

Automatic Petrol Pump System for Smart Cities

B. Arjun¹, N.Nireekshan²

¹ B. Tech Scholar, Department of Electrical and Electronics Engineering, Siddhartha Institute of Engineering and Technology, Vinobha Nagar, Ibrahimpatnam, Hyderabad, Telangana 501506.

² Asst. Prof., Department of Electrical and Electronics Engineering, Siddhartha Institute of Engineering and Technology, Vinobha Nagar, Ibrahimpatnam, Hyderabad, Telangana 501506.

ABSTRACT

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. Liquid dispensing systems are quite commonly found in our daily life in different places like offices, Bus stands, Railway stations, Petrol pumps. Here we are going to present modern era petrol dispensing system which is meant to be operated with prepaid card using RFID technology. The project mainly aims in designing a prepaid card for petrol bunk system and also petrol dispensing system using RFID technology. In current days the petrol stations are operated manually. 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. The customer self-going to avail the service has to done the payment by electronic clearing system.

Keywords – *unmanned power pump, based on RFID technology, prepaid system.*

I.INTRODUCTION

Today 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. This project aims at designing a system to eliminate this human interaction as that there is no need of workers to fill the petrol. In this system all drivers

have a smart card. There are various features of our project. It can offer number of advantages to the user. Our project has some of the most countable features like:

Automatic: To automatic transmission petrol can be filled into the tank without human interface.

Manual: Manual operation permits the user to make use of a prepaid card. To use smart prepaid card.

RF transmitter and receiver are used to interface pump and bike module. First it will sense the petrol existed. Level of the petrol is displayed on LCD. We would never like to be interrupted by anyone for long time when we are travelling on a highway by our car, but we cannot avoid one interrupt. That it petrol filling. We can make it less time consuming by making it automatic like our mobile phone. We can implement prepaid system in this system. This will be consisting of prepaid card, RF modems, microcontroller, software and computer. This system will reduce manpower and will save time. When some vehicles arrives at petrol pump the parameters like vehicle type, Number, colour, driver's license number will be automatically updated to the system. The software will be prepared in C. Now user will just enter the amount from keypad by sitting in car itself, and vehicle will be filled with petrol. The increase in the number of vehicles in India in recent years has led to the congestions and traffic jams in almost all cities of India. The dispensing of the fuel to this 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. [1]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 PIC18F microcontroller, RFID tags, Power supply, an LCD display, a Motor driver and RFID reader. Petroleum products are one of the valuable and rare creations of the nature. The proper use and distribution is an important task to survive these products. A fuel station is a facility which sells fuel 1 Automatic Prepaid Petrol Pump and lubricants via fuel dispensers or otherwise called browsers which themselves are used to pump gasoline, Diesel, kerosene, etc. into vehicles and to calculate the financial cost of the product thus dispensed. Enterprises engaged in urban and suburban public transport as well as other transport enterprises big fuel consumers. Need control of fuel delivery to prevent or at least minimize the misuse of the fuel. The emergency of radio frequency technology has changed the traditional methods of data collections. Compared to the traditional bar code, magnetic card and IC cards, RFID tags have the features of non-contact, reading speed, no wear, long life, user friendly and the security function. The use of RFID for vehicle identification, toll collection, traffic management has already been experimented with extensively. This paper proposes the implementation of RFID technology in controlling fuel dispensing for dense populated countries.

II.LITERATURE SURVEY

2.1 MANUAL CONTROL- In this, the control and automation are done by Manual Operation.

Drawback: Human Errors subsequently affects the quality of end product. Hard Wired Logic Control. In this, Contractors and Relays together with timer and counters were used in achieving desired level of Automation. Bulky and complex wiring,

Involves lot of rework to implement changes in control logic, Work can be started only when it is fully defined which leads to longer project time.

2.2 ELECTRONICS CONTROL WITH LOGIC GATES: In this, Contractors and Relays together with tillers and counters were replaced with logic gates and electronics timer in control circuit.

Advantage: - Reduced spare requirement, energy saving, less maintenance and hence greater reliability. **Drawback:** - Implementation of changes in the control logic as well as reducing project lead-time was not possible.

2.3 PROGRAMMABLE LOGIC CONTROL: In this, instead of achieving desired control and automation through physical wiring of control devices, it achieving through program say software.

Advantage:-Energy Saving, Reduced Space, Modular replacement, Easy troubleshooting, Error Diagnostics programmer.

Drawback:-Expensive, It requires Third parties license, Bulky to carry, Expert person required. Above processes are used for automation from several decades as there technologies were developed. As each of them having some drawback to overcome them we are replacing them with other technology.

III.PROPOSED SYSTEM

In this project, the customer having the RFID card. The card is nothing; magnetic member is embedded in the card. The reader circuit generates majestic signal to read the majestic number. When customer shows this card on the reader, the reader reads that majestic number and given the corresponding signal to microcontroller. In microcontroller, we have already programmed. So it checks the number whether it is an authorized card or not and the corresponding information is displayed on the LCD display. The keypad is used to enter the quantity of petrol. In microcontroller we already set time for

litres. When you entered the designed quantity on the keypad the microcontroller activates the relay driver for that particular time period. The driver circuit is used to turn ON, turn OFF the relays. Relay output is directly connected to petrol pump. So it pumps the petrol as per our designed quantity entered in the keypad. The petrol quantity and their corresponding cost are displayed on the LCD display.

IV. HARDWARE DESCRIPTION

4.1 Hardware required is

- 1) Microcontroller PIC18F452
- 2) RFID tag
- 3) RFID reader
- 4) Relay
- 5) 16*2 LCD
- 6) RF TX & RF RX
- 7) Dispensing system.

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. This system does not require any high performance microcontroller such as ARM series. It is some using low cost microcontroller which indirectly reduces the cost of the total system.

V. Results

The complete prototype as developed was tested and verified results .It successfully deduct the money from smart card also received a alert information and operation of the project is clearly verified.

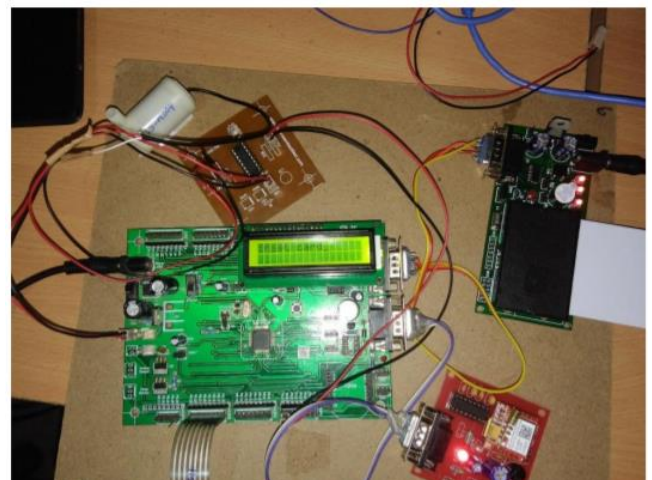


Fig 1. Experimental Setup

VI. CONCLUSION AND FUTURE

RFID system is a versatile technology. This system is used in many application and real time application. In our application, RFID system dispenses the accurate amount of fuel which reduces the misuse of the fuel. And it also reduces the man power. And if the customer tries to swipe with the unauthorized card, the RFID system rejects the card. In this way the system is so secured. To obtain best performance the RFID readers and Tags must be in good quality.



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.

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