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AI Based Smart Ration Distribution and Monitoring Web Portal

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Abstract: *The E-Ration Card Web Portal is a digital platform developed to make the ration card process faster, easier, and more efficient. In the traditional system, the entire process is handled manually, which often results in excessive paperwork, long waiting times, and limited transparency. These challenges create difficulties for both citizens and administrative authorities. To overcome these limitations, this project offers a simple and user-friendly online solution. Through the portal, users can create an account, apply for a new ration card, update family information, upload required documents, track the status of their application, and download the ration card after approval. The system also includes an administrative module that allows government officials to examine applications, verify details, and either approve or reject requests. This helps in better management of user data and improves overall efficiency. By digitizing the entire process, the portal reduces manual effort, saves time, and minimizes errors. It also increases transparency and helps prevent fraudulent use of ration services by maintaining accurate records and proper verification mechanisms.*

Keywords: *E-Ration Card Web Portal*

I. INTRODUCTION

The ration card system is an important part of the public distribution system. It helps provide essential food items like grains to eligible people at lower prices. It is also used as an important document to get benefits from various government schemes. However, in many places, the ration card system still works in a traditional way using paperwork and manual processes. Because of this, the system becomes slow, less transparent, and difficult to manage. Both citizens and government staff face problems due to delays and extra work. In the current system, people have to visit ration offices many times for tasks like applying for a new ration card, updating family details, submitting documents, and checking application status. Since everything is done manually, there is a higher chance of mistakes, loss of documents, duplicate entries, and even misuse of ration benefits by people who are not eligible. At the same time, genuine people may face delays in getting their benefits. To solve these issues, the E-Ration Card Web Portal is introduced as an online solution. It provides a single platform where users can complete all ration card-related work. People can register, apply for a new card, upload documents, track their application status, and download their ration card once it is approved. This system reduces paperwork, saves time, and removes the need to visit government offices again and again. It makes the process easier and faster for users. The system also includes an admin panel for officials. Through this, they can check applications, verify details, approve or reject requests, and manage records properly. This helps in keeping accurate data and reduces errors. Overall, by making the entire process digital, the system becomes more transparent, efficient, and reliable.

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II. RELATED WORK

Many efforts have already been made to improve the ration card system using digital technology. The Government of India has taken important steps under the Digital India initiative to make public services more accessible and transparent. One such initiative is the Aadhaar-based system, which helps in verifying the identity of beneficiaries and reduces duplication and fraud in the ration distribution process. Some states have also introduced online ration card services where users can apply for new cards, update details, and check application status through official websites. These systems have helped in reducing paperwork and saving time, but in many areas, the services are still limited and not fully integrated. The Public Distribution System (PDS) has also been improved by introducing electronic Point of Sale (e-POS) machines at ration shops. These machines use biometric authentication to ensure that only eligible users receive the benefits. This has increased transparency but still depends on proper system connectivity and maintenance. In addition, some research studies and projects have focused on using web-based applications to manage ration card data. These systems aim to store beneficiary information digitally, reduce manual errors, and make the process faster. However, many of these systems lack a complete user-friendly interface or do not provide all services in one place. The proposed E-Ration Card Web Portal improves upon these existing systems by providing a complete solution in a single platform. It allows users to perform all activities such as registration, application submission, document upload, status tracking, and downloading the ration card online. It also provides an efficient admin module for proper verification and management. Overall, the project builds on previous work and government initiatives but aims to create a more simple, efficient.

III. LITERATURE REVIEW V. PROPOSED SYSTEM OVERVIEW

1. Smart Ration Distribution and Controlling
Authors: S. Valarmathy et al.
Explanation:
This system uses RFID technology instead of traditional ration cards. Each user gets an RFID card, which works like a smart card. The system helps in reducing fake ration cards and corruption.
Additional Issues:The system depends on special hardware devices, which may increase cost and require maintenance.

2. Automated Ration Distribution System using RFID and Biometric
Authors: K. Bala Murugan, R. Ramachandran
Explanation:
This system uses RFID cards along with fingerprint verification for better security. First, the card is scanned, and then the user's fingerprint is checked. After verification, ration is provided, and all details are updated in a central database
Additional Issues:Requires biometric devices and good network connectivity, which may not be available in all areas.

