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A Review on Automated Fuel Pump System

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Abstract: In modern society, the main issue with fuel stations is the lengthy wait times for fill-ups, even though the money handling process is completed fast thanks to the project's implementation. The petrol station now offers UPI ID for use exclusively in transactions. Everything is digital now. Nearly all petrol pumps in many current systems feature a controlling device to manage the electrical pump, operate the display, measure the flow, and then turn OFF the electrical pump. However, a person is still needed to collect the money, and there is always a chance for human error.

In the proposed automated fuel pump system, we use UPI QR Code to obtain fuel at various petrol stations owned by various petroleum corporations across the nation. We only need to scan the QR Code and make payment each time we use the petrol dispenser to fill up the tank. The GSM module then reads the message and takes the appropriate action in accordance with the requests of the customer. By removing the involvement of people, this computerized petrol pump system also offers security to customers when they fill up at petrol stations.

Keywords: GSM, UPI ID, QR Code

I. INTRODUCTION

Recently, human resources have taken over administration of the fuel distribution at the filling stations to the cars that each customer has. This distribution was based on the fidelity of the man who was in charge of carrying out this task. The evolution of industries is expanding quickly today, and they are concentrating more on customer happiness. In order to effectively accomplish their objectives, the industries are working to create a new, enhanced security system for the secure transfer of goods.

However, there are significant drawbacks to the current petrol distribution system, including human resource waste, illegal petrol sales, and theft of petrol. We refer to the twenty-first century as the "internet age" because we utilize the internet more frequently in our daily lives. Online transactions, cash management, tax filing, computerized gas pumps, and the medical industry are a few examples of these uses. However, the electronic fuel pump is more important, and several changes have already been made. All of the customer's data is uploaded to the cloud with the aid of computers.

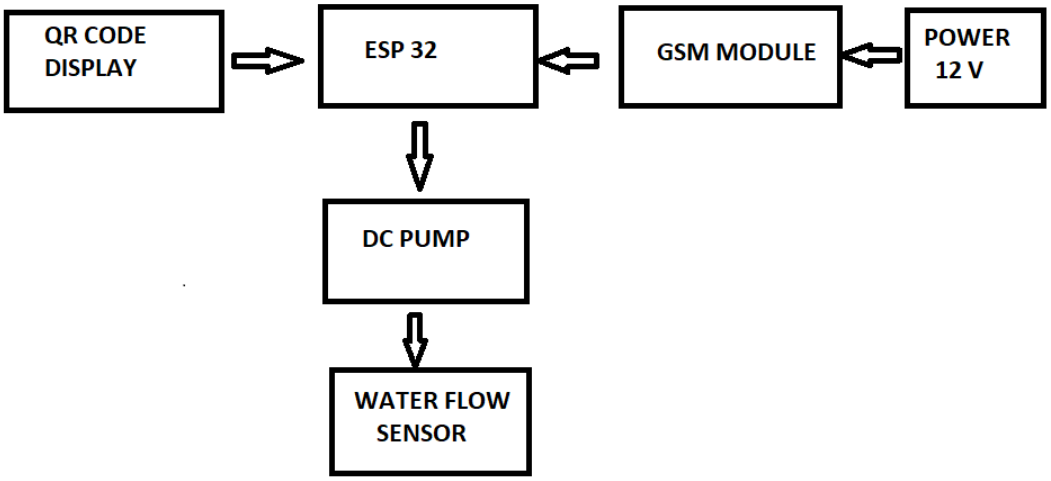

Fig 1: Block Diagram

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II. LITERATURE REVIEW

R. Alhafi et al., [1] E-commerce trading has sparked a variety of user-centered applications globally. Online ticket booking and shopping's steadily rising popularity have shown new facets of technology. For both customers and banks, the security of personal information and debit or credit card theft are key concerns, particularly when money is being transferred or when purchasing online. In this study, a different approach is suggested that makes use of E-Payment and QR Code transactions. The proposed study focused on developing an application for smart phones running the Android operating system and was examined using the Unified Modelling Language (UML). The QR code has a white background with black modules organized in a square arrangement. The data that is typically encoded in a QR code is text, alphanumeric characters, a URL, or other information that fits the QR code's layout. Additionally, QR codes include a lot of properties like 360-degree reading, high speed scanning, tiny print out size, dirt and damage resistance, and structural flexibility of application.

