

Novel Design of Automated Petro-Filling System

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ABSTRACT

Today almost all petrol pumps have a microcontroller to control the electric pump, drive the display, measure the quantity and accordingly turn off the electrical pump. To eliminate this human interaction so that there is no need of workers to fill the petrol. In this system, all drivers have a Smart Card called RFID card which can be recharged by some amounts. The petrol pump is equipped with a smart card and will display it on the LCD. The electric pump is then turned on accordingly the amount filled in the keypad, fills the tank and automatically turned off. Added to that, this system has a gas sensor to detect any fire in the area and trim pot is used to sense the fuel level available in the vehicle tank. So this implementation of automatic petrol pump by using RFID and also monitoring the fuel level in the vehicle before and after filling in order to avoid petrol theft. This system can improve the fuelling process in order to make easier, reliable and secure. The keypad is used to type the how much amount of petrol the user want. The trim pot used in this project, will detect the level of petrol displays the results of petrol in past and petrol in present at before/after filling in the LCD. The important feature of this project is that it eliminates human interaction and avoids the situation of black selling in absence of service man. Hence this project make the automated petrol bunk system with no boundation and reduced man power.

Keywords: RFID Technology, Trimpot, Fire sensor.

1. INTRODUCTION

The main aim of our project is to implement the security system for filling petrol at the petrol bunks by avoiding human interaction. The purpose of this project is to provide a security based accessing system for filling petrol at the petrol bunks to avoid the risk of carrying money every time and also provides the feature of prepaid recharge. RFID based petrol automation petrol pump is to reduce human work and develop an auto-guided mechanism and to implement the task sequentially by using RFID Technology. The components used in the project are 8051microcontroller, RFID tags, power supply, LCD display, a motor driver, an RFID reader and keypad.

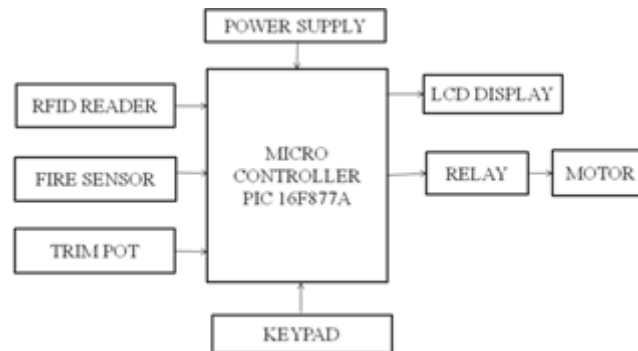
2. LITERATURE REVIEW

RFID is the acronym for Radio frequency identification, which is an automatic identification technology. It is used for to retrieve and store data on to the RFID tags without any physical contacts. An RFID system typically consists of RFID tags, RFID readers, and database management system. The tags may be either passive or active. Through its antenna, RFID reader reads the information stored on this tags. For the RFID operation, the frequency of the reader ranges from 125KHZ - 2.4GHZ. One of the advantage of the RFID system is that, line of sight is not essential for reading the tags with the reader, therefore, it require much less human handling to be read and processed.

3. PROPOSEDSYSTEM

The project is implementing as an RFID-based petrol bunk. Users use RFID card: Petro Card with RFID tags including user verification codes. These cards can be recharged at the 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 signals to the relay such that the motor operates to pump petrol.



The system proposed states three simple uses of RFID smart cards. Among these two cards are known and the rest is unknown. 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. If the customer swipes with unauthorized card, then the reader will display the error message as the card is unauthorized. In such a way the system is secured.

Algorithm:

1. Start.
2. Vehicle enters a fuel station.
3. RFID reader is waiting to get a tag.
4. Data simultaneously send to controller
5. Turn on fuel dispenser display allow amount of fuel.
6. Display the customer balance on LCD.
7. The amount will be deducted automatically from the user card.
8. After filling petrol, turning off the fuel pump.
9. End

4. HARDWARE REQUIREMENTS

4.1. Introduction to Microcontrollers

Circumstances that we find ourselves in today in the field of microcontrollers had their beginnings in the development of technology of integrated circuits. This development has made it possible to store hundreds of thousands of transistors into one chip. That was a prerequisite for production of microprocessors, and the first computers were made by adding external peripherals such as memory, input-output lines, timers and other. Further increasing of the volume of the package resulted in creation of integrated circuits. These integrated circuits

contained both processor and peripherals. That is how the first chip containing a microcomputer, or what would later be known as a microcontroller came about.

