

RATIONARY

Next-Gen Ration Booking System

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Abstract—Rationary is a coming- generation digital portion reserving system designed simply for Ration cardholders. The design aims to streamline the process of portion distribution by barring inefficiencies similar as long ranges, homemade verification, and lack of translucency. By integrating a structured niche booking medium, family operation, QR- grounded authentication, Rationary enhances availability and ease of use for druggies. The system allows druggies to register, book portion collection places, and manage family details efficiently.

Each booking generates a unique QR law, icing a secure and hassle-free collection process. also, Rationary incorporates a charity donation module, enabling druggies to contribute fat sections to associations in need, therefore promoting social weal. Admins can corroborate stoner documents digitally, reducing homemade crimes and icing authenticity.

The platform offers a stoner-friendly interface with visual pointers to simplify niche booking and insure a smooth stoner experience. unborn advancements could include AI-grounded demand vaticination for optimizing stock allocation.

By contemporizing public portion distribution, Rationary aims to ameliorate effectiveness, translucency, and availability in the food force chain.

Keywords — Portion Booking System, QR Code Authentication, Family Management, Slot Scheduling, Admin Dashboard, Charity Donation Feedback System, stoner- Centered Design, MongoDB.

Index Terms — Digital Public Distribution, Food Security, Web- grounded operation, Social Welfare, Real- time Booking, Document Verification, System Architecture, stoner Feedback, robotization in Governance.

I. INTRODUCTION

Rationary is a digital portion operation system designed for Ration cardholders, enabling effective and hassle-free portion distribution. The traditional portion collection system is agonized with long ranges, homemade verification crimes, and availability challenges, leading to an inconvenient experience for druggies and an

hamstrung workflow for directors. Rationary addresses these issues by offering a structured niche reserving system, a QR- grounded authentication process, and a family operation module that allows druggies to add or remove family members with document verification.

A unique QR law is generated upon successful niche booking, allowing quick and secure verification at portion centers. also, the platform includes a charity donation point, enabling druggies to contribute fat sections to listed associations in need, fostering social responsibility. Charities can request specific portion particulars grounded on their yearly conditions, and if druggies wish to contribute, they can contribute consequently, icing a streamlined and effective donation process. directors play a pivotal part in vindicating stoner documents, covering niche vacuity, and managing portion stock distribution in real time.

The backend structure utilizes MongoDB for effective data operation, while the frontend is erected using React.js, icing a responsive and stoner-friendly interface. The design is designed with scalability in mind, allowing unborn advancements similar as AI-powered demand vaticination, realtime force shadowing, and digital payment integration for a completely automated experience.

By contemporizing portion distribution, Rationary aims to enhance translucency, availability, and effectiveness in the public distribution system, eventually serving both druggies and directors. The traditional portion distribution system faces several challenges that produce inefficiencies and vexation for druggies.

One major issue is overcrowding at portion centers, where the lack of a proper scheduling system results in long ranges and detainments. This makes the process time consuming and inconvenient for druggies while also adding the workload on staff

managing the distribution. Another significant problem is family updates on portion cards. presently, adding or removing family members requires homemade verification, which is slow and hamstrung. druggies need to visit portion services in person, submit physical documents, and stay for blessing, leading to gratuitous detainments and executive burdens. Communication walls also impact the effectiveness of the portion distribution system. numerous digital platforms primarily operate in English.

also, there's no structured medium for charity integration in being systems. individualities who wish to contribute fat sections to those in need warrant an easy way to do so, and charities can not effectively communicate their conditions. This results in inefficiencies and prevents unused rations from reaching those who need them the most.

These challenges highlight the need for a modern, digitalized ration booking system that integrates slot booking, QR-based authentication, a simplified family management module and charity donation features. Addressing these issues will enhance accessibility, efficiency, and fairness in the public distribution system.

