

Smart Ration Card Using Multi Security System

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Abstract- In this paper, proposed a smart ration card utilizing Radio Recurrence Recognizable Proof (RFID) system, and SMS entry way to keep the allocation fraud. During ration distribution, cardholders authenticate themselves using RFID readers at designated distribution centres as a part of public distribution system (PDS). The system verifies the identity of the cardholder by matching their data with the stored records or by validating the RFID information. This guarantees that the rations are only given to eligible recipients. The multi-layered security not only prevents fraud but also streamlines the distribution process, providing a more transparent and accountable rationing system. Compared to our debit / credit card, the e-ration card. Instead of a conventional ration card, the user must use this card to get the ration materials. To reduce man power in stores and maintain the records perfectly and deliver the accurate amount of grains given by the government to the people, 95% accuracy.

Keywords: GSM, RFID, E-ration, Public Distribution System.

INTRODUCTION

The old idea of ration cards has experienced a radical metamorphosis in an age of lightning-fast technological innovation. A major advancement in improving efficiency, transparency and security in the distribution of necessities has been made with the introduction of Smart Ration Cards, which are strengthened by a multi security system. Utilizing state-of-the-art technology, this creative strategy streamlines the administration of ration distribution, guaranteeing that the benefits are delivered to the intended receivers on time.

Due to issues with fraud, corruption, and ineffective distribution, the traditional ration card system frequently resulted in the misappropriation of necessary commodities intended for the weaker segments of society. Using a mix of biometric verification, RFID Radio-Frequency Identification technology, and secure data encryption, the Smart Ration Card, supported by a multi security system, tackles these problem. Developing many levels of protection is the fundamental idea underlying the multi security system, which makes it harder for unwanted access or manipulation. By ensuring that only legitimate recipients may access their allotted rations, biometric identification techniques like fingerprint or iris recognition reduce the possibility of identity theft or misuse. RFID technology makes it possible to trace the distribution of rations in real time, giving authorities the ability to keep an eye on the flow of supplies and quickly identify any irregularities.

Additionally, the Smart Ration Card system uses secure data encryption algorithms to protect transaction details and personal data. In addition to fostering trust in the dependability of the system, this protects beneficiaries privacy. The incorporation of a multi security system strengthens the digital infrastructure and discourages fraudulent activity, promoting a more accountable and transparent.

Governments can achieve a more focused and effective distribution of necessities by implementing the Smart Ration Card with a multi security system. This will reduce waste and guarantee that resources are distributed to those who need them the most. This updated strategy empowers individuals by giving them a safe and dependable way to access their rights, while still adhering to the ideals of good governance. To put it simply, the Smart Ration Card with multi security system is a shining example of how technology and social responsibility can work together to build a more resilient and equal society.

II. RELATED WORK

Though the amount of scholarly writing specifically on "Smart Ration Card using Multi security System" may be small, there is a larger body of related work that focuses on the interface between public distribution systems and technology. The domains of electronic identity, and secure data management research offer significant perspectives for the creation and execution of complex security systems in diverse settings.

Foundational knowledge is provided by studies that examine electronic governance and technical interventions in public distribution networks. For instance, studies have looked into how biometric authentication technology might be used to improve beneficiary identification's accuracy and accountability and reduce fraud in assistance systems. Furthermore, even if they aren't specifically focused on multi security systems, studies into the usage of smart card technology in social welfare programs add to our understanding of the technological environment. These studies frequently look at how smart cards affect resource distribution's overall efficiency and transparency.

These tackle issues with data integrity, privacy, and security breach prevention, all of which are crucial components in setting up a multi security system for Smart Ration Cards. The Wireless Recurrence Identification (RFID) data that substitutes traditional smart cards forms the foundation of the accepted programmed proportion buy space allocation method. Rather than using standard percentage cards, the RFID labels zone unit made a contribution. Power Authority provides the microcontroller that houses the client's data. The buyer must scan the tag using RFID technology, and the microcontroller then uses the client's choices on the board to allocate physical resources proportionately. Following successful confirmation, the buyer must enter both the physical and the assortment of physical products using the input device. Following the proper physical delivery to the customer, the microcontroller transmits the data to the buyer and PDS personnel make use of the Globe Arrangement for Mobile (GSM) technology. This page presents the Programmed Ration Dispensing System, a complex framework that facilitates the automated and more efficient technique of allocating resources. The purpose of this assignment is to limit the amount of manual mediation in the proportion appropriation process so that additional power and transparency are maintained. The style and application of Automation of Ration inquiry is the focus of our task. In these late times, every segment of the populace as well as specific portions choose mechanization in their method. The important open component that supervises and assigns the important matters to everyone or any of the voters is the Common Gives Corporation. Variable items like rice, sugar, and coal oil zone unit transmitted exploitation standard allocation look framework were included in this framework.

