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SMART RATION CARD SYSTEM USING RFID

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ABSTRACT

The ration distribution service is among the most important public services; however, it is faced with numerous challenges such as queuing up for hours, ration cards being forged, entering ration information manually, and ration being distributed unfairly. In addition, a large number of people are deprived of their rightful share of rations due to the fact that the existing system relies entirely on human intervention.

Therefore, the Smart Ration Card System using RFID is an effective solution to the mentioned challenges of the existing ration distribution service.

Each ration card holder will have an RFID card. Once the card is scanned at the ration shop, the system checks the identity of the user and then distributes ration according to the approved government quotas. All records pertaining to the ration distribution are digitized which results in reduced corruption and increased transparency. Our test results clearly demonstrate that the RFID-based ration distribution system has improved the accuracy of ration distribution and has significantly reduced fraudulent activities, and ultimately made the ration distribution service quicker and smoother Simple Technology. Big Improvement!

1. INTRODUCTION

Ration card systems were created to provide food commodities like wheat, rice, sugar, and kerosene to common people at subsidized rates. However, the ration distribution system is still plagued by several shortcomings. For example, the majority of ration shops continue to utilize manual registers, which create an environment conducive to manipulation and make it difficult to accurately determine how much ration was actually distributed. Moreover, people spend a considerable amount of time waiting in line for ration, and some times they do not even receive their ration in full (ration shop owners may intentionally reduce the quantity of ration given out). Furthermore, there exist a large number of fake ration cards and duplicate entries, which adversely affect the authentic recipients of the ration.

Therefore, the Smart Ration Card System using RFID can play a vital role in addressing the above-mentioned challenges.

RFID enables rapid identification and automatic authentication. As a result, only the legitimate cardholders are able to obtain the ration and all ration-related information are stored securely in the system.

This ultimately contributes to the reliability, speed, and transparency of the entire ration distribution process.

2. SYSTEM OVERVIEW

The **Smart Ration Card System using RFID** is designed as a digital solution for ration distribution.

Main Components

- **RFID Card**: Given to every ration card holder.
- **RFID Reader**: Installed at ration shop to scan cards.
- **Microcontroller/System Unit**: Processes data and controls the flow.
- **Database**: Stores user details, ration quota, and transaction history.
- **Display / Application Interface**: Shows user details and ration balance.
- **Admin Panel**: For government/admin monitoring and management.

3. METHODOLOGY

We followed the **Prototyping Model** for developing this project. First, we created a basic prototype to understand how RFID verification and ration allocation would work. After testing the initial prototype, we improved it step-by-step based on requirements.

The development process included:

- Requirement Gathering and Analysis
- System Design
- Prototype Development
- Implementation and Testing
- Deployment

We made improvements multiple times because in real projects, requirements change and systems need refining. That's the beauty of prototyping—it helps build better solutions.

4. MODULE DESCRIPTION

The system is divided into multiple modules for smooth working:

1. User Authentication Module

- RFID card scanning
- Verification of card holder details
- Prevents fake card usage

2. Ration Allocation Module

- Displays available quota
- Checks monthly limit
- Automatically calculates remaining ration

3. Transaction Management Module

- Records every ration distribution entry
- Stores date, time, and quantity
- Maintains complete history

4. Admin Module

- Add/update/delete user records
- Set ration quota
- Monitor distribution reports

5. Notification / Alert Module (Optional)

- Alerts if quota is exceeded
- Can notify users about transaction details

All modules work together to ensure secure and fast ration distribution.

5. APPLICATIONS

This system can be used in:

- Government ration shops (PDS system)
- Rural ration distribution centre's
- Smart city public distribution systems.

6. ADVANTAGES

Reduces corruption and fraud

Prevents fake and duplicate ration cards

Faster distribution process

Automatic record keeping (no manual register)

More transparency and fairness

7. LIMITATIONS

RFID cards can be lost or damaged

Requires electricity and proper hardware setup

Internet/database connectivity is needed for real-time updates

Maintenance cost of RFID readers and system

User training may be needed initially

8. CONCLUSION

The **Smart Ration Card System using RFID** is a practical and modern solution to improve ration distribution. It removes manual dependency and brings automation in the process. RFID-based identification ensures that only genuine beneficiaries get ration, and every transaction is recorded properly.

Overall, this project proves that using simple digital technology can reduce corruption, improve efficiency, and make government services more transparent and reliable.

9. FUTURE SCOPE

In future, the system can be improved by adding:

- Fingerprint / biometric verification with RFID
- Mobile app for users to check quota and history
- SMS alerts after ration distribution
- Integration with Aadhaar database
- Online monitoring dashboard for government

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