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# Embedded Based Smart Ration Shop Using Pic Microcontroller

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**ABSTRACT:** The "Embedded Based Smart Ration Shop Using PIC Microcontroller" project aims to revolutionize the conventional public distribution system by leveraging the capabilities of PIC microcontrollers. The project addresses longstanding challenges in the distribution of essential commodities, such as lack of real-time monitoring, inefficient inventory management, and vulnerabilities to corruption. At the core of this innovation is the integration of PIC microcontrollers, renowned for their reliability and efficiency. These microcontrollers play a pivotal role in automating various aspects of the ration shop operations, offering a more streamlined and technologically advanced system. The introduction of RFID cards, replacing traditional ration cards, provides a unique identification mechanism for consumers, contributing to enhanced accuracy and security in the distribution process.

**KEYWORDS:** Ration Distribution, Public Distribution System, Unique Identity

## I. INTRODUCTION

In the evolving landscape of technological advancements, the integration of embedded systems has become instrumental in enhancing the efficiency and effectiveness of various real-world applications. One such critical domain is the public distribution of essential commodities, where traditional methods often face challenges related to transparency, accountability, and operational efficiency.

This project introduces an innovative solution, the "Embedded Based Smart Ration Shop Using PIC Microcontroller," aimed at addressing these challenges and ushering in a new era of streamlined and technologically advanced public distribution systems. The public distribution of essential commodities is a cornerstone of government welfare programs, ensuring that vital resources reach citizens efficiently. However, the existing systems are not without flaws, often plagued by issues such as manual errors, lack of real-time monitoring, and susceptibility to corruption. To overcome these challenges, this project employs the capabilities of PIC microcontrollers, renowned for their reliability and versatility in embedded systems.

The PIC microcontroller serves as the central intelligence of the proposed smart ration shop, enabling automation of key processes and introducing advanced features. The utilization of RFID cards, replacing traditional ration cards, provides a unique identification mechanism for consumers, enhancing accuracy and security in the distribution process. This transition from manual to automated processes is designed to not only streamline operations but also to mitigate common pitfalls associated with traditional public distribution systems.

Automation is extended to inventory management, transaction processing, and connectivity features, fostering a more responsive and efficient system. Real-time monitoring of inventory levels ensures a proactive approach to stock management, minimizing the likelihood of shortages or overstock situations. The integration of connectivity features allows for seamless communication with centralized databases, promoting data accuracy and enabling informed decision-making based on consumption patterns. The security features embedded in the PIC microcontroller play a pivotal role in safeguarding the system against unauthorized access and tampering, ensuring the integrity of the distribution process and protecting sensitive information.



In essence, the "Embedded Based Smart Ration Shop Using PIC Microcontroller" project represents a transformative step towards a more transparent, efficient, and accountable public distribution system. By harnessing the power of embedded technology, this initiative seeks to address longstanding challenges, enhance the overall quality of service delivery, and contribute to the welfare and well-being of citizens relying on essential commodities distributed through public channels.

## II. LITERATURE SURVEY

This project focuses on revolutionizing traditional ration distribution systems by implementing an Automatic Ration Distribution System using RFID technology. Traditional systems often grapple with inefficiencies, lack of transparency, and susceptibility to fraudulent activities, prompting the need for a more advanced and secure approach. The proposed system introduces a fundamental shift by adopting RFID technology. Each beneficiary is assigned an RFID card, serving as a digital identifier to replace conventional ration cards. This RFID card facilitates a unique and secure means of identification for consumers, contributing to heightened accuracy and security throughout the distribution process. A key feature of the system is the automation of critical processes, including inventory management, transaction processing, and data recording. Through the integration of RFID-enabled smart cards, the system ensures real-time monitoring and communication, marking a departure from manual and error-prone methods. This not only streamlines operations but also introduces a more efficient and accountable approach to ration distribution. The project aims to address challenges related to corruption by leveraging RFID technology. The unique digital identifier assigned to each beneficiary helps mitigate the risks associated with fraudulent activities, enhancing the overall integrity of the distribution system. The significance of real-time communication and monitoring cannot be overstated. Through the use of RFID technology, the system allows for instant data exchange, providing timely information on stock levels, transaction details, and distribution patterns. This contributes to a more transparent and responsive distribution process, ultimately benefiting both the ration shop operators and the consumers. The Automatic Ration Distribution System using RFID technology represents a significant advancement in the domain of public distribution systems. By embracing the capabilities of RFID technology, this project aims to create a more secure, efficient, and transparent system for the allocation of essential commodities. The use of RFID-enabled smart cards ensures unique identification, automation streamlines processes, and real-time communication enhances monitoring, collectively contributing to a more advanced and accountable approach to ration distribution.

## III. EXISTING SYSTEM

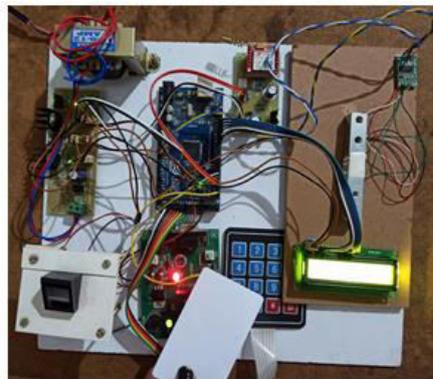
The Public Distribution System (PDS), commonly known as the ration distribution system, grapples with controversies and malpractices largely due to its manual operations. Fair Price Shops (FPS) commission agents manually handle critical tasks such as product distribution, ration card entry, product weighing, and product delivery. This manual approach has given rise to challenges, including inaccurate quantities, slow processing speeds, long waiting times, and material theft in ration shops. The accuracy of the quantity of goods distributed is compromised due to manual handling and calculations, leading to discrepancies in the allocated quantities received by beneficiaries. The system's inefficiencies are exacerbated by slow processing speeds, resulting in extended waiting times for beneficiaries and hindering the overall distribution workflow. Additionally, the manual nature of operations creates an environment prone to material theft in ration shops, where tracking mechanisms and accountability measures are lacking. In response to these challenges, a transformative solution is proposed – the automation of the entire ration distribution process. This paradigm shift involves integrating cutting-edge technologies to streamline operations, enhance accuracy, and fortify the system against malpractices. Components of the automated system include RFID technology for product tracking, digital ration card management, smart weighing systems, and efficient product delivery mechanisms.