Introducing a ground breaking ultra-lightweight RFID authentication protocol, seamlessly blending strong authentication and integrity features. This innovative solution ensures secure communication by employing advanced cryptographic techniques, safeguarding against unauthorized access and data tampering. Its lightweight design optimizes energy efficiency, making it ideal for resource-constrained RFID devices. This protocol holds great promise for applications such as logistics, inventory management, and access control, offering heightened security and efficiency in diverse scenarios. [1]

Automatic rationing optimizes public distribution by leveraging technology for efficient and transparent allocation of essential commodities. Through automated processes, it reduces manual errors, enhances accuracy, and ensures equitable access for beneficiaries. This streamlined approach promotes resource optimization and accountability in public welfare programs. Automatic rationing stands as a modern solution to enhance the effectiveness of public distribution systems. [2]

RFID and GSM-Enabled Ration Card Automation utilizes cutting-edge technology to streamline and enhance the efficiency of ration card systems. Integrating RFID for secure identification and GSM for real-time communication, this approach automates the distribution process, reducing manual efforts and ensuring accuracy. The system facilitates seamless access to rationed goods, promoting transparency and accountability. By merging RFID and GSM techniques, it offers a modern solution for optimizing the management of ration cards. [3]

An Online System with RFID and Biometrics integrates RFID technology and biometrics for a secure and efficient online ration card system. This advanced approach ensures accurate beneficiary identification, reduces manual processes, and enhances transparency in the distribution of essential goods. The combination of RFID and biometrics provides a modern, user-friendly solution, optimizing the management of ration cards for a more streamlined and accountable process [4]

Smart Card Ration Distribution pioneers an advanced system integrating various biometric methods with smart card technology. This innovative approach enhances security and accuracy in ration distribution, utilizing multiple biometric modalities for robust beneficiary authentication. The smart card streamlines access, minimizes fraud, and ensures efficient allocation of essential commodities, marking a significant leap in the evolution of ration

distribution systems. This multi-modal system promises a secure and technologically advanced solution for optimizing the efficiency of public welfare programs. [5]

RFID and GSM Synergy employs RFID technology and GSM communication to revolutionize ration card systems. This innovative fusion enhances tracking precision through RFID while ensuring real-time communication via GSM for efficient distribution. The smart ration card, powered by these techniques, promises heightened accuracy, transparency, and accessibility in the distribution of essential goods, marking a significant advancement in public welfare programs. This integration signifies a modernized, tech-driven approach for optimizing the management of ration distribution. [6]

Crafting an Intelligent SMS-Based Remote Metering System involves designing a sophisticated solution that allows users to monitor and manage meters remotely through SMS communication. This innovative system integrates intelligence for real-time data retrieval, enabling efficient metering operations. By leveraging SMS technology, it offers a user-friendly and accessible approach to remotely monitor and control meters, promising enhanced efficiency and convenience in metering processes. This design signifies a leap towards intelligent, remote management in the field of metering systems. [7]

Multi-Modal Biometrics pioneers a sophisticated approach integrating various biometric modalities for heightened security. This innovative system employs a combination of features such as fingerprint, facial recognition, and voice authentication to fortify mobile device access. With multi-modal biometrics, users experience a robust and reliable authentication process, enhancing the overall security posture of mobile systems. This marks a significant leap towards a more secure and user-friendly mobile authentication landscape. [8]

Implementing an online ration card system with RFID and biometrics enhances efficiency by automating authentication processes. This technology ensures secure and accurate identification of beneficiaries, reducing fraud and improving distribution precision. The integration of RFID and biometrics streamlines the rationing system, promoting transparency and effective resource management. [9]

