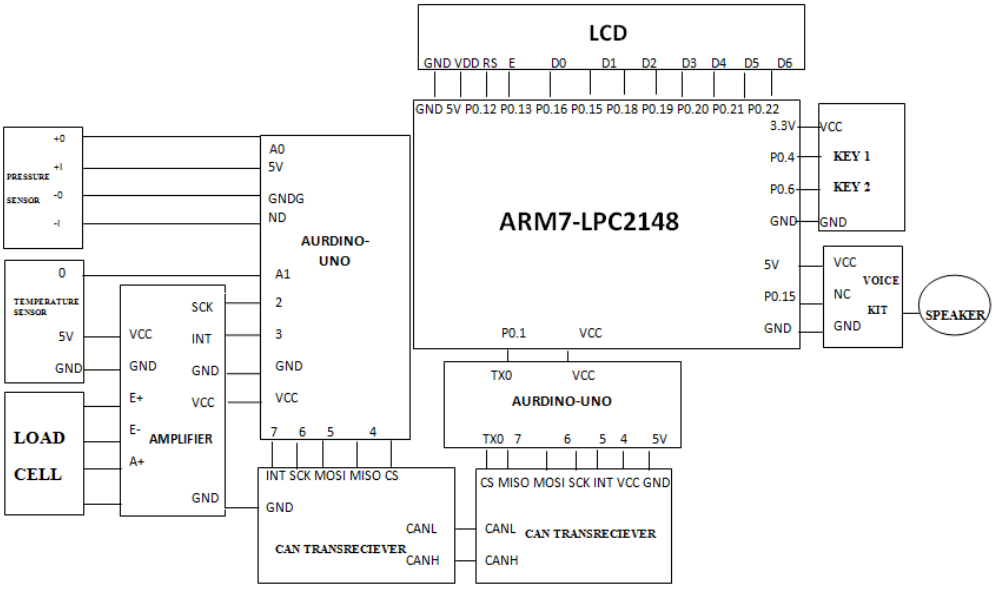

Figure2: Circuit diagram for suggested model

The required supply voltage for the system is 5 volts. We have an AC to DC adaptor for that. We use double-ended bending beam load cells to measure fuel. They have high accuracy and linearity, and they are

made of stainless steel. These load cells provide long-term, repeatable results in challenging industrial environments. A load cell is a transducer that transforms mechanical force into readable and writable digital values. When a load is applied to the load cell, weight is converted to voltage, then to millilitres. The temperature sensor is used to keep track of the engine's temperature. The signal from the load cell and temperature sensor is supplied as an input to the signal conditioning circuit, which amplifies it. It does this by converting an analog signal that has been altered into a digital signal that meets the criteria for the following stage of processing. The pressure sensor is used to keep track of tire pressure. This silicon piezoresistive pressure sensor produces a voltage output that is incredibly accurate and linear and is directly proportional to the applied pressure. A pressure sensor is an apparatus that detects pressure and converts it into an analog electric signal, the strength of which is dependent on the amount of pressure being applied. Due to the fact that they turn pressure into an electrical signal. The Aurdino microcontroller receives the output data from the signal condition circuit, temperature sensor, and pressure sensor and measures the information provided by these three vehicle sensors. The Aurdino microcontroller will transmit data to a CAN transceiver, which it will then transmit to a second CAN transceiver before being sent to the ARM processor, which will then display the data on the LCD display.

For verification purposes, the system uses a threshold value of 9 Pascal before displaying the pressure as "LOW pressure" on the LCD. Similar to this, the threshold is kept at 200 ml for demonstration purposes, but it can be adjusted to any desired value in the program. Below this threshold, fuel is indicated as being reserved and is displayed on the LCD. Additionally, the model includes a voice board that outputs the word "RESERVED". The speech recognition system is a programmable speech recognition circuit that is fully assembled and simple to use. customizable, in that you train the vocal expressions (or words) you want the circuit to be able to recognize. You can test out a variety of speech recognition technology features on this board. For additional development, it has an 8-bit data output that can be interfaced with any microcontroller. Home appliance control, robotic movement, speech-assist technologies, speech-to-text translation, and other interface applications are just a few of the possibilities. The project also includes a feature that protects the user from fuel fraud at the petrol station. As an answer In the beginning, the microcontroller is connected to two keys; press key 1 before adding fuel, and it will sense the data and display the amount of fuel in the tank on the LCD. After adding fuel, press key 2 after that. This will display how much extra fuel is added.