II. RELATED WORK

[1] The research proposes an AI-driven system for the prediction of ration collection slots to save time. It includes virtual queue management, real-time alerts, inventory status updates, and the facility to re-slot. The system is quite effective in preventing overcrowding and enhancing efficiency. Nevertheless, it is devoid of manual booking facilities, and hence user control becomes limited. AI predictions are not always correct.

[2] This paper suggests a cloud-based digital queue system for ration distribution, doing away with physical queues. It has smart card authentication, time slot booking, real-time reminders, and OTP verification. It is more efficient and anti-ration theft. It is based on server availability and does not have QR authentication. There is no option for manual time slot booking.

[3] The research enhances security with QR-based authentication for ration distribution. Every ration card consists of a separate QR code to authenticate user identity and avoid fraud. It has a complaint portal as well as real-time tracking for better transparency. It does not have slot booking features and the users have to go there without booking in advance. Admin verification is also not available.

[4] This study digitalizes ration management through an online portal with beneficiary login and slot booking. It helps reduce fraud and ensures timely ration distribution. Features include item selection, booking confirmation, and tracking. However, it lacks a user-friendly interface for booking. limiting accessibility.

[5] This system employs QR codes for secure ration distribution and to prevent fraud. It supports real-time inventory tracking, transaction logging, and grievance redressal. The system enhances efficiency and ensures correct ration delivery. The system is devoid of admin verification and family management capabilities. Users are not able to add or delete family members from their ration card.

III. METHODOLOGY

The approach used for the Rationary project is a modular and user-focused methodology that provides seamless interaction between end users, administrators, and charity bodies. The system starts with user registration and login, wherein Ration cardholders register with respect to personal and family information, which is stored securely in a MongoDB database. After authentication, users are given access to a dashboard from where they can book ration slots by choosing a desired date and time. If a slot is available, the system will book it and automatically create a QR code with booking details for verification at a later stage at the ration distribution center.

Apart from booking slots, users are also able to maintain family details by adding or deleting members. These modifications need supporting documents like certificates of birth or death, which are processed and authorized by the admin. There is also a donation feature whereby users can donate excess rations to registered charities. Donations are tracked in the system and made accessible to charity organizations, who can log in, access current stock, and make requests for needed items.

The admin module also allows user verification, review of feedback, approval of family update, and coordination of donation logistics. Admins also track system feedback provided via the contact form and respond to users directly. To make the site available and accessible to everyone, multilingual support has

been added, enabling users to change the interface language as and when required. This whole approach makes the ration booking and donation process efficient, transparent, and socially responsible.

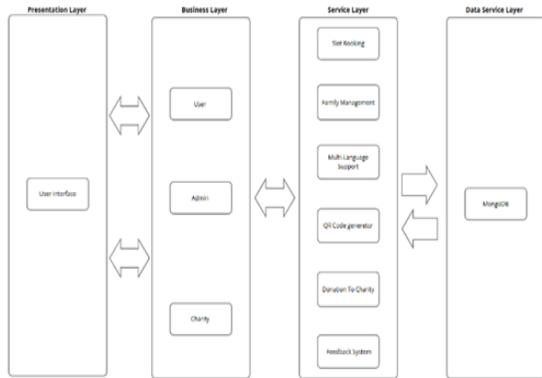


Fig. 1. Architecture Diagram

IV. TECHNICAL REGIMENTS

- 1) Windows 10
- 2) React JS
- 3) Node.js Runtime Environment
- 4) MongoDB Database
- 5) Visual Studio Code IDE
- 6) Any modern browser (Google Chrome, Firefox, etc.)

As far as the hardware regiments are concerned, For development and deployment, the system should run on Windows/MacOS/Linux with a 64-bit processor, a minimum of 4GB RAM (8GB recommended), and at least 100GB of free hard disk space. The system should have an active internet connection via Wi-Fi or LAN for real-time database and API communication. For users, a standard smartphone or desktop with internet access and a modern browser is sufficient to interact with the application.