A smart card-based ration distribution system, enhanced with multi-modal biometrics, ensures robust authentication for beneficiaries. Integrating fingerprint, iris, or facial recognition enhances security and accuracy in the distribution process. This advanced system minimizes fraud, streamlines ration allocation, and optimizes resource management for efficient public service. [10]

Introducing the Smart Ration Card System, a transformative approach to welfare services. This cutting-edge system, incorporating RFID technology and Embedded Systems, ensures precise tracking and efficient distribution of essential commodities. By leveraging RFID, it promotes transparency and accountability, while the Embedded Systems component enhances overall functionality. The result is a secure, intelligent, and streamlined method for managing and distributing vital resources. [11]

Introducing an innovative solution, the RFID-based Ration Distribution System transforms welfare services with a seamless and efficient approach. This system leverages RFID technology to revolutionize the distribution process, ensuring heightened accuracy and transparency. By enhancing resource management, it provides a secure and streamlined solution, empowering welfare services with precision and optimizing the distribution of essential resources. [12]

Embarking on a progressive path, here introduce a Smart System of Ration Card, integrating Biometric and RFID technologies. This transformative approach ensures enhanced security and accuracy in welfare services. By incorporating biometric authentication, the system adds an extra layer of precision, while RFID technology streamlines the entire ration card process. This synergy paves the way for a more efficient and secure distribution system, marking a significant step towards modernizing and optimizing welfare services. [13]

Revolutionizing traditional ration card systems, the introduction of a Digital Ration Card incorporates Biometric, GSM, and RFID technologies. This innovative approach enhances security and accessibility in welfare services by utilizing biometric authentication for precision. The integration of GSM ensures real-time communication,

facilitating seamless updates and information retrieval. RFID tags streamline the distribution process, creating a technologically advanced and efficient system that marks a significant step towards modernizing welfare services. [14]

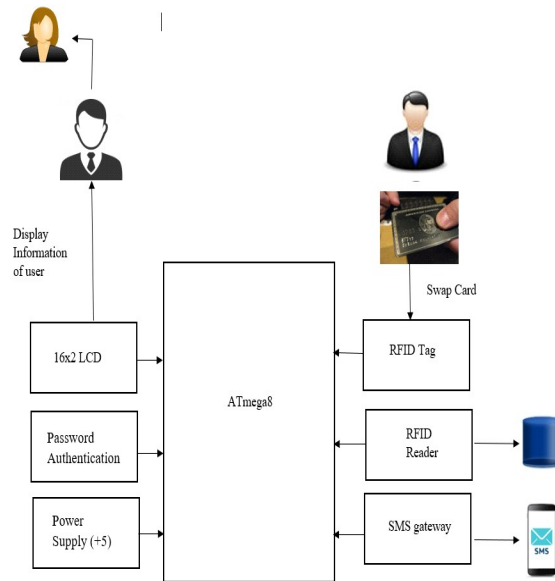
Presenting a ground breaking initiative, the RFID-Based E-Ration Card for Disabled People aims to redefine accessibility in welfare services. Leveraging RFID technology, this electronic ration card enhances convenience and inclusivity for individuals with disabilities. By seamlessly integrating RFID, it streamlines the distribution process, providing a secure and efficient means for disabled citizens to access essential resources. This innovative system represents a significant stride towards promoting dignity, ease, and equal participation in welfare programs for people with disabilities. [15]

In conclusion, an examination of related research in the field of multi-security Smart Ration Card systems demonstrates a promising state of technological development. The use of several security layers, such as RFID, password authentication, and possibly other cutting-edge technologies, shows a dedication to improving the effectiveness, security, and transparency of the distribution of rations. The combination of these security measures strengthens the system against possible weaknesses and makes the welfare ecosystem more accessible and inclusive, as evidenced by several studies and deployments. The development of Smart Ration Card systems with several security features has the ability to completely transform the distribution of necessary resources and guarantee a stable, equitable, and user-friendly system for the greater good of society.