3. Smart Ration Distribution System using Raspberry Pi
Authors: P. Sangeetha, M. Mahalakshmi
Explanation:
In this system, Raspberry Pi is used as the main controller. Instead of ration cards, Aadhaar QR codes are used for user verification. The system automatically checks user details and shows the quantity of ration on a screen.
Additional Issues:Depends on internet and device setup, which may be difficult to manage in rural areas.

4. Smart Ration System using QR Code and Biometric Authors: A. Ashok Kumar, J. Selvakumar Explanation:
This system replaces traditional ration cards with QR code- based smart cards and uses fingerprint authentication for security. All user data is stored in a central database.
Additional Issues:Needs better system integration and strong data security to handle sensitive user information

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IV. PROBLEM STATEMENT

The current ration card system still works in a manual and paper-based way, which creates many problems. People have to deal with a lot of paperwork and often face delays in getting their ration cards. There is also a lack of transparency in the process, so it becomes difficult to track what is happening with the application. Citizens usually need to visit ration offices many times for applying, submitting documents, or checking the status. This takes a lot of time and effort. Also, checking income eligibility is not done properly in many cases, which can lead to misuse of ration benefits by people who are not eligible. Because of these issues, there is a need for a digital system like an E-Ration Card Web Portal.

V. PROPOSED SYSTEM OVERVIEW

The proposed E-Ration Card Web Portal is designed as a web-based system that connects users, admin, and the database in a simple and organized way. The system mainly has three parts: the user interface, the application logic, and the database. The first part is the user interface, where citizens and admin interact with the system. Users can register, log in, apply for a ration card, upload documents, check application status, and download their ration card. The admin has a separate dashboard where they can view applications, verify details, and approve or reject requests. The second part is the application layer (backend), which handles all the processing. It checks user inputs, manages login and session, verifies data, and controls the overall workflow of the system. It acts as a bridge between the user interface and the database. The third part is the database, where all the information is stored. This includes user details, family information, uploaded documents, application status, and admin records. The database ensures that data is stored securely and can be accessed when needed.

VI. SYSTEM ARCHITECTURE

The proposed E-Ration Card Web Portal is designed as a web-based system that connects users, admin, and the database in a simple and organized way. The system mainly has three parts: the user interface, the application logic, and the database.

1. Modules

1.1 User Module

In this module, users can manage their personal and family details. After logging in, users can enter and update information such as name, address, and family members. Users can also view their application history and track their ration card status. All data is stored securely in the database.

1.2 Ration Card Application Module

This module allows users to apply for a new ration card or update an existing one. Users fill in required details like income, family information, and upload necessary documents. After submission, the system generates a unique application ID, which helps in tracking the application.

1.3 Admin (Verification) Module

In this module, the admin verifies all submitted applications. Admin checks user details and uploaded documents carefully. Based on verification, the admin can approve or reject the application. This helps maintain accuracy and prevents misuse of the system.

1.4 PDF Generation Module

Once the application is approved, this module generates the ration card in PDF format. The document includes all necessary details and can be downloaded or printed by the user anytime. This removes the need for physical collection.

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1.5 AI Chatbot Module

This module provides instant help to users through an AI-based chatbot. The chatbot can answer common questions such as how to apply for a ration card, required documents, application status checking, and other related queries. It is available 24/7 and reduces the need for manual support. This improves user experience and makes the system more interactive and user- friendly.

2. Backend Architecture (Firebase Integration)

The system uses backend technologies to handle authentication, data storage, file handling, and chatbot integration:

- Authentication System: Ensures secure login and registration of users with proper identity verification.
- File Storage System: Stores uploaded documents such as ID proof and address proof securely on the server
- AI Chatbot Integration: The chatbot is integrated using AI technology to handle user queries.

2. Notification Workflow

- When a user submits a ration card application, the system sends a confirmation notification.
- The application is then sent to the admin for verification.
- When the admin reviews the application, the system updates the status (Under Review, Approved, or Rejected).
- If the application is approved, the user receives a notification that their ration card is ready for download.
- The AI chatbot can also assist users by providing status updates when asked.

