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Vehicle Fuel Theft Detection and Monitoring System

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***Abstract:** The improvement of the car alarm security system is the main goal of this article. Since the public's safety when it comes to car fuel is of utmost importance, we became aware of this initiative when we noticed the startling rate at which vehicle fuel is being stolen in our nation. The modern world requires digital methods for measuring any quantity, and since standard fuel meters are analog, we are working to digitize them so that they can display fuel values digitally. Our project displays the fuel quantity.digitally represented as 1 liter, 1.5 liter, 2 liter, etc. in the gasoline tank. Fuel theft is a major issue worldwide as well. In our concept, the bike owner will receive a text message if fuel is stolen, and the owner will also hear a buzzer to alert them. Certain types of systems, such as computerized fuel availability displays and gasoline Bicycle theft can be prevented. The project focuses on the fuel management system, which manages sensors, logs, and theft alerts to ascertain the current state of the gasoline tank.*

Keywords –Digital techniques, buzzer, sensors

1.INTRODUCTION

The world has gone digital these days, allowing us to deal with real-time systems with ease. The actual fuel that is in the bike's fuel tank is a downside of the digital fuel meter that is currently being used in automotive systems. is displayed as a bar or deflecting needle rather than in terms of numbers. As a result, we were unaware of the actual amount of fuel in the bike's fuel tank, as the display simply indicated the fuel level. Customers will occasionally fill up their cars using a digital gasoline pump, however our car has a bar or deflection needle mechanism instead of a digital interface. The gasoline meters seen in cars and motorcycles are depicted in the illustration. However, because of the current fuel metering technology, it is unable to provide an actual value for the fuel filled, which means that the owner of the gas station has deceived the customer. The customer is unaware of this deception. The proprietor of the gas station receives all profits, which leads to frequent customer fraud. In order to address this issue, we created a digital gasoline meter system that displays fuel values in digits like 1 lit, 1.5 lit, 2 lit, etc. The digital gasoline meter can be used with any kind of vehicle, including cars and motorcycles. Car One of the biggest worries for many automobile and bike owners is fuel theft.. We have frequently heard, or some of us have personally experienced, the theft of gasoline from automobiles or bikes. The owner of the car or bike is not aware that fuel has been stolen. The next time he rides his bike, he will have several difficulties due to fuel theft. The primary component, the microcontroller, uses the GSM module to send a message to the owner when fuel theft occurs. A buzzer will then sound to alert the owner of the theft; the entire process is done in real time, making it more precise and safe GSM-based automobile fuel theft detection system with SMS alert is applicable to cars, motorcycles, and all other types of vehicles. We employed communication to implement the concept; specifically, SMS is integrated into or modified from the current car security system. This system creates a new entity called machine to human telecommunication in place of human to human telecommunication. The goal of this project is to monitor fuel security using GSM technology.

2. LITERATURE PAPER

Srinivas. M et.al [1developed to use a flow sensor with an ultrasonic sensor to indicate the fuel level. When the key was entered, the operation began. The sensor then began to function and check the fuel level in the tank. All of the circuit's components that take 230 volts from the main supply and convert it to 9 volts are powered by a 2 amp switched mode power supply, or SMPS.The voltage regulator integrated inside the Arduino will change 9 volts to 5 volts. The fuel level is measured by the microcontroller and shown on the LCD when the power is turned on. It additionally displayed the ignition's ON and OFF statesThe owner will not receive the notification if the fuel level was above the range. If not, the owner will receive a notification, and the buzzer will turn on right away. An LCD was utilized to display the fuel level. An SMS alerting the user of fuel theft was sent using a GSM module.

HedaVenkata et.al [2] suggested a project for fuel theft and indication. The fuel level in the fuel tank was found in this using a Level Sensor. Additionally, if the fuel level drops below a predetermined point, the sensor signals the microcontroller, which only requires a 5V power source that was obtained from solar panels. The microcontroller then activated the buzzer and informed the owner of the automobile or bike.This technology uses solar panels, which saves energy and makes solar electricity cost-effective over time.

Mr.Aniket Shinde et.al [3[had developed a concept for a fuel level detecting system in which the operational model also included an ignition key. Here, a signal is sent to the microcontroller whenever the bike or car key is entered into the ignition lock and turned on, activating the level sensor only when the key is removed from the lock. This indicates that the monitoring system is turned on as soon as the driver exits the vehicle. Here, the microcontroller receives a signal from the fuel level sensor, and then turns on the buzzer. After that, a mobile SMS with this information was sent. The location of the theft is also determined by the unique IMEI number (International Mobile Equipment Identity) that the GSM module uses to transmit this message.

