Automated Fuel Pump System using UPI Payment

M. Saravanan, D. Yuvaraj, K. Lokesh, R. Mahesh Ashwin, S. V. Kavin karthik

Abstract: ***In our society, the major problem in the petrol station is waiting for a long time to fill the petrol, even though the filling is done the money handling take longer by implementing this project we can do it quickly. Now UPI ID is available in the petrol station for the transaction purpose only. This idea will eliminate the human resources used in the station. The right quality can ensure by maintaining the proper density of petrol/diesel. To measure fuel quantity regularly, we insert a device inside the underground storage tank. It gives the reading of fuel quantity in the display unit. Automation helps build trust among the customers. At a petrol pump trust is the most significant factor in growing sales. Most of the customers will come from a nearby locality if they generate strong word of faith then more customers will visit.***

Keywords: UPI ID, GSM, Electro-Magnetic Pulse, Secure Socket Layer, CCP, RFID, PIR, UART, SIM

I. INTRODUCTION

In recent days human resources control the distribution of fuel at the fuel stations to the respective customer vehicles. This distribution depended on man's loyalty who is responsible for doing this job. Nowadays, there is rapid growth in the advancement of industries, and they are thinking more about consumer satisfaction. For the secure distribution of products, the industries are trying to develop a new advanced security system to achieve their goals efficiently. However, in today's petrol distribution system, there are some disadvantages related to stealing of petrol, unauthorized petrol selling and wastage of human resources, etc. We know the 21st century as the internet age as there is an increase in the use of internet in our day-to-day activities. Examples of these applications include online transactions, cash management, tax filling, computerized petrol pump, medical field. But, electronic petrol pump is more concerned, they have done already many modifications. With the help of computers, all the customer's data is uploaded to the cloud.

But, we are all concerned about the safety, and we are still behind. The main aim of the system is to provide authentication to consume and control the opening or closing of the fueling valve according to the amount mentioned by the consumer.

Revised Manuscript Received on February 24, 2020.

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II. PROJECT DESCRIPTION

This project is to secure a fueling system that can be accessed through UPI ID or debit card transaction. The major problem takes place in the fueling process the customer doesn't know about the quantity of petrol they are getting filled. In a particular petrol station, the customers are getting cheated by the filling person. Our idea is to take the necessary action to eliminate this activity.

At present drivers expect fast and convenient services at the gas station. Pay at pump process eliminates the need to lock the car and walk inside then pay the cashier before filling up — saving a great deal of time and hassle. Besides, pay at the pump allows gas station attendants more time to do other tasks and manage the customer's in-store for improvised service.At earlier fuel station attendants pumped the fuel and checked tire pressure while customers sat in their cars. Instead, customers use pumps and pay on their own, while workers can focus on other responsibilities. As most fuel stations are attached to convenience stores, attendants can improve customer service inside the store, while customers outside can serve themselves.

III. EXISTING SYSTEM

The micro-controller helps to store several card details and checks with the database details given by the RFID reader. When these details match, it sends the signal to the relay such that the motor operates to pump petrol. The system states three simple uses of RFID smart cards.

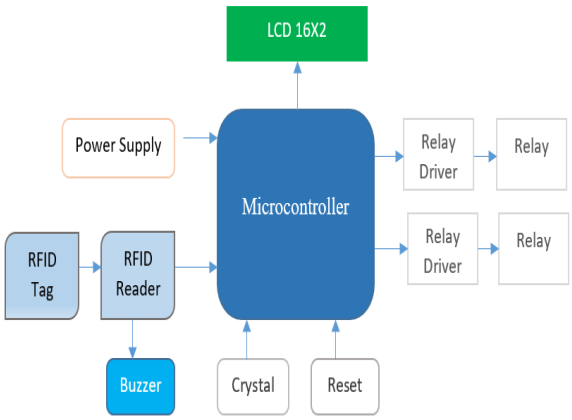

Fig. 1.Existing system block diagram

In this system, the micro-controller stores the specific card details and it compares with the data present in the RFID reader. When the reader details matched, it signals the relay. Then the motor operates to pump petrol. When the customer fills the fuel at the station, first he will swipe the card, if it allows the card RFID reader will accept the card. After it will ask for a PIN. Then it will enable the correct pin, and then the petrol is dispensed to the vehicle.