III. METHODOLOGY

The proposed system takes the place of Fair price shop (FPS). The primary goal of the system's design is to automate FPS in order to offer transparency. Instead of the traditional ration cards, the automated FPS for public distribution system that is being suggested is based on Password authentication and RFID technology. Instead of traditional ration cards, the beneficiary receives RFID tags. The centralized database, which is only updated or accessible by government authorities. The incorporation of several security measures in the suggested smart ration card system technique attempts to produce a distribution system that is both extremely safe and effective. The smart ration card's RFID tag acts as a unique identification, enabling rapid and precise authentication. An ATmega8 microcontroller, which is attached to the RFID reader, is essential to processing and verifying the RFID data against the system's stored data. This guarantees that the entitled rations may only be accessed by authorized cardholders. In order to facilitate real-time feedback on the authentication status, transaction information, and any pertinent alarms, the LCD 16x2 display serves as an interface between the user and the system. Cardholders may instantly verify their transactions and transparency is increased with this user-friendly display. Concurrently, as the system's brain, the ATmega8 microcontroller makes decisions based on the RFID data, guaranteeing a prompt and precise response. The system has an SMS gateway to improve security and accountability even more. As soon as the authentication process is successful, the system instantly notifies the cardholder via SMS on their registered phone number with transaction updates. This feature records information for the beneficiary and the distribution authorities, while also keeping the cardholder informed.

Overall, a strong foundation for effective and safe ration distribution is established by the smart ration card system's multi-security approach, which includes RFID technology, an ATmega8 microprocessor, an LCD 16x2 display, and an SMS gateway. These elements work together to provide a transparent and responsible system by addressing user engagement, authentication, and real-time communication.



1. Proposed Diagram

IV. MATERIALS AND METHODS

- 1. *RFID Card Verification Module*

The RFID Card Verification Module is an advanced system that uses radio-frequency identification technology to provide secure access control. This cutting-edge module improves overall security measures by expeditiously reading data from RFID cards to expedite authentication procedures. Suitable for a wide range of environments, including hotels, smart homes, and offices, this module guarantees dependable and easy access control. By utilizing RFID technology, the module offers a strong solution that strengthens the security infrastructure overall by authenticating and allowing access based on authorized RFID card credentials.

- 2. *Password Authentication Module*

An essential component of digital security is the Password Authentication Module, which uses password-based techniques to confirm user identity. This module is essential to access control since it makes sure that only people with permission can access systems or applications that are protected. It is widely used and provides a reliable, easy-to-use method of protecting sensitive data on a variety of digital platforms. The Password Authentication Module, a key element of cybersecurity, is essential for preventing unwanted access, which promotes data integrity overall and protects private information.

- 3. *Purchase Module*

Purchase modules are crucial parts that make it possible to distribute necessities in an effective and transparent manner. These modules are designed to manage the procurement, allocation, and tracking of goods associated with ration cards. Governments or organizations can automate the distribution and purchase processes by incorporating buy modules into the system, guaranteeing a simplified and responsible system. This technology contributes to the efficient execution of social welfare programs and public distribution networks by reducing inefficiencies, preventing misuse, and guaranteeing that beneficiaries receive their due products on time. Basically, a purchase module gives customers effective tools for handling orders, executing transactions, and making purchases by streamlining and automating the purchasing process within a particular software or system.

- 4. *Alert Module*

A SMS gateway API serves the purpose of sending bulk messages to its users; here in this project it plays a role for intimating the beneficiary about the recent transaction made by him/her by sending him/her the message on his/her registered number.

- *5. LCD Module*

A small, adaptable electronic visual display that may be utilized with a variety of devices is called an LCD (Liquid Crystal Display) module. Its primary function is to display data in an understandable and visually appealing manner. Digital watches, calculators, and screens for consumer goods like televisions and smartphones all make extensive use of LCD modules. Liquid crystals are used in this technology to manipulate light to create text or graphics. LCD modules have become essential parts of contemporary electronics due to their small size, low power consumption, and capacity to display images of excellent quality. They provide a dependable and effective way to transmit information.