V. RESULTS

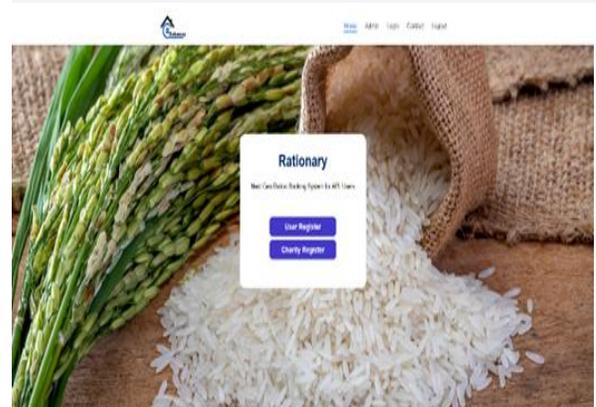
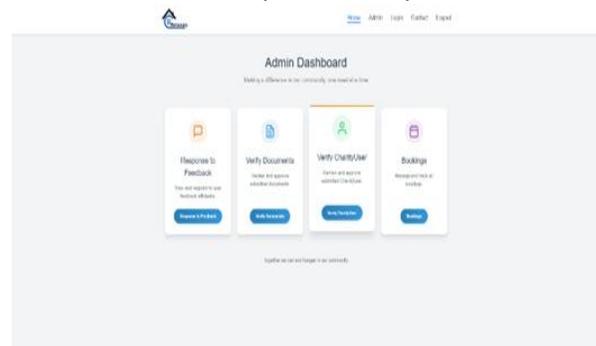
Rationary offers a comprehensive and user-centric approach to digital ration distribution through its robust set of feature.

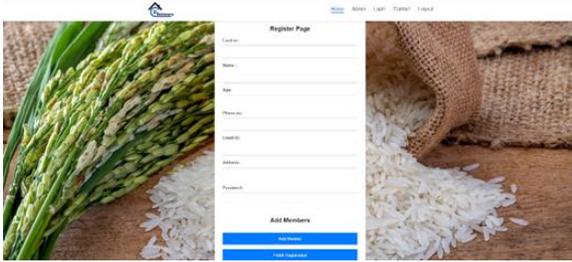
One of the standout components is the User-Friendly Slot Booking System, which allows users to pre-book their ration collection time slots, helping reduce long queues and manage crowd flow effectively. The inclusion of visual indicators—green for available and red for full—

makes the process intuitive. To further enhance security, the platform uses QR-Based Authentication, where each successful slot booking generates a unique QR code. This QR code is scanned at the ration center to verify the user’s identity and booking details, reducing fraud and ensuring smooth transactions.

Additionally, Rationary simplifies family record updates through its Family Management Module. Users can add new members by uploading a digital birth certificate or remove deceased members with a death certificate, avoiding time-consuming in-person verifications. A unique feature of Rationary is its Charity Donation Integration, which connects users with registered charities. Charities can list their ration needs, and users willing to contribute can donate surplus items, with the platform automatically updating inventory levels in real time.

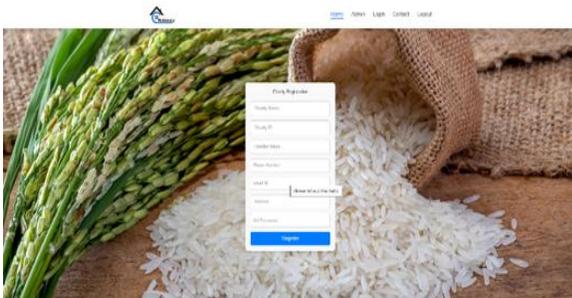
To oversee and manage the entire process, an Admin Dashboard provides centralized access for administrators to verify user updates, manage donations, monitor slot bookings, and authenticate QR codes. This backend functionality ensures smooth operations, accountability, and efficient service delivery across the system.