4.2. PIC 16F877A Specification

It is a high performance RISC CPU. Its operating speed is DC-20MHz clock input, 8K bytes flash program memory, 368 byte RAM data memory, 256 byte EEPROM data memory, in-circuit serial programming, interrupt capability up to 10 sources, two 8-bit timer/counter, one 16-bit timer/counter, 10 bit analog to digital converter, universal synchronous receiver, 33 I/O pins with individual direction control.

4.3. PIC 16F877A Description

A PIC microcontroller is a single integrated circuit small enough to fit in the palm of a hand. 'Traditional' microprocessor circuits contain four or five separate integrated circuits - the microprocessor (CPU) itself, an EPROM program memory chip, some RAM memory and an input, output interface. With PIC microcontrollers all these functions are included within one single package, making them cost effective and easy to use. PIC microcontrollers can be used as the 'brain' to control a large variety of products. In order to control devices, it is necessary to interface (or 'connect') them to the PIC microcontroller.

4.4. DC Motor

A DC motor is used to drive a mechanical load. In this lab, a separately excited DC generator provides the load. The load on the motor is adjusted by varying the generator field current. By increasing the field current of the DC generator, the load on the DC motor increases and thus the armature current increases. In general, DC motors are characterized by their torque-speed curves. In a DC motor, the stator poles are supplied by DC excitation current, which produces a DC magnetic field. The rotor is supplied by DC current through the brushes, commutator and coils. The interaction of the magnetic field and rotor current generates a force that drives the motor. The magnetic field lines enter into the rotor from the North Pole (N) and exit toward the South Pole (S).

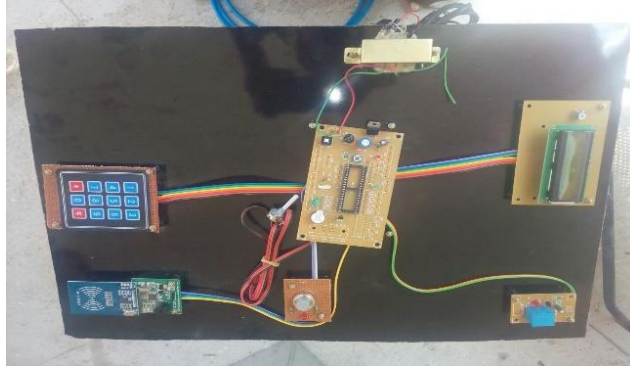
4.5. Power Supply

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

4.6. Liquid crystal display (LCD)

A liquid crystal display (LCD) is an electro-optical amplitude modulator realized as a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. It is often utilized in battery-powered electronic devices because it uses very small amounts of electric power. Each pixel of an LCD typically consists of a layer of molecules aligned between two transparent electrodes, and two polarizing filters, the axes of transmission of which are (in most of the cases) perpendicular to each other. With no liquid crystal between

the polarizing filters, light passing through the first filter would be blocked by the second (crossed) polarizer. The surfaces of the electrodes that are in contact with the liquid crystal material are treated so as to align the liquid crystal molecules in a particular direction.



5. CONCLUSION

RFID system is a versatile technology. This system is used in real time application. In this proposed project RFID system dispenses the accurate amount of fuel which reduces the misuse of the fuel. It also reduces the man power. The unauthorized usage of the petro card is blocked by the unique RFID tag and thus the security of the system is assured. To obtain best performance the RFID reader and Tag must be in good quality. This electronic system is easily marketable because of its cost and simplicity of the design. It also has the advantage of low power consumption and reliability. This proposed system ensures security for filling petrol to vehicles at the petrol bunks using RFID card accessing system. Thus the system proves to be an efficient and reliable system by automating the fuel stations. 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.

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