

“RFID and GSM based Automatic Rationing System using STM32”

Aniket Satpute¹, Supriya Raut², Nikita Bhongale³, Prof. Aniket Gunjal⁴,

^{1, 2, 3, 4}Department of Electronics and Telecommunication Engineering, Jspm's Bhivrabai Sawant Institute of Technology and Research, Pune

ABSTRACT:-

A ration card is essential for every household as it serves various purposes. However, the traditional Ration Distribution System is prone to corruption, resulting in the wastage of a significant amount of government money. The primary objective of the proposed system is to automate the ration shop and provide transparency in the distribution process.

Currently, anyone with a ration card can purchase various materials such as sugar, rice, kerosene, etc., from the ration shop. Nevertheless, this system has some drawbacks, such as incorrect weight measurement due to human errors and the ration shop owner's improper use of consumer materials without the knowledge of ration cardholders the government office and the customer through GSM technology.

The paper proposes an Automatic Ration Materials Distribution system based on RFID (Radio Frequency Identification) and GSM (Global System for Mobile) technology, preferably using a ration card. The system requires the customer to scan their RFID tag on the reader. The microcontroller then verifies the customer's identity number and all the details in the smart card. After successful verification, the customer must enter the type and quantity of material they wish to receive using the keypad. Once the customer receives the materials, the microcontroller sends the information to the government office and the customer through GSM technology.

The proposed system aims to avoid corruption and provide better management of the public distribution system. By using RFID and GSM technology, the distribution process will become more efficient, accurate, and transparent, reducing

the risk of fraud and ensuring that the materials reach the intended beneficiaries.

INTRODUCTION:-

The Public Distribution System (PDS) in India has been plagued by malpractices such as inaccurate measurements due to manual intervention and ration shop owners illegally using consumer materials without the knowledge of ration card holders.

A proposed solution to address these issues is an automatic system based on RFID and GSM technology. Each consumer is provided with an RFID card that serves as their ration card and has a unique identification number. When the consumer scans their card on an RFID reader interfaced with a microcontroller at the ration shop, they are prompted to enter a password and select the appropriate material and quantity of material using a keypad. Based on the selection made by the consumer, the appropriate circuitry is activated, and the consumer receives the material.

The system is also interfaced with GSM technology, which sends information in the form of SMS to relevant individuals. By implementing this proposed RFID-based automatic ration shop system, transparency can be brought to the PDS, and malpractices can be prevented.

The PDS is a significant government financial policy in India that provides food grains such as sugar, wheat, rice, and lamp oil to people at affordable rates. The PDS is managed through ration shops spread throughout India, with the cen-

tral and state governments monitoring and controlling the distribution of ration.

However, the system has numerous limitations. Many ration retailers keep fake ration cards, allowing them to receive additional ration from higher authorities, which they can then sell on the black market. The retailer may also provide insufficient quantities of food grains to consumers, and people are often unaware of the availability of ration at ration shops. Additionally, the retailer may sell ration at higher rates than those recommended by the government or may make errors in register entries. As a result, corruption in the PDS has become a significant issue that needs to be addressed.

The government currently lacks an effective system to ensure that food grains are being used by individuals as intended. The proposed system seeks to eliminate malpractice in the public distribution system and increase transparency between the public and the government. It will also reduce the need for manual labor, as the distribution of ration materials will be automated.

Radio frequency identification (RFID) technology has become a popular tool for managing goods and other important items. In urban areas, ration card holders are given kerosene fuel in the first week of every month, and shopkeepers are making an effort to distribute it three or four days a week. The Indian ration identity card serves as a means for people to purchase subsidized food and fuel, and it also provides proof of identity and connects users to government databases. However, the current ration distribution system suffers from various drawbacks, such as incorrect quantities of goods, slow processing times, long waiting times, and theft in ration shops.