The system accepts the allowed RFID card. The system operates by receiving the values entered by the user to the micro-controller, which represents customer request. And customers get the exact amount of fuel. The RFID system is a versatile technology. We use this system in many real-time applications. In our application, the RFID system dispenses the precise amount of fuel which reduces the misuse of the fuel. And it also reduces human resources. The RFID system rejects the card if a customer tries to swipe an unauthorized card. To get the best performance, the RFID readers and tags must be in good quality. It will require some time and error can occur quickly.

If the customer swipes with an unauthorized card, then the reader will display the error message. RFID is a versatile technology, and it has many applications. Even though it has many applications for fast reading of the scanner, it cannot be used widely. Sometimes the scanner will reject the details. So we consider them as a drawback and use the operation to operate efficiently. This RFID petrol pump system does not providea high-security transaction for the customers for filling petrol at the Petrol stations even though it avoids the involvement of human beings, hence reduces the use of physical money every time. This petrol pump system comprises Atmega328 micro-controller, RFID module, LCD, Keypad, Ac pump and alarm. When RFID reader, reads the card it asks for the 3-digit password, if we enter the wrong password more than twice, it raises the alarm.

IV. PROPOSED SYSTEM

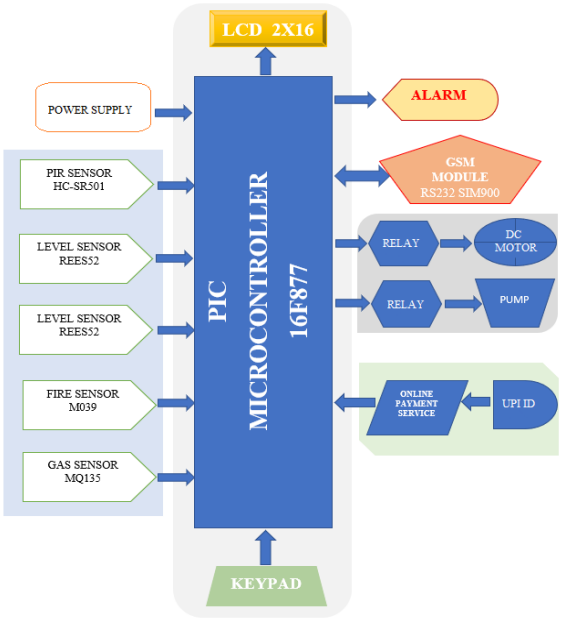

Fig. 2.Proposed system block diagram

In this proposed system, when the customer enters the petrol bunk, PIR sensor detects the motion of the customer and turn on the fueling machine. In this way, there is an efficiency in saving power in the petrol bunk. After it turns the device on the customer needs to scan the Q.R. code placed in the petrol bunk with our smartphone. When the customer scans the code, connection with the server will be established. The first point is to make sure that the connection that we made is correct or not, which will be displayed on your mobile phone. If that connection is right, then the payment process will takedown. The customer has to enter the amount for the fuel needed to be filled to the vehicle. After they enter the amount, the GSM module will send the message to the server and gets the information to be processed. The GSM module gets a frequent update about the current amount for the fuel.

The display will be provided in the machine to confirm the UPI payment process. The is UPI payment method is very secure and easy to use by everyone. Two-level sensors are used in the fueling machine to detect the amount of fuel. According to that output, the relay will be turned on, and the pump will help to fill the fuel in the vehicle. The PIC microcontroller will control the timing of relay should be turned on and the fueling process. The amount will be debited after the fueling process automatically.

V. PIR MODULE

The PIR Sensor allows us to sense motion. It is always used to detect the movement of a human within the sensor's range. PIR has an on-board pyroelectric sensor, conditioning circuitry, and a dome-shaped Fresnel lens. The PIR sensor provides an output "HIGH" when a human body is detected and an automatic Delay "LOW" when no signal is motion is detected. The delay time can be changed using the potentiometer in the circuit-board. The delay time can be changed manually the minimum is 5 seconds and maximum is200 seconds.