VII. IMPLEMENTATION DETAILS

The implementation of the proposed Android-Based Organ Donation Platform consists of four main steps: User Input and Registration, Donor–Recipient Matching, Doctor Verification, and Notifications and Updates.

User Input and Registration

The system starts with user registration. Citizens create an account by entering basic details like name, address, mobile number, Aadhaar number, and family information. Proper validation is applied to ensure that all details are entered correctly. After registration, users can log in securely using their username and password. Passwords are stored in encrypted form to maintain security. Once logged in, users can fill out the ration card application form by entering complete family details, income information, and category (APL/BPL).

Application Processing and Verification

After filling the form and uploading documents, the user submits the application. The system assigns a unique application ID to each request for tracking purposes. The application is then stored in the database with a “Pending” status. The backend system processes the data and makes it available in the admin dashboard for further verification. This step ensures that all applications are organized and easily accessible.

Admin Verification

The admin logs into a secure dashboard where all submitted applications are displayed. The admin checks each application carefully, verifies user details, and reviews uploaded documents. Based on eligibility criteria such as income level, family size, and address verification, the admin decides whether to approve or reject the application. If the application is correct, it is approved; otherwise, it is rejected with proper reasons. This step ensures that only eligible users receive ration benefits and prevents misuse of the system.

Notifications and Updates

Users can easily track the status of their application through the portal using their application ID. The system updates the status in real time as the admin processes the request. Additionally, notification features like SMS or email alerts

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can be implemented to inform users when their application is approved or rejected. This reduces the need for users to visit offices and improves transparency.

Ration Card Generation and Download

Once the admin approves the application, the system automatically generates a digital ration card. This card contains all necessary details such as user name, family members, ration category, and unique ID. The user can log in and download the ration card in PDF format. This digital approach makes the process fast and eliminates the need for physical paperwork.

SYSTEM AECHITECTURE

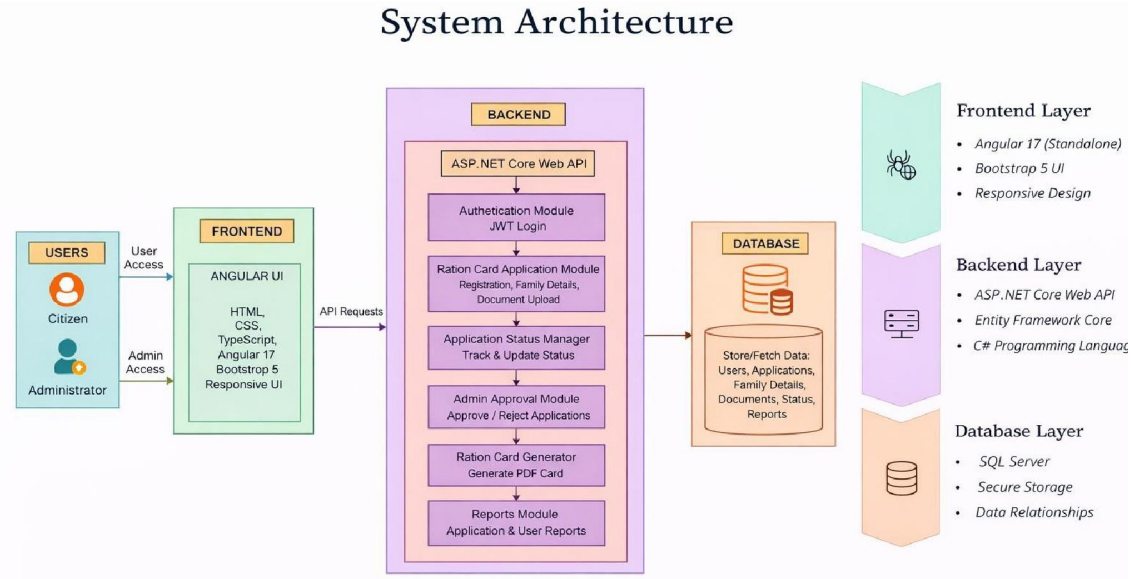

Figure 1: System architecture

VIII. PROPOSED SYSTEM

System Architecture :

System Architecture is shown in Figure1.