Rajesh Krishnaswamy et.al [4] This proposal's dual goals were to prevent fuel theft and to notify users of the amount of fuel that gasoline bunks are currently filled with. The user was informed each time the fuel level changed.

Jaiharish.M et.al [5] This system was created utilizing IOT to monitor the gasoline level and notify users if anything changes. No matter where the vehicles were, the system tracked their fuel levels and immediately updated the data. This system's primary goal was to decrease fuel identification fraud at refueling stations by utilizing IOT. The fuel tank was observed using the float sensor for fuel level. Next, an analog signal was acquired from the voltage circuit. This signal was supplied to the Raspberry Pi microcontroller via the analog input ports. The raspberry pi then produced the output after reading the sensor's input.The actuators were fed this output by the microcontroller.. Mobile applications received an alert from the GSM module. Additionally, the fuel level was displayed on the LCD panel. gasoline theft and the range of gasoline level were successfully monitored and notified by this implementation.

Kaivalya Kulkarniet.al[6] used a Raspberry Pi to compare the fuel level in the tank and implement this fuel system. The GSM/GPRS module was linked to the Raspberry Pi. The single channel ADC 0804 was supplied with the voltage received from the gasoline sensor as input. This produced the matching 8-bit digital output from an analog input voltage that was analogous. Eight Raspberry pins are connected to these pins. The Raspberry Pi was directly connected to the buzzer. The Raspberry Pi used the initial fuel level reading as the reference value when the system

was turned on. The matching analog voltage that is collected from the fuel level sensor changes the resistance of the sensor whenever there is a false fall in fuel level.. This 8-bit binary output was transformed by the Raspberry Pi into an equivalent decimal format, and it was then compared to the reference value. The buzzer was activated if the difference was greater than the threshold value. Next, the GSM module received commands from the Raspberry Pi. It contacts the designated mobile number with an SMS or call. Following the SMS request, the Raspberry Pi's reference value was changed to the current fuel value, and the procedure was initiated once more. This implementation concept has numerous uses and creates new opportunities for preventing fuel theft. In light of the future, this project guaranteed the owner total protection for both the fuel and the vehicle.

Daniela Popescu et.al [7] put forth this article. to significantly contribute to the creation of an automated mobile tracking and fuel tank level monitor system This paper's primary goal was to construct and test a system that would manage gasoline tank level, mobile tracking, location management, and the compilation of data reports for particular activities. The secondary goal is to install a volumetric sensor in the gasoline tank. Fuel system smart control was made possible by the introduction of software-automated systems, which also tracked pollution and fuel efficiency, among other things. Both mobile and fixed machines employed the gasoline level sensor, which was installed in the fuel tank.. A 12-to 24-volt battery provided the circuit's power.The car's fuel level sensor was installed and wired to a control module. A Bluetooth Low Energy channel (BLE) was used for data transfer. Utilizing GPS machinery tracking, fuel tank-related drains and mishaps were identified. The control of machinery position was accomplished using a web connection and a support map. The primary results of the tests provided quick tracking of the movement of the machines and the fuel level. The Initial Fuel Level (IFL) evolution curve, which was stored in an electronic database, was used to calculate fuel usage. This provides an accurate assessment of the fuel level inside the tank and stops fuel leaks. This project's computability and fuel level sensor accuracy were extra benefits. The real monitoring system results are useful for validating engineering endeavors.

A .Avinashkumar et.al [8] have shown a system that, by utilizing an Arduino and an ultrasonic sensor, has completely changed the fields of fuel monitoring and fraud detection. It was adjusted to determine the fuel level and provided information on the amount of fuel in the tank at that moment, the total amount of fuel after filling the tank, and the current fuel level.Fuel filling fraud could be managed with the use of this.

Vijayakumar P et.al[9[have projected a concept for a fuel level monitoring system that uses a flow sensor to measure the amount of fuel being poured into the tank through the inlet. The Atmega16 microcontroller then uses this information to display the output on an LCD screen. The microcontroller receives information from the load sensor, which is positioned at the bottom of the gasoline tank, about how much fuel is in the tank at any given time. Once the fuel is used up, it exits the tank through an outlet where a second flow sensor counts the fuel used. After gathering all the data, the microcontroller examined the amount of fuel used. Through the Wi-Fi module, the user's mobile device and the cloud received the raw and processed data. The user obtained correct fuel usage details in this method.

