# SMART AUTOMATED FUEL STATION

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**ABSTRACT**

Earlier, Petroleum pumps are running physically. This requires a more workforce and time. Placing these in away zones causes additional extreme costs and maintaining staff with cash counters in some agency areas are prone to robberies and threat to lives. To overcome this issue we aim to build automated Fuel stations with RFID technology payments. This helps in saving time in everyone's busy schedule. In this we focus on both owners and users of the petrol stations. Like, the admins can monitor the petrol levels, maintenance and all other aspects from a remote location. Users can know status of petrol/diesel availability in station by light indicators. This can be done through sensors which reduces waiting time. The payment and filling of petrol is done by the user by himself by using the RFID cards. By this we can reduce the man power used in the petrol stations and provides security for the users.

**Key Words**: RFID Module, Arduino, LED lights, LCD, Motor Pump.

## 1. INTRODUCTION

Dispensing of the fuel to huge number of vehicles at the fuel stations has caused many complications in India. The vehicle driver has got to buy fuel with cash money and should need to pay quite the quantity of dispensed fuel thanks to the shortage of small money change available with station operator. RFID Based Automated Petrol Pump is to scale back human work and develop an auto-guided mechanism and to implement the task sequentially by using RFID technology. These systems are highly reliable and fewer time-consuming devices. The components utilized are Microcontroller, RFID tags, Power supply, an LCD display, a Motor and an RFID reader. Petroleum products are one among the precious and rare creations of the character. The proper use and distribution are an important task to survive these products.

A fuel station is a facility which sells fuel and lubricants via fuel dispensers which themselves are used to pump gasoline, Diesel, kerosene, etc. into vehicles and to calculate the financial cost of the product thus dispensed the emergency of radio frequency technology has changed the traditional methods of data collection. The customer is provided with RFID card. Before using this card it has to be recharged like a prepaid card. Whenever we would like to fill the tank just we've to put the RFID card near the RFID reader. Then microcontroller reads the info from the RFID reader and performs the action consistent with the customer. This system also provides the security for the customers by avoiding the involvement of human beings to fill petrol, so to avoid the risk of carrying money every time.

## 2. LITERATURE SURVEY

This system uses RFID technology which is frequency Identification based automatic identification technology. It want to retrieve the stored data on the RFID Tags with none physical contact. RFID system comprises of: RFID Tag, RFID Reader and management System (DBMS). RFID tag has an antenna on its microchip. The chip stores the Electronic Product Code (EPC) of the scanned product, which may be a unique number used for the identification of a selected item. RFID reader is employed to collect the info from a tag using

radio waves. RFID Reader's antenna transmits electromagnetic waves which are received by RFID tag's antenna. This tag transmits the info back to the reader. Data collected then transferred to the host system where it's stored within the cluster database.

**Related Works**

G. Janani [1] G. Janani proposed a petroleum Bunk Automation which uses a PIC microcontroller, GSM and RFID technology. This technique provides the consumers to know , the quantity of petrol has been filled. This procedure saves the customer time and increases accuracy. 1.2 Priyanka .A. Gaikwad [2]
Priyanka. A. Gaikwad proposed petrol bunk automation using RFID and GSM technology which uses an Arduino Uno controller, GSM and RFID technology. This technique increases the fueling process and it prevents unauthorized fueling by providing RFID card to the purchasers and it's rechargeable. Here, system equipped with a RFID card reader which reads the available amount with within the card. 1.2 Wavekar. Asrar. A [3] Wavekar. Asrar. A proposed a "RFID Based Automated Petrol Pump" which is capable of automatically deducing the worth of petrol dispensed from user
RFID card. it uses AT89C52 microcontroller and it singular dispensing system which operates with RFID card. this is often unmanned power pump which needs less time to work and it can be installed anywhere .Here, customer fills the petrol by using RFID card and amount is automatically deduced from the user RFID card.