The proposed system aims to replace manual labor in ration shops with an RFID-based system that can prevent fraud. This process is now online, which is a relief for people who dislike standing in long queues to fill out application forms and then having to return to the office to check the status of their application. Under the new system, each user will have an RFID-based ration card that contains their personal information, including bank details

The proposed system aims to automate the manual work in ration shops and increase transparency between the government and the public. To achieve this, RFID (Radio Frequency Identification) technology will be used, which will help

prevent fraud and eliminate the need for manual record-keeping. Each user will be issued an RFID-based ration card with a unique number, and their biometric data (fingerprint) will also be stored in the system. When a user wants to purchase groceries, they must show their RFID card to the shopkeeper, who will check its validity using an RFID reader. The system will also use biometrics to verify the user's identity.

The proposed system offers several advantages over the existing ration distribution system, such as reducing fraud and manual work, increasing transparency, and eliminating the need for users to stand in long queues. Bank details will be present on the RFID card, and the required amount of groceries will be deducted from the user's account after the card is swiped. The final bill will be displayed on an LCD screen, and the user will receive an SMS with the details of the transaction. Overall, the proposed system is designed to improve the efficiency of the ration distribution system and provide a better experience for users

LITERATURE SURVEY:-

Several research papers have explored the use of technology to improve the efficiency and transparency of the Public Distribution System (PDS) for the distribution of rationed goods.

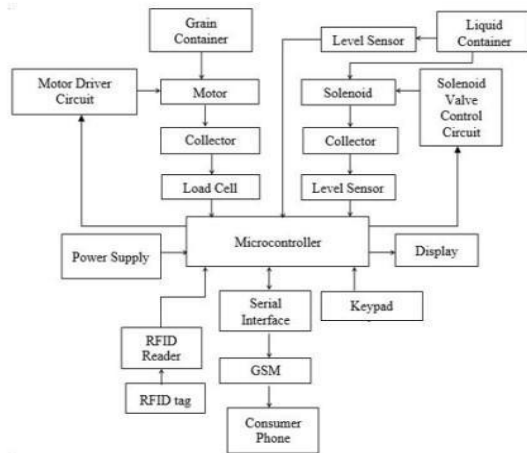
In paper [1], the authors propose an E-ration PDS using SMART CARD and GSM technology to automate the ration distribution system and eliminate the drawbacks of the current manual system, including inaccurate quantity of goods, long waiting times, low processing speed, and material theft. The proposed system replaces conventional ration cards with smart cards that contain all the details about the card holder, such as family details, type of card, and its validity.

Similarly, paper [2] proposes a smart ration card system using Radio Frequency Identification (RFID) Technique and IOT to prevent malpractices and corruption in the current ration distribution system. The conventional ration card is replaced with a unique RFID tag that is verified at the fair price shop for user authentication. The user's identity is verified by a microcontroller that is connected to an Amazon Web Services (AWS) database, and an OTP is sent to the user's registered mobile number for added security.

Another paper [3] proposes a system to reduce forgery from ration shops and make it easier for users to obtain their rationed goods. The proposed smart ration card system is based on RFID and BIOMETRICS, and allows users to fill their data online, eliminating the need for manual work. When a user wants rationed goods, they present their Smart ration card, which is swiped to check if the user is valid. The system also checks the fingerprints of the user to authenticate their identity, and automatically updates the government database with changes in ration allocation.

Overall, these studies demonstrate the potential of technology to improve the transparency, accuracy, and efficiency of the PDS system, and to reduce fraud and corruption

BLOCK DIAGRAM:-



METHODOLOGY:-

The system then reads the weight of the ration material using the load cell and displays it on the LCD. The microcontroller sends this data along with the user's details to the government database using the GSM module. The solenoid valve control circuit is used to control the flow of liquid materials such as kerosene. The system also includes an IR sensor to detect the presence of a container during liquid material distribution to avoid wastage.

The proposed system eliminates the possibility of manual errors in weighing and recording the distribution of ration materials, and the use of RFID and biometric authentication

ensures that only authorized users receive the ration materials. The use of GSM technology allows for real-time monitoring and reporting of ration distribution, reducing the possibility of fraud and corruption. Overall, the system aims to improve the efficiency and transparency of the public distribution system and ensure that the benefits of government welfare schemes reach the targeted beneficiaries.

authority about the transaction details. This system provides an automated and secure way of ration distribution, reducing the chance of errors and fraud. The use of RFID technology also ensures that only authorized customers are able to avail of the benefits of the ration distribution system.

