



## RFID Based Petrol Pump Automation System

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*Abstract* : Petroleum is the foremost and mainstay of modern civilization. It is one of the nature's rare and valuable creation. Its formation takes millions of years which insist proper utilization of the resource. In present scenario, fuel stations are operated manually which consist a controlling unit to perform various tasks. like managing the electrical pump, drive the display, measure the flow & accordingly turn OFF the electrical pump. But still a person is required to collect the money and there is a possibility of many human errors. In this proposed petrol pump automation system, we are using RFIDcard to access petrol at different petrol stations of different petrol companies across the country and here, we are connecting all these petrol stations using single web server. This web server access is secured by a password which is known only to the petrol companies. Whenever we want to fill the tank from the fuel dispenser, we just have to place the RFID card near the RFID reader. Then the microcontroller reads the data from the RFID reader and performs the action according to the customer requirements. This digital petrol pump system also provides the security for the customers for filling petrol at the Petrol stations by avoiding the involvement of human beings, hence reduces the risk of carrying money every time. This petrol pump system consists of Atmega328 microcontroller, RFID module, LCD display, Keypad, Ac pump and alarm. When RFID reader, reads the card it asks for the 3-digit password, if we enter wrong password more than twice it raises an alarm. And when the right password is entered is into the system, the system asks for the amount and it also shows the balance amount. On entering the amount, the motor starts and petrol gets filled in the petrol tank from the fuel dispenser.

**Index Terms:** RFID Technology, Fuel dispenser, At mega 328 microcontroller.

### 1.INTRODUCTION

India became the fourth largest auto market in 2017-18 and was the seventh largest manufacturer of commercial vehicles in 2018. Around 2.19 million cars were sold in India in 2017–18. According to the Ministry of Road Transport and Highways (MORTH), there is a tremendous increase in India's Registered Motor Vehicles in the recent years. These increase in the number of vehicles in India has led to a huge usage of petroleum as well. The consumption volume of petroleum products in India was estimated to be approximately 202.6 million metric tons in fiscal year 2018. The country was ranked third with regard to primary energy and fuel consumption across the globe[12].Petroleum is the non – renewable resource and it is present in a limited quantity. Its formation takes millions of years. It cannot be replaced rapidly enough to cope up with its current consumption.

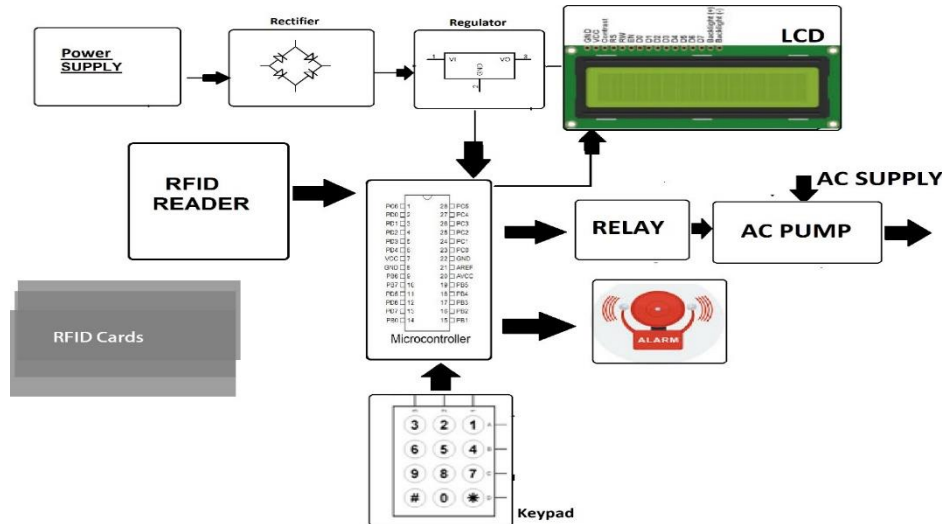
Thus, it is extremely crucial to ensure the right utilization and consumption of petroleum products so as to preserve it for future generations as well [1]. The dispense of fuel to this large number of vehicles in India attains major interest as numerous complications may involve. A long queue in front of a fuel station due to huge rush at the station is a common scenario. This leads to the wastage of valuable time, energy as well as human hours. The manual pump operation at present leads to various malpractices such as delivering less quantity to the customers and adulteration of fuel. And in case of climatic condition a person cannot be stay for longer time, an these issues inspire us for automation of fuel stations which is quite necessary to deal with all these recent era problems. The main aim of the project is to design a system which is capable of automatically deducting the amount of petrol dispensed from user card based on RFID technology and at mega 328 Microcontroller. The RFID reader verifies the user from RFID tag placed nearer to it. The amount of required fuel is entered in terms of amount at the unit. These all activities as well as dispense of fuel is monitored and controlled by the at mega 328 Microcontroller. It reads the data stored in its memory from the RFID reader and performs the action according to the customer requirements and delivers fuel to the vehicle. On the other end, the respective amount will be deducted automatically

RFID based automated petrol pump, is to reduce human work and develop an auto-guided mechanism and to implement the task sequentially by using RFID technology. This system are highly reliable and less time-consuming devices.