**3. PROPOSED MODEL**

This system is using RFID technology in which each user is having the RFID card and it is prepaid. It can be rechargeable at any time. These cards contains unique verification codes to detect user. The RFID reader captures the digital data encoded in radio frequency tags.

When a customer brings the card close to the RFID reader, it captures the digital data and then sends the corresponding signal to the microcontroller. The microcontroller compares the information entered by user with stored details of various cards. If the respective match is found, the amount entered by the user is deducted from that account. The microcontroller activates the relay driver for that specific amount in respect of your time and therefore the desired stipulated fuel is dispensed into the tank. In such a way, user gets fuel for the deducted amount from the user's prepaid card.

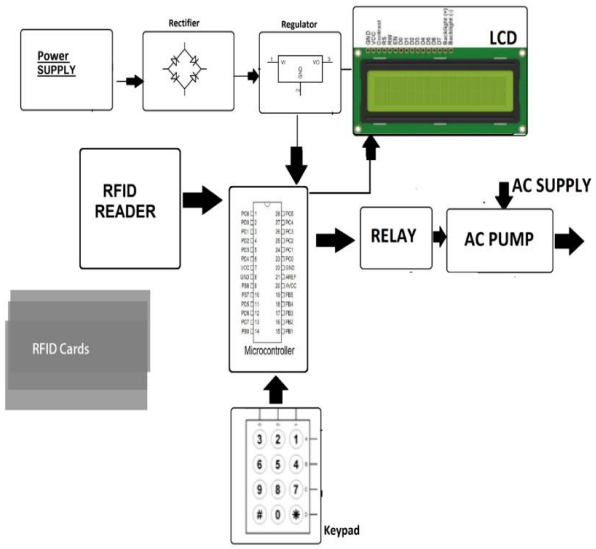


Figure 1.Architecture for smart fuel station

**Hardware Requirements**

RFID Module

RFID Cards
Pump Motor
Relays
LCD Display
Crystal Oscillator
Resistors
Capacitors
Transistors
Cables and Connectors
Diodes
PCB and Breadboards
LED
Transformer/Adapter
Push Buttons
Switch
IC
IC Sockets