VI. GSM MODULE

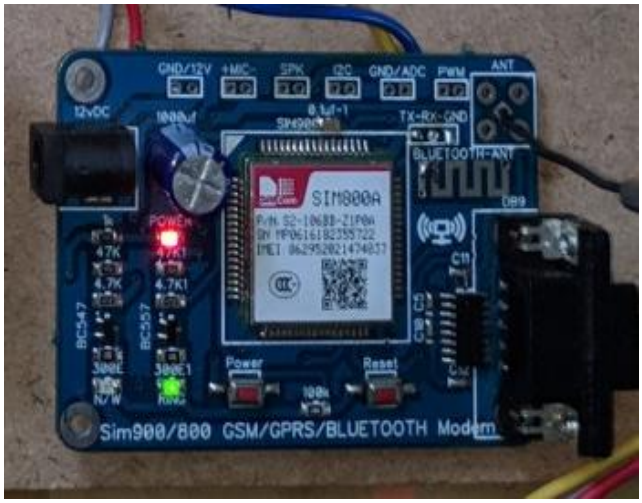

Fig. 3. GSM Module

GSM Module is a plug and play interface with a simple serial interface. This module is used to send SMS and can make or receive calls, and do other GSM operations by controlling it through simple AT commands from microcontrollers and computers. It uses the highly popular SIM900 module for all its services. It comes with RS232 interface which can easily interface the modem to microcontrollers and computers. The module comprises all the required external circuitry required to experiment with the SIM900 module like the power regulation, external antenna, SIM Holder.

VII. RESULT

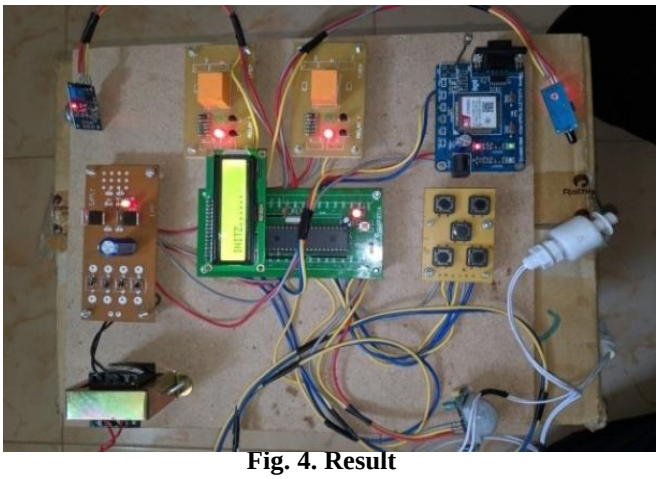

Fig. 4. Result

The above figure shows that the hardware implementation of the Automation in petrol bunk using online payment. The application contains PIC micro-controller, GSM, Fire sensor, Level sensor, Relay, LCD. Two-level sensors are fitted into the tank to know the level of petrol in the storage tank of the petrol bunk. When the amount is transferred using the UPI ID, the PIC micro-controller gets the message of how many rupees and then the program converts the amount of money into the time of petrol pump so that the petrol will be dispensed accordingly. The relay helps in switching ON and OFF of the petrol pump.

A. Level measurement process

It is the primary devices which will carry out the initializing operation to measure the level of petrol available in the station. Single-probe vibrating level sensors are ideal for sensing level. Since only one sensing element contacts the fuel, bridging between two probe elements is eliminated, and media build-up is minimized.

B. Motion detection process

When the user came nearer to the filling place, it will automatically detect the motion of the person, and it will switch the motor to fill or to fetch the petrol form underground. It will detect the movement up to distances of at least 15 feet (4.6 meters). Here, we used in low range because of this accuracy increases.

C. Flame Sensing Process

In case of any emergency, we used Fire sensor and the Gas sensor for the purpose to take an early measure. There are lots of gas stations also available in our country. If any leakage occurs, it will notify us through the alarm embedded with the system. This sensor uses the infrared flame flash method, which allows the sensor to work through a coating of oil, dust, water vapour, otherwise ice.

D. GSM Process

For every processed transaction that is done successfully are sent to the retailer, and it will be stored in the cloud storage. The GSM module (SIM900) equipped with the SIM can send a text message to the owner. We used simple commands in the program to tell the controller to send or receive data. The controller sends the data to the module through the UART Interface based on protocol set up in libraries. The module sends the data to another GSM user using a cellular network. If the GSM receives any data from the mobile network (or another GSM user), it will transmit it to controlled through UART serial communication.

VIII. CONCLUSION

It ensures security to users as UPI ID technology gives unique proof of identity to each user. Maintenance of this system is straightforward. This implementation reduces the time that was wasted in conventional fuel stations — the main goal of this to upgrade the traditional petrol pump by reducing manpower and enabling the smart transaction. The software part is done in Embedded C language, which is a user-friendly language to fulfill the user's need. Due to up-gradation to smart transaction cheating in fuel station is completely neglected. In future the system can be enhanced by using touch screen display and bill printer to give the user a smart interface.

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