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RFID Based Automated Petrol Pump System

Kirti Chaudhary[1], Harsh Gupta[2], Divya Tyagi[3], Amarjeet Kumar[4]

Department of Electronics and Communication Engineering, IMS Engineering College, Ghaziabad, India[1,2,3,4]

Abstract: RFID is a versatile and trending technology which is used in many real time applications. In this proposed work, RFID system is a microcontroller-based system that reduces the man power and dispenses the accurate amount of fuel. Also, if the customer tries to swipe the unauthorized card, the RFID system rejects the card. In this way, the system is very secured. For the RFID operation, the frequency of the reader ranges from 125 KHz to 2.4 GHz.

Keywords: RFID, Microcontroller, Dispensing system, Automated Petrol Pump system.

I. INTRODUCTION

The dispensing of the fuel to huge number of vehicles at the fuel stations has caused many complications in India. The vehicle driver has to pay for fuel with cash money and may have to pay more than the amount of dispensed fuel due to the lack of small money change available with station operator. 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. These systems are highly reliable and less time-consuming devices. The components used in this project are 8051 Microcontroller, RFID tags, Power supply, an LCD display, a Motor driver and an RFID reader. Petroleum products are one of the valuable and rare creations of the nature. 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. Compared to the traditional bar code, magnetic card and IC cards, RFID tags.

II. LITERATURE SURVEY

Everything has been digitized. In many existing systems, almost all petrol pumps have a controlling unit to perform the 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 RFID card to access petrol at different petrol stations of different petrol companies across the country and here.

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.

Hardware's required are:

1) Microcontroller
2) RFID tag
3) RFID reader
4) Relay
5) LCD
6) Keypad
7) Dispensing System
8) Buzzer

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III. PROPOSED SYSTEM

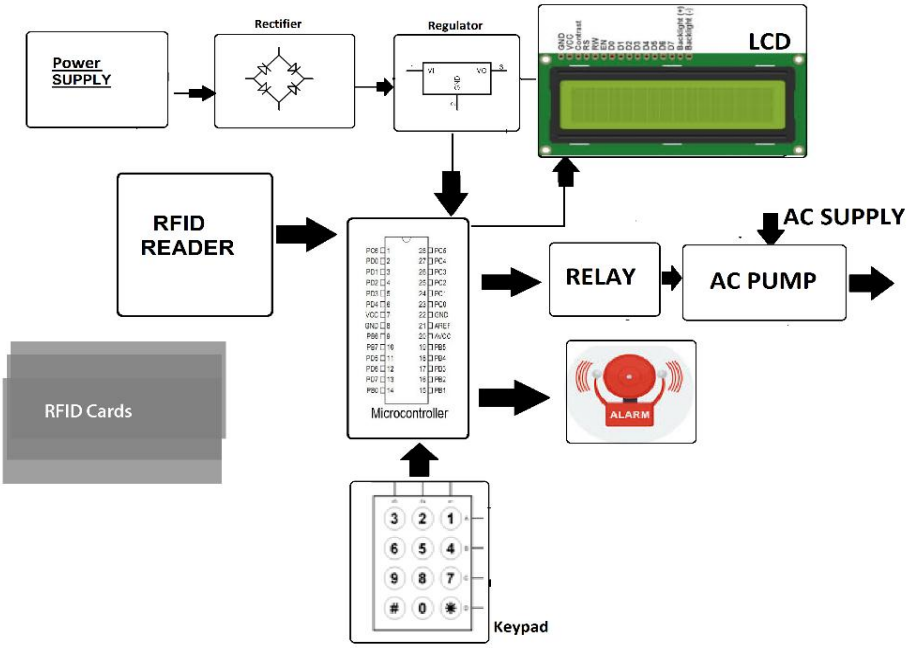

Fig 1: Block Diagram of RFID Based Automated Petrol Pump System

When the customer comes to fill the fuel at the station, firstly he will swipe the card. If the card is authorized, RFID card reader will accept the card. Then it will ask for the pin number. If he entered pin number by the customer is correct then it will ask for the amount for the petrol to be dispensed. In such a way system works.

