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RFID based Petrol Pump Automation System

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Abstract - *The main aim of the project is to design a dispensing system which is capable of automatically dispense the petrol for the amount to be given by the customer. Petrol dispensing systems are most commonly found in our daily life in different places like offices, Bus stands, Railway stations, Schools, etc., Here we are going to promote a modern era petrol dispensing system which is to be operated with RFID technology. This project is about designing a prepaid card for petrol bunk system and also petrol dispensing system using RFID technology. In recent times all the petrol stations are manually operated. These manual petrol pumps are time consuming and require more man power. Normally placing the 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. The customer can avail the service which has to be done the by electronic clearing system.*

***Key Words*: RFID Technology, Petrol Dispensing System, Automatic Petrol Control, Petro Cards, Payment and security.**

1. INTRODUCTION

RFID Based Automatic Petrol Pump is used to reduce human work, to develop an auto-guided mechanism and to implement the task sequentially by RFID technology. These dispensing systems are highly reliable and less Time-Consuming devices. The major components used in this project are 8051 Microcontroller, RFID tags, Power supply, a Motor driver, an LCD display and an RFID reader.

1.1 What is RFID?

Radio-frequency identification (RFID) technology is an automatic identification method, relying on storing and remotely retrieving data using RFID tags or transponders. This technology requires some extented cooperation of an RFID reader and an RFID tag.

An RFID tag is an object that can be applied and incorporated into a product, animal, or person for the purpose of identification of individual and tracking them using radio waves. Some RFID tags can be read from several meters away depend upon its sequence strength beyond the line of sight of the reader.

1.2 COMPONENTS OF RFID

The basic RFID dispensing system consists of three main components:

- An antenna or coil which is used to transmit
- A transceiver extended with decoder
- A transponder which is a RF tag electronically programmed with unique information

1.3. Advantages of RFID Over Bar Coding

1. No "line of sight": Sometimes Bar code reading capacity can be limited or problematic due to the need of having a direct "line of sight" between a scanner and a bar code. RFID tags can be easily read even through materials without line of sight.

2. More automated reading: RFID tags can be read automatically whenever a tagged product comes past or gets close to a reader, this reduces the labor required to scan product and allowing more proactive, Real-time tracking.

3. Improved read rate: RFID tags offers the higher read rates than bar codes, these RFID tag can be read once in a millisecond especially in very high-speed operations such as carton sortation, etc.,

2. EM-18 RFID READER

The EM-18 RFID Reader module operating at 125 KHz frequency. This reader is an inexpensive solution for your RFID based application and it is easily available. The Reader module comes along with an on-chip antenna and it can be powered up with a 5V nominal power supply. Once we Power-up the module and connect the inbuilt transmit pin of the module to receive pin of your microcontroller they will begin to initialize. Then show your card within the reading distance and the card number is thrown at the output at the display area. Optionally the module can be configured for output as well as detecting source.

BLOCK DIAGRAM

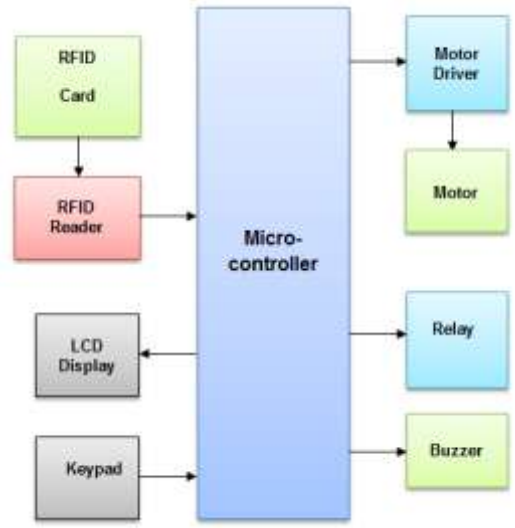

Fig -1: Block Diagram

The microcontroller which is the main processor of the system stores several cards details and compares the data given by the RFID reader. When both the details of the card and microcontroller match, it sends the control signals to the relay so that the motor operates to pump petrol.

In this system we proposed three simple RFID smart cards. Among these two cards are known, authorized and the rest is unknown. When the customer reaches the bunk 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 and then it moved to further steps. Then it will ask for the pin number to the customer. If the entered pin number by the customer is correct then it will process and ask for the amount for the petrol to be dispensed. In such a way this dispensing system works.

If suppose the customer swipes with unauthorized card, then the reader will not able to recognized the card and it will display the error message as the card is unauthorized. In such a way the system is fully secured. This system does not require any high performance and costly micro-controller such as ARM series. It is done using low cost micro-controller which indirectly reduces the cost of the total system.

HARDWARE REQUIREMENT

1) Microcontroller AT89C52

2) RFID tag

3) RFID reader

4) Relay

5) Graphical LCD

6) Keypad

7) Dispensing system

8) Buzzer

FLOW OF THE SYSTEM

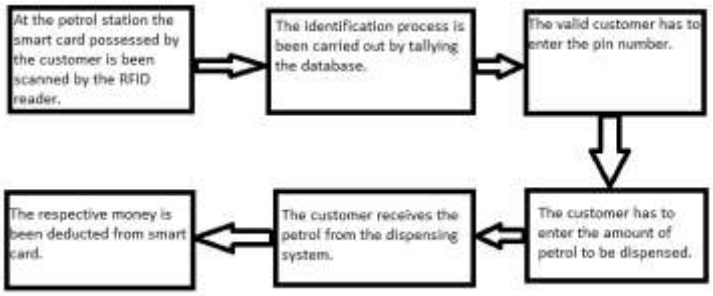

Fig-2: Flow of system

APPLICATION

1. e-Payment
2. e-Toll Road Pricing
3. e-Ticketing for Events
4. e-Ticketing for Public Transport
5. Access Control

IMPLEMENTATION

Fig-3 Complete hardware structure of the system

ADVANTAGES

1] Man power is conservatively reduced because of automated self-service.

2] Due to use of RFID technology robbery of the fuel from the bunk is avoided.

3] The time taken by the system is very less.

4] Low power only consumed.

5] Accuracy in the amount of petrol is maximum.

6] Highly sensitive device.

CONCLUSION

RFID system is a versatile technology where we can save our time, money, etc., This RFID system is used in many application based industries and real time application. In our application, RFID system dispenses the accurate amount of fuel which required for the customer need and it will reduces the misuse of the fuel. And if the customer tries to swipe with the unauthorized card, the RFID system rejects the card so system is fully secured. To obtain best performance the RFID readers and Tags must be in good quality and they should be maintained properly.

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