RESULT

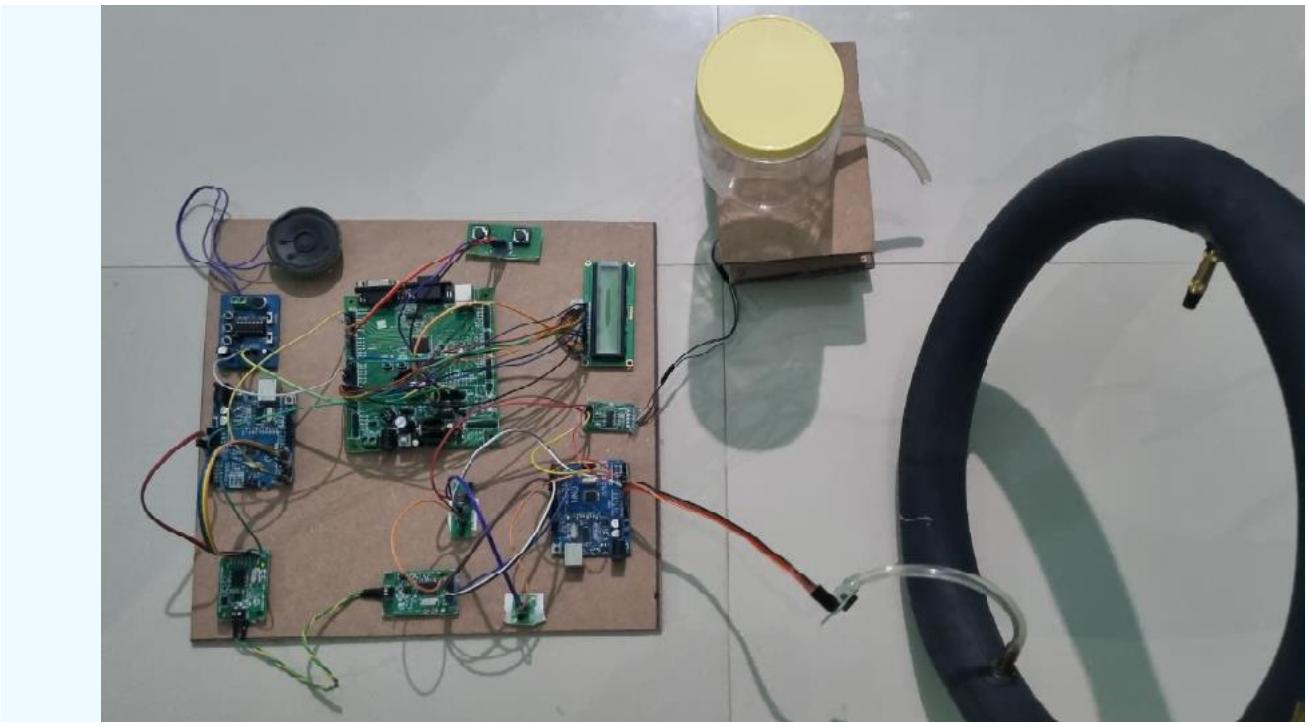

Figure3: Prototype for suggested model

The prepared prototype of the suggested methodology is shown in Figure 3. Through the load cell, the user will know how much fuel is in the tank. When fuel is getting close to the reserve condition, or when the fuel drops below the threshold value, the user hears a voice alert. A few petrol bunks who don't fill the fuel properly currently take advantage of people. The user can see how much fuel is in the tank and how much has been added in the bunk, resolving this issue. Additionally, the user receives information regarding tire pressure and can also signal low pressure when it falls below a predetermined level. The user receives data regarding engine temperature.

CONCLUSION

The advantage of the suggested system is that it can obtain a digital reading of the vehicle's current petrol level. Additionally, it offers a solution to the issue of fuel fraud that is discovered in fuel bunks when fuel is being refilled. Additionally, based on the threshold set to indicate the reserve, the system notifies the user via RESERVE voice output that fuel is in reserve. When the pressure in the tires is below the threshold, it indicates LOW pressure. Additionally, the engine's temperature is shown.

REFERENCE

[1] The Smart Fuel Level Indication System, proposed by Mandar Milind Gijre, Arjun Mane, Ramchandra Gadade, and Swati Gandhi.

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[4] Petrol level indicator with automated audio alert system proposed by R. Kalidoss, R. Praniha, P. Raveena, C. Revathy.

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[6] Design of Tire Pressure Monitoring System Using a Pressure Sensor Base proposed by Lukman Medriavin Silalahi1, Mudrik Alaydrus1, Agus Dendi Rochendi1, Muhtar Muhtar2.

[7] The Design and Research of Tire Pressure Monitoring System proposed by Tian Xiangjun.

[8] Smart Tire Pressure Monitoring System with Piezoresistive Pressure Sensors and Bluetooth 5 proposed by H. Fechtner, U. Spaeth, B. Schmuelling.