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# Smart Petrol Pump

Himesh Mukherjee, Debdeep Kundu and Samadreeta Ghosh



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# *SMART PETROL PUMP*


Himesh Mukherjee
ECE
MCKV Institute of Engineering
Haripal, India
himesh9679966456@gmail.com

Debdeep Kundu
ECE
MCKV Institute of Engineering
Serampore, India
debdeepkundu98@gmail.com

Samadreeta Ghosh
ECE
MCKV Institute of Engineering
Howrah, India
samadreetaghosh@gmail.com

Dr. Atanu Banerjee
Faculty Advisor
ELECTRONICS & COMMUNICATION ENGINEERING
MCKV Institute of Engineering
mail_2_atanu@yahoo.com



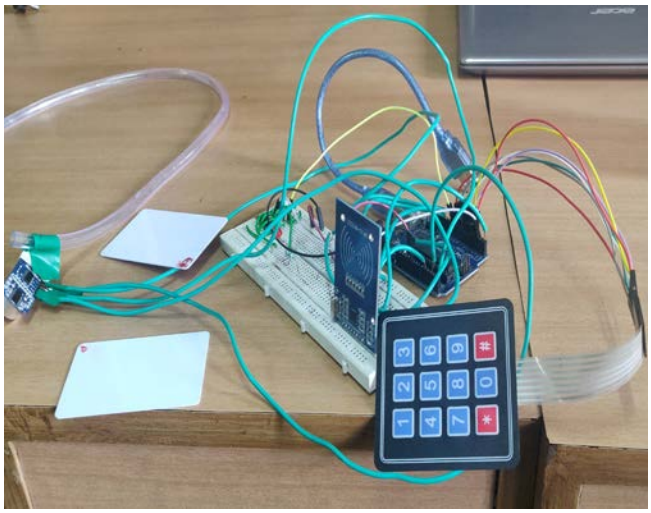
***Abstract*— In current days fuel stations are operated manually. These fuel pumps are time-consuming and require more manpower. All these problems are sorted out by the present fuel dispensing system based on RFID technology. The system can improve the fueling process in order to make it much easier, secure and reliable. It prevents unauthorized fueling by assigning a specified amount of fuel for registered vehicles, depending on their types, within a specific period of time so that each vehicle will get a sufficient amount of fuel. It also provides efficient statistics about the various quantities of fuel at the stations. The hardware part of this system consists of a microcontroller, card, motor driver (L293D), LCD, mini submersible pump, keypad and other basic electronic components, which is attached to conventional fuel dispensers in order to make them work under the RFID technology. Additional features of this system include a website and a phone application, which allow customers to login to their accounts. Moreover, auto cut system is available too if the customer wants to fill the entire vacant capacity with fuel.**



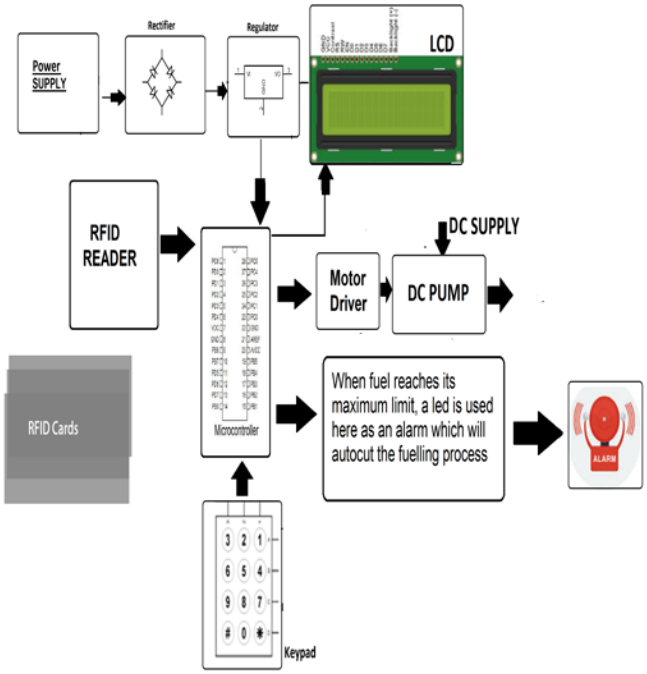
***Keywords*— *Microcontroller, LCD, mini submersible pump, 4x3 matrix keypad, Motor driver(L293D), RFID reader; Automation;***


## I. INTRODUCTION

The 21st century is aptly known as the internet age because of the increasing use of internet in the day to day activities. Examples of these applications include online banking and brokerage, cash management, tax filing, computerized petrol pump, medical field. As far as computerized petrol pump is concerned, a lot has already been done in this field. Each and every data is being inserted with the help of the computers. But as far as the safety of Fuel pump is concerned, leakage of petrol or any oil leads to a blast and stealing of petrol may lead to a debacle. The aim of the system is to provide an authentication to the user & control the opening or closing of the tank valve according to the amount demanded. This project is fully automated with the help of various electronic devices, components, and circuits. Mainly this project is featured on the microcontroller and smart card in which microcontroller acts as an active device while smart card act as a passive device. Automatic petrol pump provides the feature of instant recharge. The smart card is added to an account which has a specific amount of money and it is necessary to have a smart card for this service. Only by the help of smart card, a customer can access this service. It is a type of self-service system. In recent days the distribution of fuel is controlled manually. Even though there are a lot of automatic systems are existing but still, there are some constraints. For the safe distribution of the fuel, an advanced system can be developed. In this system, a flow is used sensor to sense the flow of fuel into the tank. The required quantity of fuel is typed using the keypad. LCD display is used to show up the information. L293D motor driver switches the Pump and motors. Overall Automation has added a new look to petrol pump which is very attractive with zero rushes as there is no serviceman. There are so many profits for the customers and the owners of the petrol company after installing the automated petrol pump with accuracy and security services. It blocks the black selling of petrol and minimizes the human involvement.