Our proposed system will function in following steps:

Step 1: User Registration

Users register on the web portal by entering their personal details such as name, address, contact number, and family information.

Step 2: Login & Authentication

After login, users fill out the ration card application form and upload required documents like ID proof, address proof, and income certificate.

Step 3: Application Submission

The system stores all application data in the database and assigns a
unique application ID. The application status is set to “Pending”.

Step 4: Data Storage & Processing

The admin checks the submitted application, verifies the details and documents, and decides whether to approve or reject it.

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Step 5: Admin Verification
The admin checks the submitted application, verifies the details and documents, and decides whether to approve or reject it..
Step 6: Status Update & Notification
The system updates the application status (Approved/Rejected). Users can check their status online and may receive notifications.
Step 7: Ration Card Generation
If the application is approved, the system generates a digital ration card with all user details.
Step 8: Download Ration Card
Users can log in and download their ration card directly from the portal.

IX. ANALYSIS OF PROPOSED SYSTEM

1. Improved Efficiency and Faster Processing:
The proposed E-Ration Card Web Portal makes the entire ration card process faster and more efficient. By moving the system online, users can complete all tasks like registration, application, and status checking without visiting offices. This reduces delays and saves time for both users and administrators.
2. Accurate Verification and Reduced Errors:
The system ensures proper verification of user details and documents through the admin panel. Since all data is handled digitally, it reduces human errors, avoids duplicate entries, and helps prevent misuse of ration benefits by ineligible users.
3. Secure Access and Data Protection:
The system provides secure login and role-based access for users and admin. Only authorized persons can access and manage the data, which helps in maintaining privacy and security of user information.
4. Better Transparency and Communication::
Users can track their application status anytime through the portal. This improves transparency and reduces confusion. Notifications and updates keep users informed without needing to visit offices repeatedly.
5. Improved Management and Reliability:
Compared to the manual system, the proposed system stores all data in a centralized database, making it easy to manage and access records. It improves coordination between users and admin and ensures reliable service delivery.
6. MODULES
he proposed E-Ration Card Web Portal is divided into different modules to handle specific tasks and ensure smooth working of the system.
1. User Module
This module is used by citizens to register, log in, apply for a ration card, upload documents, check application status, and download the ration card. Users can also update their personal and family details when needed.
2. Application Module
This module handles the ration card application process. It allows users to fill out forms, submit details, and manage application data. It ensures that all required information is collected properly.
3. Admin Module
The admin module is used by government officials to manage the system. Admin can view applications, verify user details and documents, approve or reject requests, and maintain records.
4. Database Module
This module stores all system data such as user information, application details, documents, and status updates. It ensures data is stored securely and without duplication.

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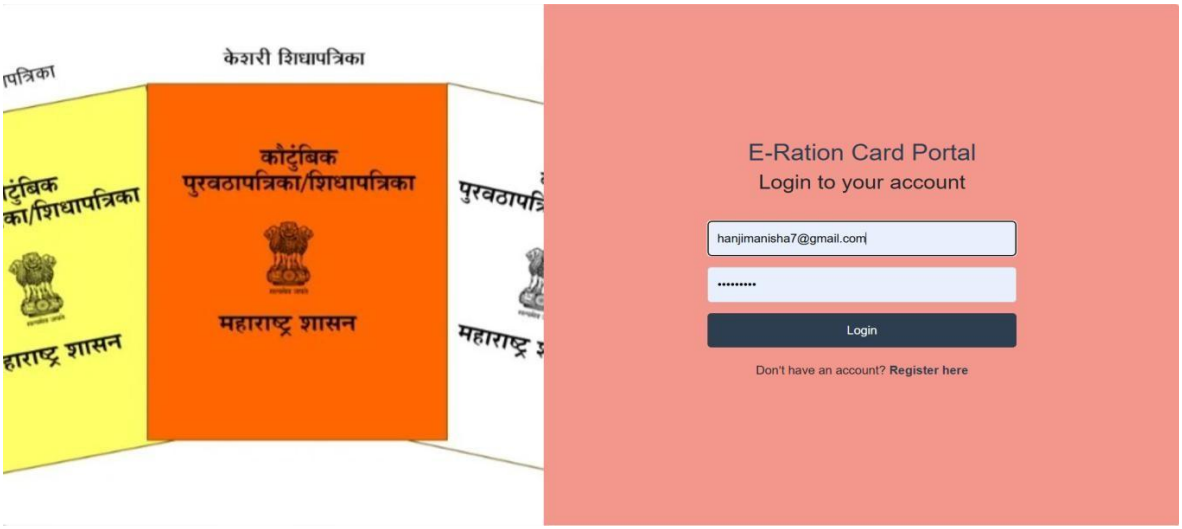
5. Notification Module