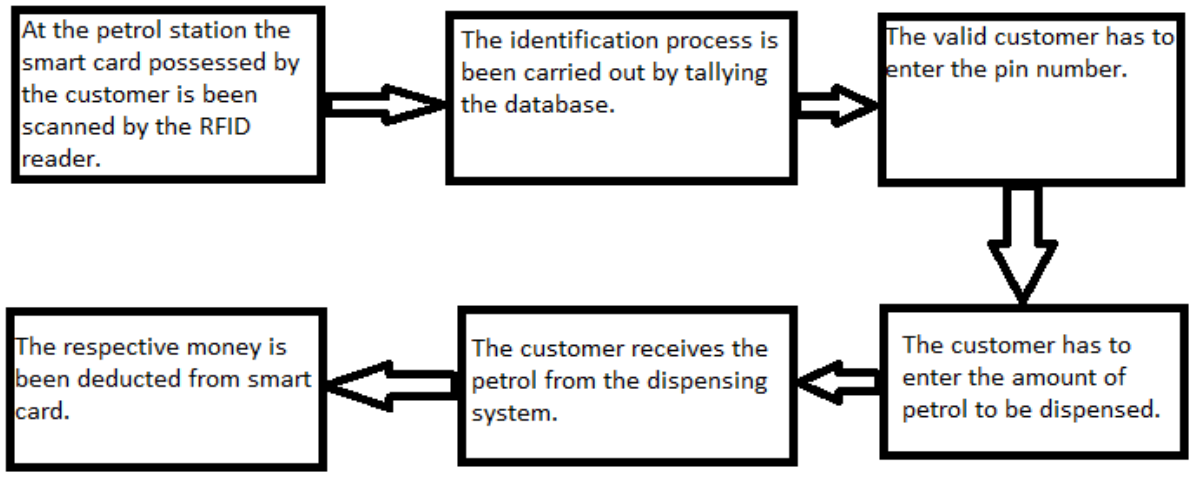

Fig 2: Flow Chart of the RFID Based Automated Petrol Pump System

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.

Disadvantages

- Awareness about Unmanned Petrol Pumps.
- If network fails then whole system will collapse.

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IV. IMPLEMENTATION AND THE RESULTS

Implementation of RFID technology has changed the operation of conventional fuel dispensers. The practical implementation of the system is done by oil products distribution company, Baghdad at its fuel pump. This technology can be enhanced to implement the same system for milk processing industries while distributing the milk and its products to the market. In day to day life we can see that water distribution in summer is also one of the problems in front of India. So, it is possible to keep control on water distribution in particular area. The rationing products like vegetable oil as well as kerosene and its sub products may be securely distributed to the customers using the same system we proposed. Also, it is possible to keep record of the distributed products in market which is commercially most important for industries.

V. CONCLUSION

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 display it 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. Our electronic 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.

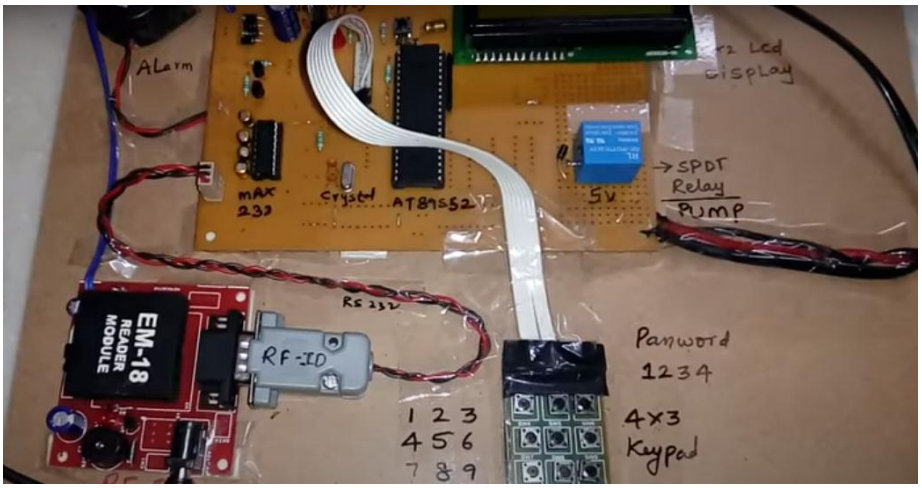

Fig 3: Hardware Model of RFID Based Automated Petrol Pump System

VI. 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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