RFID based Petrol Pump Automation System

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ABSTRACT:

The project's major goal is to build a dispensing system that can automatically distribute gasoline for the amount specified by the customer. Petrol distribution systems can be found in a variety of settings in our daily lives, including offices, bus stops, railway stations, and schools. Here, we'll advocate a modern-day gasoline delivery system that uses RFID technology to operate. This project involves using RFID technology to create a prepaid card for a petrol bunk system as well as a petrol delivery system. In recent years, all gas stations have been manually operated. These manual gasoline pumps take longer to operate and require more manpower. Normally, locating petrol stations in remote areas is prohibitively expensive in order to give quality service to customers.the customers All of these issues can be solved by using an unmanned power pump, which takes less time to operate, is effective, and can be mounted almost anyplace. The consumer can take use of the service, which requires the use of an electronic clearing system

INTRODUCTION:

In India, the delivery of fuel to a large number of automobiles at fuel stations has generated numerous issues.Due to a scarcity of small money change accessible with the station operator, the vehicle driver must pay for fuel with cash money and may have to pay more than the amount of dispensed fuel. The goal of the RFID-based automated petrol pump is to reduce human labor by developing an auto-guiding system and implementing the operation in a sequential manner. These systems are extremely dependable and time-saving devices. Microcontroller, RFID tags, Power supply, an LCD display, a Motor driver, and an RFID reader are among the components utilized in this project. Petroleum products are one of nature's most valuable and uncommon inventions. To survive these products, correct use and distribution are essential.

SYSTEM REQUIREMENTS:

The system requirements includes Hardware and Software requirement, which are provided   below:
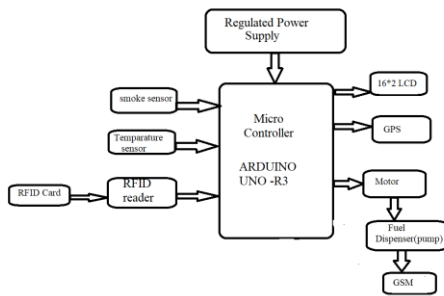
HARDWARE REQUIREMENTS:

- Microcontroller-Arduino UNO R3
- 12 V Adopter
- GSM Module
- RFID Reader.
- RFID Tag.
- DC Pump.
- GPS device
- Smoke sensor

SOFTWARE REQUIREMENTS:

- Arduino IDE 2020
- Proteus IDE 2020

SYSTEM DESIGN:

This chapter gives overview of architecture design:

ARCHITECTURE DAIGRAM:

The above figure represents architecture of proposed system.

RFID READER AND TAG:

RFID (radio frequency identification) is a wireless identification system that detects the presence of RFID tags using radio waves. RFID technology, like bar code readers, is used to identify people, objects, and other things.

MICROCONTROLLER-ARDUINO UNO R3:

The Arduino Uno is a microcontroller board based on the ATmega328P microcontroller. It contains 14 digital input/output pins, 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header, and a reset button. It comes with everything you'll need to get started with the microcontroller. The system's main processor, the microcontroller, maintains various cards' details and compares them to the data provided by the RFID reader. When the card's and microcontroller's details match, the microcontroller sends control signals to the relay, causing the motor to pump petrol.

GSM MODULE:

A GSM modem is a particular form of modem that accepts a SIM card and functions on a mobile operator's subscription, much like a cellphone. A GSM modem appears to a mobile operator to be identical to a mobile phone. It assists in sending SMS to the programmed recipient

SMOKE SENSORS:

: A gas detector is a device that detects the presence of gases in a given space, and is frequently used as part of a safety system. Operators in the area where the leak is occurring can be alerted by a gas detector, giving them the opportunity to flee. Because many gases can be detrimental to organic life, such as humans or animals, this type of equipment is essential. Combustible, flammable, and toxic gases, as well as oxygen deficiency, can all be detected with gas detectors.
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TEMPAREATURE SENSORS:

The LM35 family of temperature sensors are precision integrated-circuit devices with an output voltage that is linearly proportional to the temperature in degrees Celsius. In comparison to linear temperature sensors calibrated in Kelvin, this device has the advantage of not requiring the user to remove a significant constant voltage from the output to obtain convenient Centigrade scaling. To achieve Arduinoal accuracies, no external calibration or trimming is required.

LCD DISPLAY:

The LCD "LM020L" is a 16 x 2 alphanumeric display. LCD prices are decreasing. Numbers, text, and artwork can all be displayed. LEDs can only display numbers and a few characters. Character and graphics programming is simple.
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MOTOR DRIVER L239D:

The L293D is a well-known 16-pin motor driver IC. It is mostly used to drive motors, as the name implies. A single L293D IC can drive two DC motors at the same time, and the two motors' directions can be regulated individually. So, if you have motors that operate at less than 36V and less than 600mA and are controlled by digital circuits such as Op-Amps, 555 timers, digital gates, or even Micron rollers such as Arduino, PIC, ARM, etc.