**1.1 EXISTING SYSTEM:-** In beginning days, the petrol pumps were disseminating petrol utilizing lab our to particular client vehicles and were thoroughly relies upon man's steadfastness who was carrying out this responsibility. These petrol pumps are time consuming and require more man power. To place petrol stations in distant area is very costly to provide excellent facility to the

consumers. All these problems are sorted out by the use of unmanned power pump which requires less time to operate and it is effective and can be installed anywhere.

**1.2 PROPOSED SYSTEM:-**The project is implementing as an RFID -based petrol bunk. Users use RFID card Petro card with RFID tag including user verification codes these cards can be recharged at recharge points. When a user swipes the card through the RFID reader. It senses the amount entered by the user and delivers fuel to the vehicle. Therefore, the amount will be deducted automatically from the user card and the LCD display shows the amount and details of the user . The microcontroller stores several cards details and compares the data given by the RFID reader. When both these details match, it sends the control signal to the relay such that the motors operate to pump petrol.



**Block diagram**

## 2. Working principle

In first part, sensor is going to be used in measurement of the petrol transferred to the customer's tank. Calculations and programming are to be made through at mega 328 microcontroller programming to trigger the open-close valve to operate when needed. A 230 V AC supply is given to Rectifier, the supply is converted AC to DC. the rectified supply is Tran served to Regulator, the regulator maintains the constant voltage.

Constant voltage is supplied to the Atmega328 Microcontroller. Microcontroller control the function of embedded system, here Atmetga328 Microcontroller operates RFID reader, LCD display, relay, alarm, key pad. every user has its own account on RFID tag. Which have username and password for login purpose. User enter the amount details on microcontroller keypad and user get balance which is used to find out the number of liters owed to his calculation. User enter the ID tag on petrol machine and machine gives exact amount of petrol. In this system, Arduino mega uses as the main brain for its pumping hardware system, where all drivers have a petrol card (RFID tag) which can be recharged by some places. The petrol pump is supply with a RFID reader which reads the quantity in the RFID tag and will offer it on the LCD. Here come two conditions, if the user card holds sufficient fund the transaction would occur and the petrol will be dispensed. Else if the card does not have sufficient amount, then the transaction fail information would appear on the screen. And in case if user types an wrong password more than twice it rises an alarm, by this action we can stop malpractices and This allows the drivers see the accurate amount of petrol that has to be filled in. This not only guarantee accuracy, but also keep a lot of time for drivers and prevents human mistakes.

## 3. CONCLUSIONS

This project is meant for security systems whose access is only for respected authorities. Using a microcontroller, the petrol pump is equipped with a smart card reader/write. At the Petrol Pump,the driver swaps the card and the smart card reader reads the amount in the card and will displayit on the LCD. The driver then enters the quantity of petrol that has to be filled using a keypad. The corresponding amount is calculated & deducted from his petro card. The electrical pump is then turned ON according to the entered amount, fills the

tank and automatically turns OFF. Ourelectronic system performed as expected. We were able to implement all the functions specified in our proposal. The biggest hurdle we had to overcome with this project was interfacing the micro controller with the hardware components. We feel that this electronic system is very marketable because it is easy to use, comparatively inexpensive due to low power consumption, and highly reliable. By using this project one can design a secured system. For filling petrol to vehicles at the petrol bunks using Smart Card based Accessing System.

## 4. ADVANTAGES

- Man power is reduced because of automated self-service.
- Due to use of RFID system robbery of the fuel is avoided.
- The time is saved.

- Low power consumption.
- Accuracy in the amount of petrol dispensed.
- Highly sensitive.

## 5.FUTURE SCOPE

- Unmanned petrol station was required for over the years to fulfil the requirement of consumers over the wide area.
- Unmanned petrol station concept is not limited petrol station, but it can be applicable for the availability of food grades at long distinct area.
- It can make human safer from robbery, fraud, and any other unwanted incidences by the use of plastic money.

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