Naomi Somer Lepcha.et al [10] With a microprocessor, the gasoline theft detector was constructed. The Universal Asynchronous Receives-Transmitter (UART), an integrated circuit used for serial communications through a computer or peripheral device serial port, was utilized to connect the microcontroller to the GSM module. To

communicate over UART, this system requires three fundamental signals: receive, transmit, and common ground. By integrating the three signals—Transmit (TXD), Receive (RXD), and Common Ground (GND)—a model may send text messages. The TXD signal was linked to the microcontroller's serial port send signal. Similarly, the RXD signal was linked to the microcontroller serial port's receive signal. The system's buzzer, which announced the gasoline theft, activated the alarm after the microcontroller instructed the GSM to send a message. A microcontroller was also linked to the sensor. The buzzer began to sound and the message was transmitted to the mobile number stored in the microcontroller when the sensor became occluded and went into active low.

Mrs.S.A.Chiwhane et.al [11] Installed a system that used flow sensors to monitor the gasoline level in order to prevent issues caused by fuel theft at gas stations. Fuel filling triggers the flow sensor, which generates pulses that are translated into liters and transferred to the ESP8266 SOC. From there, data is recorded and sent to a server via Wi-Fi configuration (cloud server). It is sent to the application by the server. The application used GPS to find the user. The outcomes demonstrated that it computed the amount of fuel currently in the tank. Additionally, this system's usage of the ESP8266 lowered costs. This system's drawback is the potential for information transformation and representation to be delayed as a result of sluggish internet access.

R Aravindet.al[12]created this system utilizing an Arduinouno. They have used an amplifier to interface the load cell with the Arduinouno in order to control the voltage level. In order to provide the owner with the fuel level, they additionally interfaced the GPS and GSM modules with the controller. The load cell detected the initial fuel level and transmitted data to the controller when the button was pressed by a car entering the gas station. The initial gasoline was saved by the controller. The beginning level was subtracted from the total level to determine the additional fuel level. This was determined by a load cell that provided the owner an SMS with the extra fuel level and was shown on the dashboard.. It included the location of the car using a GPS module and the spot where fuel was added. A Liquid Crystal Display (LCD) connected to the controller's output port showed the output. The controller's I/O ports are used to interface with the GPS and GSM modules. In addition to sending the owner an SMS notice, this technology measured the fuel level and displayed it on the dashboard.

3.METHODOLOGY

A Block Diagram

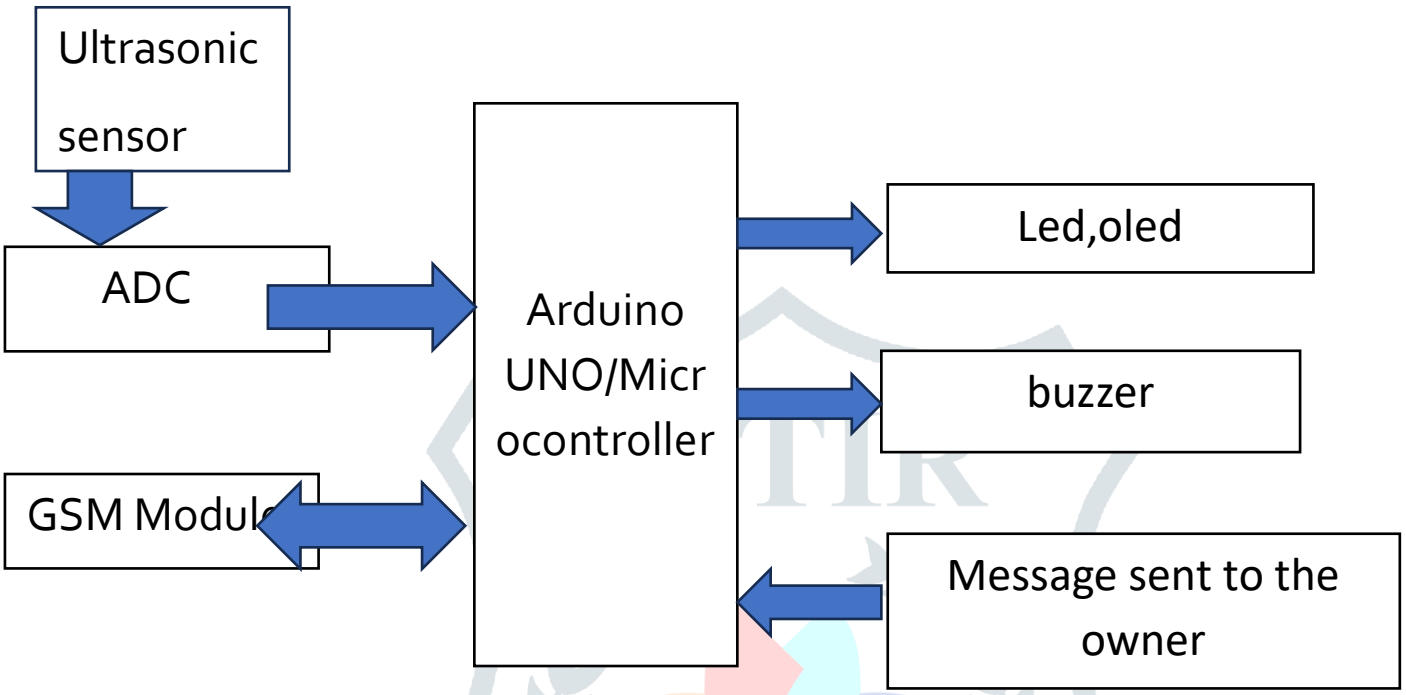
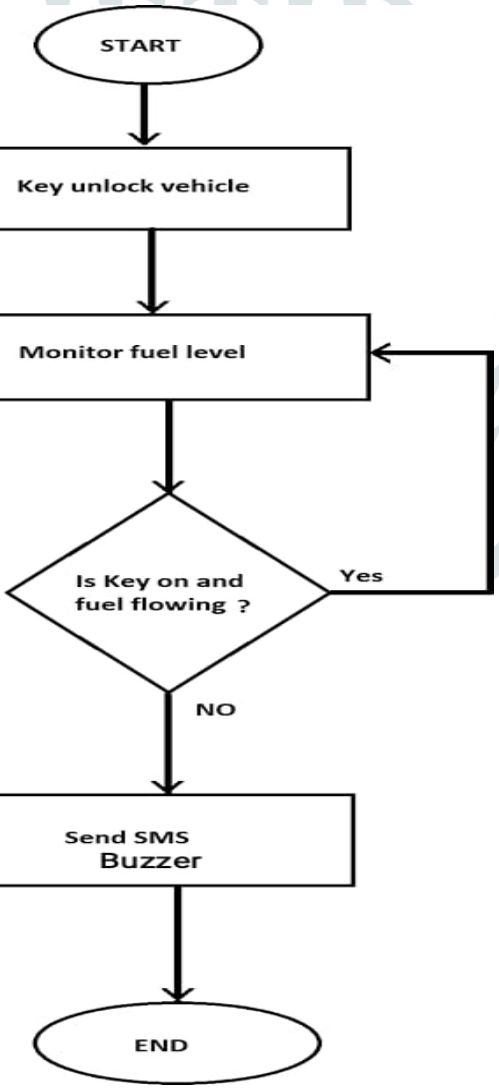