## II. Block Diagram




## III. BLOCK DIAGRAM DESCRIPTION

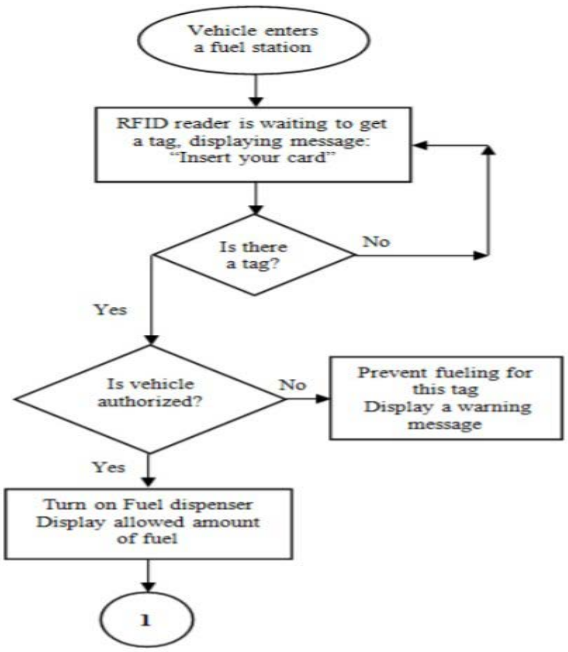
When RFID card or tag comes in the range of RFID reader, the RFID reader reads the ID number of the RFID card. Where the ID numbers of the RFID cards are already stored in the microcontroller. The microcontroller verifies whether this RFID card is authorized or not. If RFID card is authorized than microcontroller displays RFID card is authorized on the LCD screen, otherwise it displays RFID card is unauthorized and initiates the buzzer. If RFID card is authorized than microcontroller gives the access to the customer to enter the amount of the petrol using keypad and it is displayed on the LCD screen. Then microcontroller checks whether the available balance of the RFID card is more than the entered amount. If it is more than microcontroller turns ON the pump motor through relay switch for a particular time period and then pump motor automatically turns OFF. After completion of petrol filling process, the information of the petrol dispensed amount and remaining balance in that card is displayed.

## IV. SCOPE AND SIGNIFICANCE OF THE PROJECT

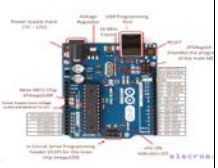
First of all, the petrol pump with our technology can be possible to operate all the time without help of manpower, in this project there will be a centralized server having the database of the customer like Customer Name, Card No, after paying the cash the balance can be increased and depending upon the use of the card for purchase of petrol the balance will be deducted. Benefits of using Smart Petrol Pump are

1. Reduce fuel theft and fraud.
2. Fast billing, account report generation.
3. Accuracy in the amount of petrol filling.
4. Benefit to the petrol companies by maintaining the data of the costumers as well as the petrol consumption.

## V. FLOW CHART OF THE PROJECT



## VI. FIGURES AND TABLES

| ***NAME*** | ***FIGURE*** | ***DESCRIPTION*** | ***PURPOSE IN PROJECT*** |
|---|---|---|---|
| ARDUINO |  | Micro controller used | Used to connect more than one components related with the project. |
| RFID READER |  | This RFID scanner works in 13.2 MHz and scans for any rfid tag or card present. | Scans for the petrol(fuel) cards of the customer |
| 4X3 MATRIX KEYAD |  | Used to take numeric inputs | Used to enter the amount of fuel |
| 12V DC MOTOR |  | can convert the direct current into mechanical energy or convert mechanical energy into **DC** power. | Used to pump fuel to customer's fuel tank/container. |
| L293D MOTOR DRIVER |  | allows the DC **motor** to drive on any direction | Helps the motor to pump the fuel |
| RFID CARDS |  | Consists of a coil having some data blocks | Stores the amount in rupees that is present in the user's card |
| | | | |

## VII. RESULT

Petrol pump with our technology can be possible to operate all the time without manpower. Our system provides a corruption free efficient fuel pumping system. Comparing to other technologies this is most relevant and useful in the current society. As the rate of fuel increasing day by day this project is very efficient and useful to current society. We are implementing a system to reduce corruption. This system provides the feature of prepaid card recharge facility and it also provides the authority to customers to access the petrol in all the petrol stations across the country through a single RFID card. Another importance of this system is to give the security to the costumers instead of carrying the money every time. In this we are dealing with a secure and fast transaction. The rate of fuel updated daily so they cannot be cheated. Users are able to know how much fuel is pumped. In case any chance of explosion, messages are sent to authority. So, this project is expected to be an efficient automatic fuel filling system.

## *Acknowledgment*

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## *References*

[1] Stephen B. Miles, Sanjay E Sharma, John R. Williams, "RFID Technology and applications", 2008 edition published by Cambridge University Press.

[2] C. R. Dongarsane, Pooja Dalavi, Sunaina Golandag , Snehal Powar, "Self-Operated Petrol Pump", International Journal of Advance Research, Ideas and Innovations in Technology, Volume3, Issue2. 5.

[3] Behera Susanta K.Prof. Farida Asraf Ali "Automobile Fuel Pump Control System Using Embedded System", International Journal of Computer Technology & Electronic Engineering Volume 3 Issue 2, April 2013