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M. C. Hemalatha et al., [2] In this research, the investigation and IoT-based control of the Brushless DC (BLDC) motor are presented. Robotics, actuation, and manipulators are just a few of the industrial applications that frequently use BLDC drive systems. The ever-expanding network of physical items with an IP address for internet access is known as the Internet of Things (IoT), as is the communication that takes place between these objects and other internet-enabled systems and devices. Because of the BLDC Motor's attributes, including its great efficiency, dependability, and high weight to torque ratio, industries have employed it extensively. The rate can be adjusted with this IoT control until the required output is achieved.

Kirti Chaudhary et al., [3] The goal of this project is to develop security systems whose Only respectable authorities are permitted access. The petrol station pump has a microcontroller-based smart card reader/writer. The driver switches the card and the smart at the petrol pump. The amount on the card is read by the card reader and shown on the LCD. The driver then uses a keypad to input the amount of fuel that needs to be refilled. His Petro Card is computed and reduced by the appropriate amount. The electrical pump then automatically shuts OFF after filling the tank based on the amount entered. Our electronic system worked as it should have. All of the functions outlined in our proposal could be implemented. Interfacing the micro controller with the hardware components was the major challenge we faced with this project. We believe that the ease of use, low cost due to low power consumption, and excellent reliability of this electronic system make it very marketable. This project can be used to develop a secure system. employing a smart card-based accessing system to fill up automobiles with petrol at petrol bunks.

Renee Garett et al., [4] This evaluation is based on the fact that engaging website and mobile application consumers now requires effective design. The design components that were discussed the most frequently in the literature under examination were readability, navigation, graphical representation, organization, content utility, and purpose. They talked about how these seven criteria have been defined and assessed in earlier studies. In order to operationalize best practices for promoting and forecasting user involvement, designers and researchers may find this review and the accompanying concise list of design features useful.

M. Praveen et al., [5 Implement a system that enables drivers to look for parking spaces online and reserve them in this paper. On their own electronics, the drivers employ this method. Similar to the usage of RFID, LED, and IR sensors, it addresses the shortcomings of conventional systems. By reviewing the available spaces and booking them in accordance with their vehicle's needs, drivers can reserve a parking space in a certain zone using this system. Additionally, a QR code is created with the user's unique information encoded in it. In order to simplify the authentication process, QR codes are employed for encryption. Thus by using this technique it may be very useful to cut back the load on the driver as well as to reduce traffic on road and may be helpful to park the vehicle within the peak hours.

Pallavi Tekade et al., [6] In this study, a brand-new code for the wealthy dubbed the two level QR (2LQR) Code is put out.The 2LQR code can be used as a confirmation component and for the secure transmission of private information. There are two levels in this 2LQR code: a public level and a private level. Any QR code reader programme can read the public level, but only certain software and input data are required for the private level. Due to its added reading level, the suggested 2LQR code expands the storage capacity of the traditional QR code. The findings of the experiment indicate a storage capacity improvement of up to 28%.

C. R. Dongarsane et al., [7] With the aid of different electronic components, devices, and circuits, this project is entirely automated. The microcontroller and smart card are the main components of this project, with the microcontroller acting as an active device and the smart card as a passive device. The ability to instantly refuel is a function offered by automatic petrol pumps. The smart card is added to an account that already has a certain amount of money, and a smart card is

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required for this service. A consumer can only use a smartcard to access this service. This kind of self-service system exists. Following dispensing, a precise amount of balance together with a receipt date and time are withdrawn from the smart card. It provides precise selling information and oversight over any adulteration. When the account balance is low, it will be indicated on the display but no dispensing will take place. UART (Universal Asynchronous Receiver Transmitter) is used to connect the GSM system to the microcontroller, allowing customers to get precise information about the balance availability and state of the smart card. Information is shown on an LCD panel. Relays are used to power electromagnetic relays, which serve as electromagnetic switches for pumps and motors.

A. Surekha et al., [8] Rapid expansion of e-commerce has given rise to a number of user-centric applications in every country. Online booking for tickets and shopping has become increasingly popular, revealing new technological frontiers. fraud involving debit or credit cards and personal Information security is a big concern for both customers and banks, especially when transferring money or purchasing online. In this study, a different approach that makes advantage of visual cryptography is suggested. For the purpose of e-payment transactions, two novel strategies are suggested. The first technique calls for the minimal personal data about the customer required for online fund transfers. This safeguards the customer data which indeed increases customer confidence and prevents identity theft. The second method is the generation of secure e-tickets for train and movie applications based on QR-Codes with encrypted content. The proposed methods are compatible with minimal infrastructure that is currently available with the customers