FUEL DISPENSER:

Water is pumped from the surface region to the child using a 6v DC water pump.

POWER SUPPLY:

A POWER SUPPLY is an electronic device that provides electrical energy to an electrical load. Power supplies are sometimes referred to as electric power converters since their principal job is to convert one form of electrical energy to another. Some power supplies are standalone units, while others are integrated into bigger units with their loads. Power supply seen in desktop computers and consumer electronics devices are examples of the latter. The power supply is 5 volts.

LITERATURES SURVEY:

> **Petrol level indicator with automated audio alert system**
> **Publisher: IEEE 2020**
> **R. Kalidoss; R. Praniha**

The author has devised a one-of-a-kind magnetic sensor-based system for this purpose. The sensors are attached to the container at predetermined points. A floating magnet floats in the liquid and, depending on the liquid level, triggers the magnetic sensors one by one. For the time being, this paper is only suited for industrial use. In this project, direct contact of level probes with the content/liquid was strictly avoided. With Buzzer Indication, it's a 'Fit and Forget' system that's fluoride and oxidation free.
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> **Vehicle Fuel Monitoring and Management using RFID authentication and Telematics Notification : An automated petrol refueling & notifying system**
> **Publisher: IEEE 2020**
> **Md. Badiuzzaman Pranto; Md. Mahidur Rahman;**

This solution uses a central and secure database to connect the pump and the mobile app, allowing them to communicate with one another. The database may be accessed from anywhere in the world, and users will be able to track their accounts using the mobile app at any time and from any location. The gasoline level inside the petrol bunk can also be measured using this technology. The purpose of this system is to eliminate pump laborers' and car drivers' dishonesty toward car owners while also providing a secure gasoline monitoring method at a low labor cost.

> **IoT based smart petrol pump**
> **Publisher: IEEE 2020**
> Punit Gupta; Sawan Patodiya;

This paper describes the design and implementation of a Smart Petrol Pump that will measure the amount of fuel at a gas station and send the information to a central server. If the station's fuel supply is depleted, the central will provide gasoline. Our goal is to build a website that gets the fuel level from the petrol station where our hardware is located and sends it back to a site that admins and users can visit. The data can be changed and updated by the administrator. Users will not be able to edit the data, but they will be able to view it. We utilize an ultrasonic sensor to determine the amount of fuel in the tank. A self-serve gas station attendant

> **An automated gas station attendant**
> **Publisher: IEEE 2020**
> Shiu Kit Tso; Ka Lun Fan;

Future cars will require refilling on a regular basis, regardless of the mode of transportation or the type of fuel used - electricity or gasoline.
Although automated refueling is not directly related to guidance, it will become increasingly crucial as autonomous vehicles begin to travel on our roads.
The authors describe the current state of autonomous refueling systems and offer a robotic solution in this study. Although refueling takes attention only a few times over the course of a vehicle's lifetime, autonomous refueling has numerous advantages, including safety, security, and personnel reduction.

PROPOSED SYSTEM:

We are employing RFID cards to access petrol at different petrol stations of different petrol firms across the country and here in this proposed petrol pump automation system. We simply insert the RFID card near the RFID reader whenever we wish to fill the tank from the fuel dispenser. The microcontroller then examines the data from the RFID reader and takes the appropriate action based on the customer's needs. This computerized petrol pump system also provides customers with security when filling up at gas stations by avoiding the participation of humans, hence reducing the risk of carrying cash at all times. The Atmega328 microcontroller, RFID module, LCD display, pump, and GSM are all included in this petrol pump system. When an RFID tag is placed in front of an RFID reader, the reader reads the card and determines how much money is on the card. If the card has sufficient funds, the petrol will be filled based on the number of taps. For example, if we tap the fuel dispenser once, one liter of gasoline will be spilled, and if we press twice, two liters of gasoline will be pumped. Through GSM technology, the total amount debited and the number of liters consumed will be sent to a cell phone.
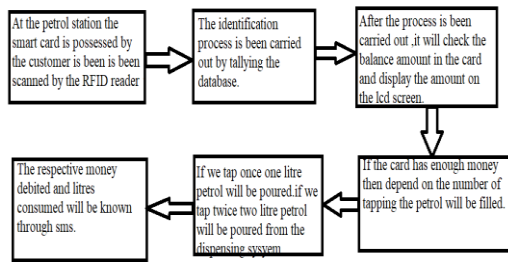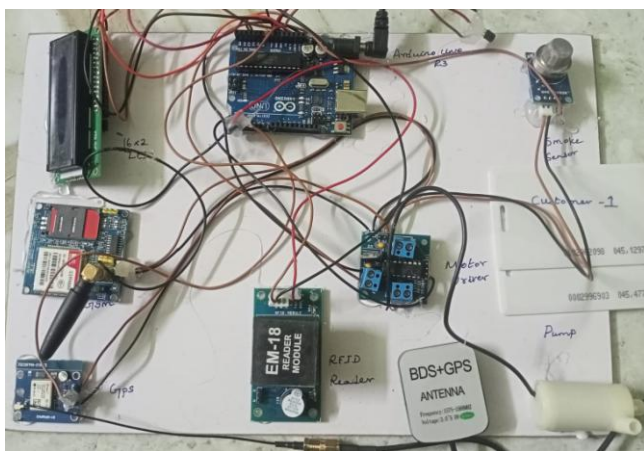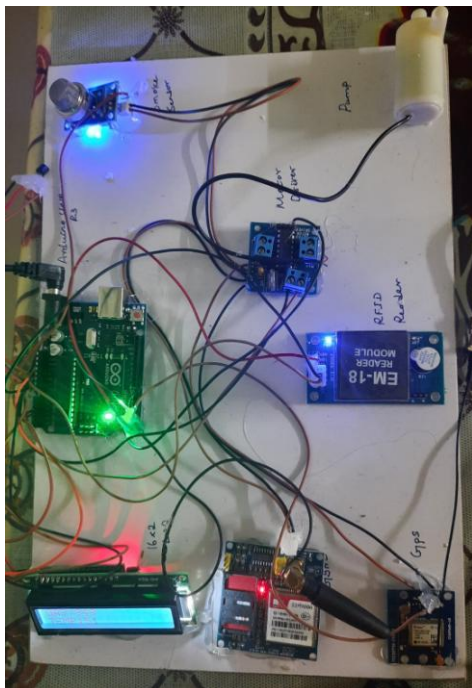
WORK FLOW OF THE SYSTEM:

| At the petrol station the smart card is possessed by the customer is been is been scanned by the RFID reader | → | The identification process is been carried out by tallying the database. | → | After the process is been carried out ,it will check the balance amount in the card and display the amount on the lcd screen. |

↓

| The respective money debited and litres consumed will be known through sms. | ← | If we tap once one litre petrol will be poured.if we tap twice two litre petrol will be poured from the dispensing sysyem | ← | If the card has enough money then depend on the number of tapping the petrol will be filled. |

Fig: flow of the system

IMPLEMENTATION:

Fig: Complete Hardware structure of the system.

> **+919989045017**
>
> Tuesday, 22 February 2022
>
> Petrol Filled Location
> Lat:16.31,Lon:80.45
> Quantity:1 litre, Amount:
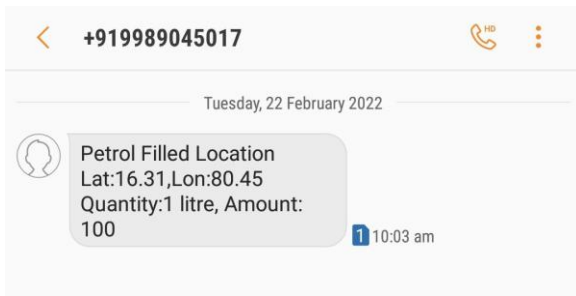> 100
> 10:03 am

Fig: Sample Sms

APPLICATIONS:

- o Fully automatic.
- o Monitoring of petrol sales is up to date.
- o No paper work.
- o Can be implemented in all places.
- o Less human work.

ADVANTAGES:

- o Man power is conservatively reduced because of automated self-service.
- o Due to use of RFID technology robbery of the fuel from the bunk is avoided.
- o The time taken by the system is very less.
- o Low power only consumed.
- o Accuracy in the amount of petrol is maximum. Highly sensitive device

CONCLUSION:

This project is for security systems that only trusted authorities have access to. A smart card reader/writer is built within the petrol pump using a microprocessor. The driver exchanges the card at the gas station, and the smart card reader reads the amount on the card and displays it on the LCD. When an RFID tag is placed in front of an RFID reader, the reader reads the card and determines how much money is on the card. If the card has sufficient funds, the petrol will be filled based on the number of taps. For example, if we tap the fuel dispenser once, one liter of gasoline will be spilled, and if we press twice, two liters of gasoline will be pumped. The total amount deducted and the number of liters consumed will be sent to you through SMS. Our electronic system worked flawlessly. All of the functions in our proposal were able to be implemented. The most difficult aspect of this project was connecting the microcontroller to the hardware components. We believe that this electronic system is very marketable because it is simple to use, low in cost due to low power consumption, and extremely reliable. This project can be used to create a secure system. Using a Smart Card-based Accessing System, filling up vehicles with gasoline at gas stations.

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