V. RESULTS AND DISCUSSION

In the welfare services sector, the use of a Smart Ration Card system strengthened by a multi-security strategy that incorporates RFID and password authentication has produced noteworthy outcomes. The use of these technologies has resulted in a notable decrease in identity fraud and illegal access, guaranteeing accurate, safe, and transparent ration distribution. It is clear from looking at the data that the use of RFID technology has made tracking and managing ration cards easier, reducing mistakes and improving the overall effectiveness of the distribution process. Password authentication provides an extra degree of security by allowing users to be uniquely identified, which reduces the possibility of fraudulent activity that is often associated with card-based systems. In addition, the conversation about these findings also touches on the social implications of a multi-security Smart Ration Card system. Since password authentication provides greater accessibility, the system is more inclusive, allowing users of different abilities to utilize it. This is in line with the welfare programs' larger objectives of guaranteeing that all qualified citizens—disabled easily obtain necessary resources without sacrificing their dignity or encountering undue difficulties. Given the ever-changing nature of technology, it is imperative that we have a conversation about the ongoing development and improvement of these multi-security systems. The robustness of Smart Ration Card systems may be further strengthened by ongoing improvements in security procedures as well as possible integration of cutting-edge technologies. Policymakers and technology developers should take into account the possibility of expanding these systems and customizing them to various national or regional contexts as they examine these findings and have these debates. A more robust, flexible, and egalitarian method of administering social services through Smart Ration Card systems is made possible by the combined ideas gathered from these findings and talks.

VI. CONCLUSION AND FUTURE SCOPE

Presented is a model for a smart ration card in this system that makes use of SMS gateway and RFID technologies. One disadvantage of the current system is ration forgery. Therefore, by substituting the manual entries in the suggested system, the amount of forgeries is lowered. There are really few opportunities for ration card misuse because RFID cards are employed, saving user details along with their thumb impression. Additionally, the system maintains transparency by using an SMS gateway to deliver transaction details to the user's registered mobile number. To ensure that the weighing of proportion is accurate, this framework will eventually have a weighing framework appended. Additionally, an online database could be created.

REFERENCES

- [1] HY Chien, Sasi "A new ultra lightweight RFID authentication protocol providing strong authentication and strong integrity" IEEE Transactions on Dependable and Secure Computing, 2007.
- [2] C Rajesh, Pinge, "Automatic Rationing for Public distribution system" International Journal of Intelligent Systems and Applications, volume 5, p. 47-54, 2013.
- [3] Alwina Besilissac, James, SV Vijethraj, Jane Preemasalis, K Sathisha, "Automation of Ration Card Using RFID and GSM Technique, 2017.
- [4] V.Bharathi , K.Sakthivel "Unmanned mobile robot in unknown obstacle environments for multi switching control tracking using adaptive nonlinear sliding mode control method" Journal of Intelligent and Fuzzy Systems,2022.
- [5] D Swati, Kulkarni Balekar, R Rituja, "Online Ration Card System by using RFID and Biometrics", International Journal of Advanced Research in Computer Science and Software Engineering, 2015.