Automation promises enhanced accuracy, increased processing speed, theft prevention, and improved user experiences. Accurate product distribution, precise weighing, and error-free data management contribute to a more reliable and accountable system. Automation accelerates processes, minimizing waiting times for beneficiaries and improving overall efficiency. Implementing RFID tracking and digital records creates transparency and accountability, reducing opportunities for material theft. In conclusion, the transition from manual to automated ration distribution is not just a technological upgrade but a strategic move to address deep-rooted challenges. By leveraging RFID, digitalization, and smart technologies, the PDS can undergo a profound transformation. This shift aligns with the broader trend of digitization and underscores the commitment to providing a more efficient, transparent, and accountable system for the welfare of the public. The vision for an automated ration distribution system is not merely an ideal; it is an imperative step towards creating a more equitable and resilient public welfare infrastructure.

#### IV. PROPOSED SYSTEM

The overall functioning of the module and proposed system that incorporates PLC based automated ration shop. In conventional system, Indian government has implemented a UID (Unique Identification) number system called AADHAR number, which contains all general information like age. Family, finger print of the family, address, contact numbers, bank account information etc. for every resident in the country. Using the AADHAR number and contact details, the government can send a message (SMS) to the individuals, containing information regarding quantity of products allotted to a public in a respective ration shop. Once when the consumer insert the smart card in the smart card inserter, the smart card can be accessed by entering the password, which was given to the all consumers separately. But there is a chance of miss using the smartcard password. To overcome the miss usage, the proposed system includes the finger print detector which detects the finger print of the consumer and their family members. If the password entered and finger print is matched, then the smart card gets accessed and immediately profile of the particular person is displayed in the touch screen. From the touch screen consumer can select the products needed for him and the process takes place in order to check the account of consumer whether the amount is there or not for the given inputs. If there is enough amount in the consumer's account then automatically the 36 products are collected in the ration shop. If not then the process does not takes place. PIC microcontroller is programmed in such a way to do the above mentioned process automatically without any manual interference. Embedded microcontroller gives the input to the PLC. Consider the consumer has provision for giving four inputs namely rice, sugar, wheat and oil respectively. The inputs given by the consumer are collected in the automated machine in one by one basis. The first input given by the consumer is rice means, the green light indicates that the rice is coming out from the machine first. Object sensor is placed in the collector side in order to avoid the wastage of products. If the bucket/ object is sensed in the collector side by the object sensor then only the process takes place by pressing the start button.

#### V. RESULT



Input through RFID



Input through Biometric



## VI. CONCLUSION

In conclusion, the implementation of an Embedded Based Smart Ration Shop using a PIC Microcontroller represents a pivotal advancement in modernizing the traditional ration distribution system. The anticipated outcomes, ranging from technological enhancements to increased efficiency and transparency, underscore the potential for significant positive impact. The infusion of the PIC microcontroller introduces automation, streamlining authentication, inventory management, and transactions, leading to a more responsive and user-friendly distribution process. The heightened accuracy in inventory monitoring and reduced waiting times for beneficiaries contribute to an improved overall experience. Furthermore, the system's focus on transparency and accountability through automated tracking and secure transactions addresses longstanding challenges associated with manual operations, fostering a fair and trustworthy distribution environment. As a scalable and adaptable solution, the embedded architecture ensures that the smart ration shop remains at the forefront of technological evolution. This adaptability allows for seamless integration of updates and improvements, promising a sustainable and future-ready system. In essence, the Embedded Based Smart Ration Shop using a PIC Microcontroller signifies a transformative step towards a more technologically advanced, efficient, and transparent ration distribution system, aligning with the broader goals of enhancing public welfare programs.

## REFERENCES

- [1] A.N.Madur, Sham Nayse, "Automation in Rationing System Using Arm 7," International journal of innovative research in electrical, electronics, instrumentation and control engineering ,vol.1, Issue 4, Jul 2013.
- [2] Rajesh C. Pingle and P. B. Borole, "Automatic Rationing for Public Distribution System (PDS) using RFID and GSM Module to Prevent Irregularities," HCTL Open International Journal of Technology Innovations and Research, vol 2, pp.102-111, Mar 2013.
- [3] S.Valarmathy, R.Ramani, "Automatic Ration Material distributions Based on GSM and RFID Technology," International Journal of Intelligent Systems and Applications, vol 5, pp.47-54, Oct 2013.
- [4] Dhanojmohan, Rathikarani, Gopukumar, "Automation in ration shop using PLC," International Journal of Modern Engineering Research, vol.3, Issue 5, Sep-oct 2013, pp 2291-2977, ISSN:2249-6645.
- [5] Neha Pardeshi, Trupti Desale, Prajakta Bhagwat, Ruchali Ahire, "Web- Enabled Ration Distribution and Controlling" ISSN: 2277- 9477, March 2012.



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