1.The Login Module is an essential component of an Automated Ration Distribution System. It is responsible for registering the details of the beneficiaries of the system, which includes their personal information such as name, address, date of birth, age, and contact number. The unique fingerprint of the beneficiary is also captured, which will be used for authentication during the ration distribution process.

In addition to personal information, the module also records the details of the beneficiary's family members and their relationship with the beneficiary. This information is crucial for ensuring that the ration quota is distributed only to the eligible beneficiaries. The module also assigns a category to each beneficiary, which determines the amount and type of ration that they are entitled to receive. This is based on the socio-economic status of the beneficiary and is determined by the government.

All the information collected by the Login Module is stored in a database, which will be used by the system for authentication and verification during the distribution process. The module also enables the beneficiaries to update their personal information or add new family members to their profile as and when required.

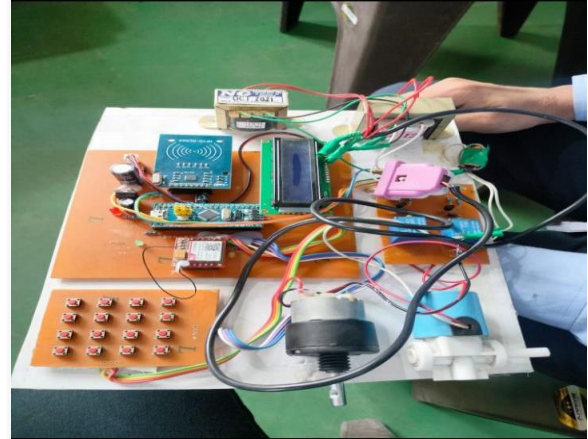
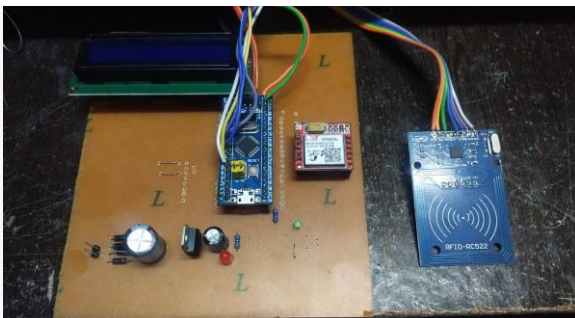
2. The RFID Card Verification Module is an important component of the proposed system. It involves the use of an RFID reader to verify the authenticity of the RFID card used by the customer. The RFID reader emits signals through its antenna and the RFID tag on the customer's smart card responds to these signals. The tag contains in-

information about the customer's account details and the amount of ration they are eligible to receive. The RFID reader reads this information and verifies it with the data stored in the database. If the verification is successful, the customer is allowed to proceed with the ration distribution process. If the verification fails, the customer is denied access to the ration distribution system. This module ensures that only eligible customers receive their ration and helps to prevent fraud and misuse of the system.

3. . In this module, the user can select the items they want to purchase from the available list of subsidized items. The system will display the total cost of the selected items along with the transaction history of the user. After confirming the selection, the payment can be made through the RFID card. Once the payment is successful, the system will generate a receipt in the form of an SMS that will be sent to the user's registered phone number. It is important to note that the user can only purchase the items that are allotted to them based on the available stock in the database. This ensures that the distribution of subsidized items is done fairly and efficiently.

4. Alert Module is responsible for sending alerts and notifications to the users regarding their transaction history, subsidy amount, available stock in the ration shop, etc. This module uses SMS gateway APIs to send SMS alerts to the registered mobile number of the user. The alerts can include details like the transaction amount, date and time of the transaction, balance amount, etc. It can also send alerts to the government authorities regarding the stock availability in the ration shops, purchase history, and other related information. The SMS gateway APIs can be integrated with the software to ensure seamless communication between the system and the users.