Figure 1: represents the block diagram of vehicle fuel theft detection and monitoring syste

B.WORKING

The Arduino (328P Microcontroller), an ultrasonic gasoline level sensor, and a flow sensor are used in the fuel theft monitoring project. gasoline theft and gasoline level alerts are sent to the user via SMS using a GSM module and LCD display, respectively. All of the components in this circuit that take 230 input from the main supply and convert it to 9V are powered by a 9V, 2A SMPS. The built-in voltage regulator on the Arduino reduces this 9V to 5V. The MCU measures the fuel level and displays it on the LCD display when all the components are powered on. It also indicates the ignition ON and OFF conditions. Flows that are monitored to identify fuel flow. Here, a GSM module is utilized to alert the user via SMS about the fuel level. gasoline theft alarm SMS is sent to the owner if gasoline level decreases while ignition is off. Additionally, buzzers are utilized to warn of gasoline theft.

C. FLOW CHART



Step 1: Start the process

Step 2: insert key lock

Step 3: Check fuel level

Step 4: Is fuel below the range? If "YES" then go to Step 5. If "NO" the message will not be sent to owner

Step 5: Send text message to owner

Step 6: Buzzer is "ON".

Step 7: Check the buzzer is stopped within 2 minutes.

Step 8: Send message owner.

Step 9: Stop

4.CONCLUSION

Using GSM technology and the ARMLPC2148, this is a novel approach to designing and deploying a low-cost circuit to detect fuel theft attempts. Without a doubt, this special equipment will be installed in every car in the future. The proposed plan will assist us in resolving the fuel theft issue. Thus, it offers total protection and makes it impossible for thieves to steal the fuel or the car. In addition to deterring gasoline theft, a digital fuel meter shows the amount of petrol left in the tank. This meter has additional benefits over an analog one because it uses a PIC microcontroller and GSM to alert the bike owner through SMS or a buzzer when gasoline theft occurs. We employ Digital Fuel Meters to raise the bar for our measuring systems since they prevent customers from being duped by fuel filling stations and they also help to improve system performance.

5.APPLICATIONS

1.It can be implement all type of fuel vehicles.

2.This can be fitted in this transportation busses to detect the petrol theft.

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