This module sends updates to users about their application status. Users are informed whether their application is pending, approved, or rejected, which improves communication and transparency.

6. Ration Card Module

This module is responsible for generating and providing the digital ration card after approval. Users can download their ration card directly from the portal.

RESULTS



LOGIN PORTAL & USER LOGINS

REGISTRATION PAGE & HOSPITAL DASHBOARD

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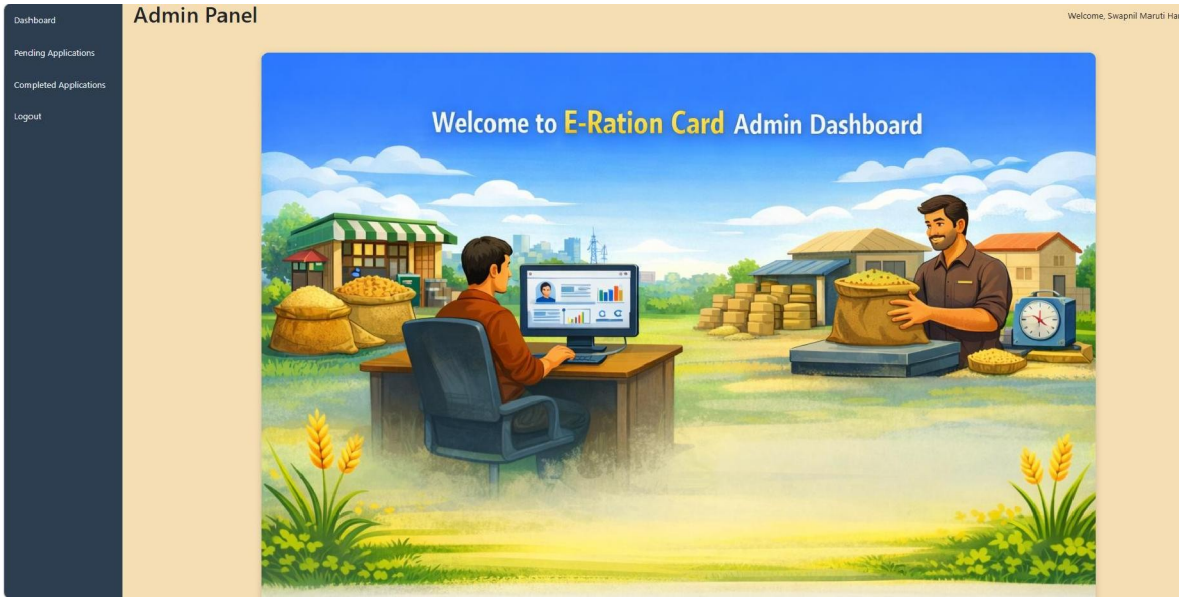

X. CONCLUSION

The E-Ration Card Web Portal makes the ration card process simple, fast, and transparent. It removes the need for paperwork and reduces the number of visits to government offices. Users can easily apply, upload documents, and check their application status online. The system also helps administrators manage applications more efficiently by verifying details and maintaining proper records. This reduces errors, avoids duplication, and prevents misuse of ration benefits. Overall, the proposed system improves service delivery, saves time, and ensures that the right benefits reach

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the right people. It supports digital governance and can be expanded in the future with more features to make public services even better.

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