A. Mehta et al.,[9] the ability to read QR codes that a computer defined or created on its own utilising an encryption or decryption method. The specific domain describes specific information in secret code that contains authentication and encrypts or decrypts that information. Denso Wave in Japan created the matrix barcode known as the QR code first for the automobile sector. Due to its quick readability and larger storage capacity compared to traditional UPC barcodes, the QR Code method has gained popularity outside of the automobile industry. This essay considers the fundamentals of QR codes, their real-time applications in daily life, and related study fields. With mobile phone technology continually evolving, particularly in the field of mobile internet access, It appears that QR codes are a suitable method for communicating URLs to users quickly and effectively. Additionally, this enables the use of offline media, such as business cards, t-shirts, signage, public transportation vehicles, magazines, and newspapers, that can print QR codes, as carriers for adverts for things sold online. Due to the structural flexibility of the QR code, it can be used in a variety of applications, including boosting data capacity and security applications like various types of watermarking and steganography. The recognition of the QR code image has also been improved through some trials that use scratch-removal methods. In an effort to highlight some of the potential study areas.

A. Singh et al., [10] The primary goal of this research project was to address the main problem with QR codes, namely their limited storage capacity. In order to expand the data storage capacity of QR codes and to safeguard the ecosystem based on QR codes, a number of strategies and procedures are explored. There are seven chapters in this research paper. Since QR codes have so many practical uses, this research could be beneficial to society. These QR codes are now highly crucial for a cashless society, and they are also quite helpful for a successful demonetization process. For e-wallet payments, the counters of street vendors prominently display QR codes. Furthermore, the implementation of smart cities can benefit greatly from the use of these QR codes.

V. Jain et al., [11 The present paper is aimed at fulfilling sensitive tasks such as payment, ticketing and provides an analysis of the latest advancements in QR code detection and pre-processing technologies. The study also reveals the multi-step process of QR code recognition, by this paper it is achieved to help organizations in optimally adopting the technology for their respective needs.

A. Jarali et al. [12] Colleges, apartments, and gated communities have always supported an antiquated pen and paper approach for security administration. The majority of the time spent by security personnel is holding the records. Entrizee automates and computerises manual chores at the main gate(s) through intelligent security management for gated premises. By offering an app to help with entering user information, maintaining records, and performing analytics on it—tasks that would otherwise need to be done manually—this system is intended to maximise security. The system will match the user's expectations of minimising the time needed at the gates for physically entering all the details while being simple to understand and use.

V. Adjiski et al., [13] This study describes a QR code integration system for the underground mining sector employing smartphones, where each worker can access information and data essential to the efficient completion of their work tasks. This study will also discuss three applications and integration scenarios for this technology in underground mining operations. The introduction of smartphones by people of all ages has made accessing QR codes very simple by supplying the end-user with material such as item identification, personal details, time monitoring, document management, etc.

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Vijay Savani et al., [14] For the fuel station, this paper has implemented the usage of RFID as a cashless payment mechanism. With the help of sensors used for monitoring and control, this idea also offers a keen control over environmental pollutants and can prevent any disastrous risks in the station. For both designers and users, Proteus software provided an easy graphical user interface platform that made it simple to apply RFID technology. Due to the low cost of sensors and microcontrollers, implementation costs are very low.

This article featured completely automated safety systems, such as gas leak detection and fire alarm. This makes it possible to generate automated control action when an authorised user is not present. Utilise Google Sheets as a legitimate method for editing the data that the esp8266 has uploaded, storing it in a location-neutral database with SQL services, and providing reports from the local hosts at each of the three stations. Use LabVIEW to monitor and manage the pump station's operations, security, and fuel supply.

III. SUMMARY AND OBSERVATION

In summary, an automated fuel pump system using UPI QR code can simplify the payment process for customers, reduce the chances of fraudulent activities, and help the fuel station owners in managing their inventory and cash flows effectively.

It enables customers to make contactless payments using their UPI-enabled mobile phones, enhancing the security of the payment process and saving time. Additionally, it can prevent fuel theft and pilferage, which are common problems in the fuel industry. Overall, this system can bring efficiency, convenience, and security to the fuel industry, benefitting both the customers and fuel station owners.

IV. CONCLUSION

An automated fuel pump system using UPI QR code can bring several benefits to the fuel industry. It can simplify the payment process for customers and reduce the chances of fraudulent activities. Additionally, it can help the fuel station owners in managing their inventory and cash flows effectively. With the implementation of this system, customers will be able to make contactless payments using their UPI-enabled mobile phones, eliminating the need for physical cash or cards.

This will not only save time but also enhance the security of the payment process. Moreover, the automated fuel pump system can help to prevent fuel theft and pilferage, which are common problems in the fuel industry. Overall, an automated fuel pump system using UPI QR code can bring efficiency, convenience, and security to the fuel industry, benefitting both the customers and fuel station owners.

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