RESULT:-



The conventional system has drawbacks like malpractices, low processing speed, long waiting time at ration shop to get material and material theft in ration shop without any acknowledgement to Government and consumer. To overcome above problems, automatic ration shop played important role. The automatic ration shop involved RFID as well as GSM technology to distribute the kerosene or grain material.

The proposed system creates the transparency in public distribution system as the work becomes automatic. With the help of this system, it is possible to make public distribution system efficient and free from malpractices. The proposed system has advantages like it is helpful to prevent malpractices at ration shop, maintain data properly, reduces paper work, time saving approach and cost effective.

CONCLUSION:-

The simulation of the proposed system and liquid indicator was carried out with the aid of Proteus 8.0 V software. Since the software doesn't come with a pre-built sensor and there are no external libraries available for the sensor, we had to improvise for this simulation. Specifically, we created two virtual terminals for the microcontroller: one for the input of t, which was connected to the Rx pin, and the other for the output, which was connected to the Tx pin. By doing so, we were able to test the system's performance and verify its functionality.

DISCUSSION:-

We discuss about the problem faced by the consumer in ration shop, In the ration shop they didn't get correct amount of ration and have to wait in line for hour. And here we are with the idea of resolving this problem. Our project contain GSM,RFID, and STM32 . In our project, consumer have to identify the user authentication with RFID card and then have to select the type of ration and have to put the quantity of the ration. After that motor or the valve will start run according to consumer's selection and then consumer will get ration . The ration shop keeper have to send the message to consumer via GSM for confirmation. And we hope that it will reduce the problem face by consumer.

REFERENCES:-

- Vinayak T. Shelar, Mahadev S. Patil , “RFID and GSM based Automatic Rationing System using STM32”, International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 4 Issue 6, June 2015
- Mr. a.chimgave ,prof.shaileshjadhav: E-Rationing , International Engineering Research Journal (IERJ) Vol-ume 2 Issue 2 Page 467-469, 2016, ISSN 2395-1621@IEEE 2016.
- Dr. M. PallikondaRajesekaran, D.Balaji, P.Daniel”,Automatic Smart Ration Distribution System for Prevention of Civil Supplies Hoarding In India”, 2017 International Conference on Advanced Computing and Communication Systems (ICACCS -2017), Jan. 06 – 07, 2017, Coimbatore, INDIA
- Anshu Prasad, Aparna Ghenge, Prof. Sashikala Mishra, Prof. Prashant Gadakh,”Smart Ration Card Using RFID, Biometrics and SMS Gateway” IEEE Conference on Inventive Communication and Computational Technologies(ICICCT 2017).
- Prof. Shital A. Aher, Akshay D. Saindane, Suved P. Patil, Shivsagar K. Chakor , “Smart Ration

Card Using RFID and Biometrics ”, Vol-3 Issue-2 2017, IJARIE-ISSN(O)-2395-4396,2017

- K. BalaKarthik , “Cloud Based Ration Card System Using RFID And GSM Technology”, International Journal of Engineering Research & Technology (IJERT), ISSN:2278-0181, Vol. 2 Issue 4, April 2013
- M.R. Rieback, B. Crispo, A.S. Tanenbaum, The evolution of RFID security, Pervasive Comput. IEEE 5 (1) (2006), Jan. - Mar.
- Ari Juels, RFID security and privacy: a research survey, IEEE Select Areas Commun. (2005), challenges and Telecommunications(ComManTel), IEEE, April 2014
- Anil K. Jain, Arun Ross, SalilPrabhakar, An Introduction to Biometric Recognition, IEEE Trans. Circ. Syst. Video Technol. 14 (1) (2004).
- Rubananth, T. Kavitha. (2012 April). GSM based RFID approach to Automatic Street Lighting system. The journal of theoretical and applied information technology. Volume. 38 no.2, ISSN: 1992-8645
- R.K. Pateriya, Sangeeta Sharma, The Evolution of RFID Security and Privacy: A Research Survey, IEEE, 2011.
- Shraddha Shah, Bharti Singh, “RFID based school bus tracking and security system”, in IEEE, 2016 International Conference on Communication and Signal Processing (ICCSP), pp. 1481–1485, 2016