**Software Requirements**

Arduino Compiler
MC Programming Language: C

**Flow Chart**

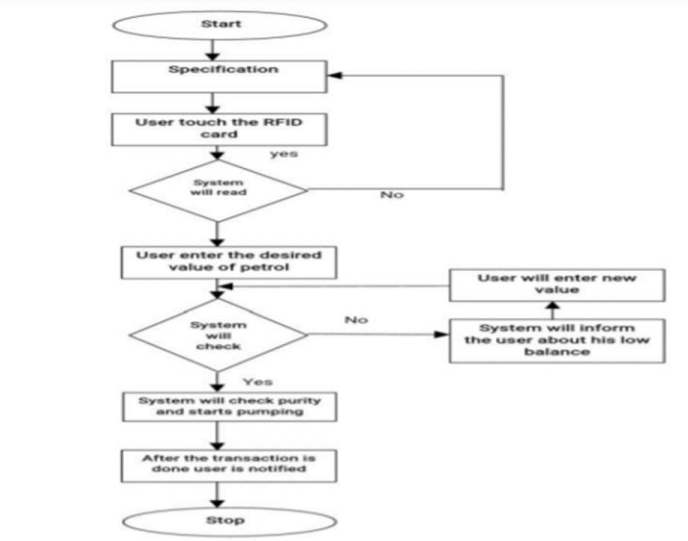


Figure 2.Flow chart for the smart automated fuel station**.**

**4. RESULTS**

**Indicators**

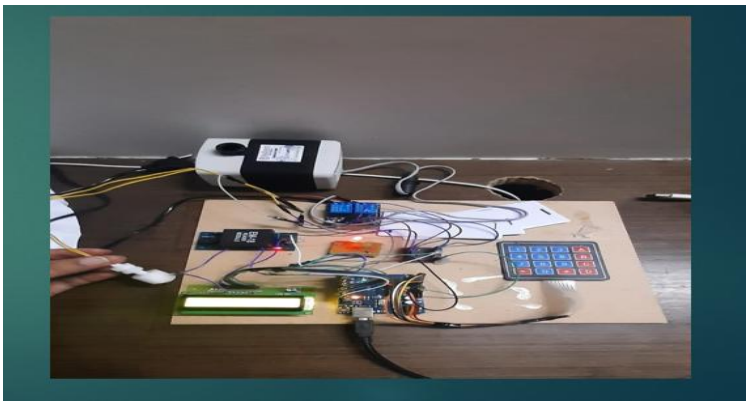

Figure 3.Indicate the low level of petrol using red LED.

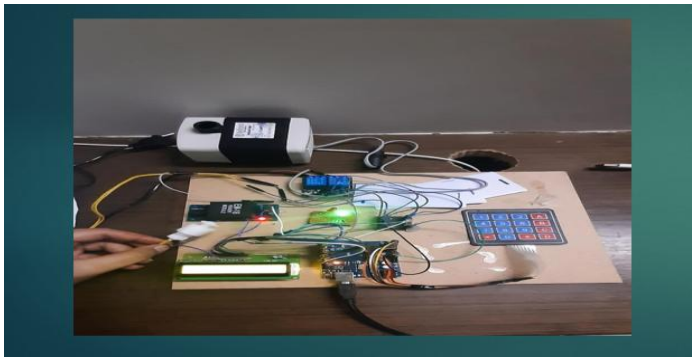

Figure 4.Indicates the sufficiency of petrol using green LED.

**Self-Payment**

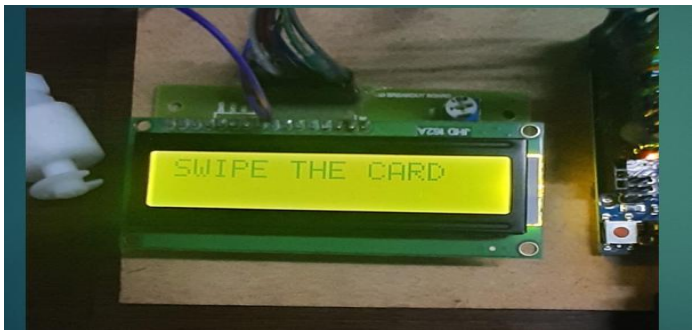


Figure 5.System asks to swipe the card.

Figure 6.System shows that the user is detected.


Figure 7.System asks the user to enter the password


Figure 8.System shows that the entered password is wrong password.


Figure 9.System asks user to enter amount if the entered password is correct


Figure 10.System showing the remaining balance of the user ,after filling fuel and payment is done successfully.

## 5. CONCLUSION

The above mentioned model proposes to remove all the shortcomings of the manually operated petrol pumps by replacing them with automated ones. RFID is a versatile technology, easy to use and it often efficiently utilized this real time application. The proposed model consists of certain goals like ensuring right amount of fuel dispensed, removing all human errors by the use of RFID cards and ensuring customer's trust for a fair sale of the product [9]. These automated fuel stations provide a lot more advantages as they reduces man power with the automated self-service. With this simple technology in use, any person can easily access for fuel at Fuel Stations. Apart from this all, these systems are less time consuming compared to the traditional ones. The technology proposed is very cost efficient and has low power consumption as well, which sets the major benchmark in today's scenario.

## 6. FUTURE ENHANCEMENT

**Purpose: To improve security levels**

The future enhancement of this project mainly focuses on the security. We all know that the usage of mobiles in the fuel station is restricted , but still the users uses mobiles in fuel station .In order to restrict this a buzzer system is used, that is a camara is placed at the top of the fuel station . Whenever the users uses mobiles in the fuel station, the camera detects it and it is notified through buzzer .By using this method one we restrict the usage of mobiles in the fuel station.

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