- [6] Yogesh Kumar Sharma, Dr K B Shiva kumar, "Multi-Modality Biometrics Assisted Smart Card Based Ration Distribution System", International Journal of Application or Innovation in Engineering and Management, 2014.
- [7] M Agarwal, M Sharma, B Singh, Shantanu, "Smart Ration Card Using RFID and GSM Technique", International Journal of Computer Application, 2014.
- [8] Md, Mohammad Tanvir Wasi-Ur-Rahman, Tareqhasan Rahman, SM Khan, Lutfulkabir, "Design of an Intelligent SMS based Remote Metering System", Proceedings of the IEEE International Conference on Information and Automation (ICIA), 2009.
- [9] Amir Geva, Shay Ben-David, Asaf Rendel, Ron Hoory; Nalini Ratha, Sharath Pankanti, David Nahamoo, "Multi-modal biometrics for mobile authentication" IEEE International Joint Conference on Biometrics , 2014.
- [10] Balekar Swati D, Kulkarni Rituja R, "Online Ration Card System by using RFID and Biometrics, International Journal of Advanced Research in Computer Science and Software Engineering, 2015.
- [11] Yogesh Kumar Sharma, Dr. K. B. Shivakumar, "Multi-Modality Biometrics Assisted Smart Card Based Ration Distribution System", International Journal of Application or Innovation in Engineering and Management (IIAIEM), 2014.
- [12] Parvathy A, V.R. Raj, Venumadhav, Manikanta, "RFID Based Exam Hall Maintenance System", International Journal of Computer Applications (IUCA), 2011
- [13] S.Santhosh, "Design and Development of a Security Module with Inbuilt Neural Network Methodologies and an Advanced Technique on Fingerprint Recognition", International Conference on Circuit, Power and Computing Technologies (ICCPCT), 2014.
- [14] M. Agarwal, M. Sharma, B. Singh, Shantanu, "Smart Ration Card Using RFID and GSM Technique", International Journal of Computer Application (JAC), 2014.
- [15] Prashant Kontami, Ajinkya Tarlekar², Akshay Deshmukh³, Vivek Kale⁴. Prof. Sachin Patils, "A Review on Smart Ration Card System", International Journal of Innovative Research in Computer and Communication Engineering Vol. 5, Issue 3, March 2017.
- [16] Ms. Kritika Patil¹, Ms. Monica Sundrani², Ms. Sweta Kumari³, Ms. Aditi Kakde⁴, Prof. Mahesh Gosavi, "Smart Ration Card System Based on GSM", Technique International Research Journal of Engineering and Technology (IRJET) Volume: 03 Issue: 11 | Nov-2016 2016
- [17] C.Nagarajan and M.Madheswaran - 'Experimental verification and stability state space analysis of CLL-T Series Parallel Resonant Converter' - Journal of ELECTRICAL ENGINEERING, Vol.63 (6), pp.365-372, Dec.2012.
- [18] C.Nagarajan and M.Madheswaran - 'Performance Analysis of LCL-T Resonant Converter with Fuzzy/PID Using State Space Analysis'- Springer, Electrical Engineering, Vol.93 (3), pp.167-178, September 2011.
- [19] C.Nagarajan and M.Madheswaran - 'Stability Analysis of Series Parallel Resonant Converter with Fuzzy Logic Controller Using State Space Techniques'- Taylor & Francis, Electric Power Components and Systems, Vol.39 (8), pp.780-793, May 2011.
- [20] C.Nagarajan and M.Madheswaran - 'Experimental Study and steady state stability analysis of CLL-T Series Parallel Resonant Converter with Fuzzy controller using State Space Analysis'- Iranian Journal of Electrical & Electronic Engineering, Vol.8 (3), pp.259-267, September 2012.
- [21] Nagarajan C., Neelakrishnan G., Akila P., Fathima U., Sneha S. "Performance Analysis and Implementation of 89C51 Controller Based Solar Tracking System with Boost Converter" Journal of VLSI Design Tools & Technology. 2022; 12(2): 34-41p.
- [22] C. Nagarajan, G.Neelakrishnan, R. Janani, S.Maithili, G. Ramya "Investigation on Fault Analysis for Power Transformers Using Adaptive Differential Relay" Asian Journal of Electrical Science, Vol.11 No.1, pp: 1-8, 2022.
- [23] G.Neelakrishnan, K.Anandhakumar, A.Prathap, S.Prakash "Performance Estimation of cascaded h-bridge MLI for HEV using SVPWM" Suraj Punj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:750-756
- [24] G.Neelakrishnan, S.N.Pruthika, P.T.Shalini, S.Soniya, "Performance Investigation of T-Source Inverter fed with Solar Cell" Suraj Punj Journal for Multidisciplinary Research, 2021, Volume 11, Issue 4, pp:744-749
- [25] C.Nagarajan and M.Madheswaran, "Analysis and Simulation of LCL Series Resonant Full Bridge Converter Using PWM Technique with Load Independent Operation" has been presented in ICTES'08, a IEEE / IET International Conference organized by M.G.R.University, Chennai. Vol.no.1, pp.190-195, Dec.2007
- [26] M Suganthi, N Ramesh, "Treatment of water using natural zeolite as membrane filter", Journal of Environmental Protection and Ecology, Volume 23, Issue 2, pp: 520-530, 2022
- [27] M Suganthi, N Ramesh, CT Sivakumar, K Vidhya, "Physiochemical Analysis of Ground Water used for Domestic needs in the Area of Perundurai in Erode District", International Research Journal of Multidisciplinary Technovation, pp: 630-635, 2019.