This is the Home Page of the Rationary – Smart Ration Booking System. It features a clean, user-friendly interface with a background image of rice and crops, symbolizing food distribution. At the center, there’s a registration panel offering two options: User Register and Charity Register, targeting APL cardholders and NGOs respectively. The navigation bar at the top includes links to Home, Admin, Login, Contact, and Logout, providing easy access to core sections. The tagline, “Next-Gen Ration Booking System for APL Users,” clearly defines its purpose.

This is the User Registration Page of the Rationary – Smart Ration Booking System. It features a split-screen layout with an appealing rice-themed background. On the right, the form collects essential user details such as Card Number, Name, Age, Phone, Email, Address, and Password. Below the form, users can add family members individually using the "Add Member" button or complete the registration using "Finish Registration."



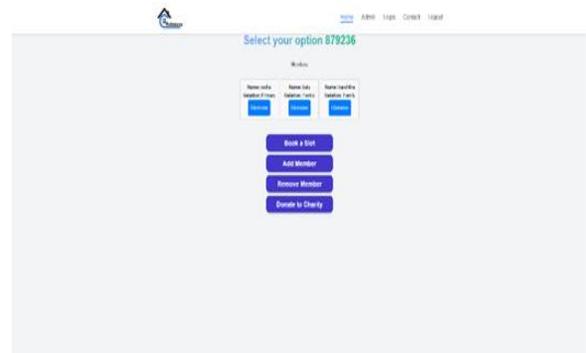
This is the Charity Registration Page of the Rationary – Smart Ration Booking System. It features a centralized form against a background of rice and paddy, creating a relevant and inviting interface. The form collects details such as Charity Name, Charity ID, Handler Name, Phone Number, Email ID, Address, and Password. Designed for NGOs and charitable organizations, it facilitates secure onboarding into the system. A single Register button at the bottom submits the data, enabling seamless participation in ration donation activities.

The Admin Dashboard of Rationary is designed to provide a centralized and efficient interface for

administrators to manage critical operations. It features clearly defined sections including feedback response, document verification, charity/user approval, and booking management. Each function is accessible via intuitive cards, enhancing user experience and workflow efficiency. The layout is minimal yet functional, enabling admins to streamline the ration distribution system with ease.



The Rationary login page offers a clean and intuitive interface designed for APL cardholders. Users can enter their unique card number to view registered family members linked to that card. Upon selecting a family member, a secure password prompt is displayed for authentication. This user-friendly design ensures accessibility for people of all age groups and literacy levels.



This page of the Rationary system serves as the User Dashboard, where authenticated users can manage their ration card family details and interact with key functionalities. It displays all family members linked to the user’s ration card, offering options to remove any member. Below, users are provided with four main actions: Book a Slot for ration collection, Add Member to their family list, Remove Member, and Donate to Charity. The interface is clean and user-friendly, ensuring easy navigation and efficient management of household and community-based ration services.

The screenshot shows a web interface for submitting a ration request. At the top, there are navigation links for 'Home', 'Admin', 'Login', 'Contact', and 'Logout'. Below this, there's a header with 'User Details' and a list of items: 'Rice', 'Wheat', 'Ragi'. The main form has three input fields: 'Ration Card No.', 'Wheat Qty', and 'Ragi Qty'. A blue button labeled 'Submit Ration Request' is positioned at the bottom of the form.

This page represents the Ration Request Interface in the Rationary system. It allows users to view the current stock levels of essential items such as rice, wheat, and ragi in real-time. Based on availability, users can submit a ration request by specifying the quantity they require for each item. The form includes input fields for rice, wheat, and ragi in kilograms, followed by a "Submit Ration Request" button. The clean layout ensures a seamless user experience, supporting transparency and efficiency in ration distribution.

VI. CONCLUSION

In conclusion, Rationary provides a smart and user-friendly solution to modernize ration distribution for APL (Above Poverty Line) cardholders. By integrating essential features such as slot booking, QR-based authentication, family management, and charity donations, the system eliminates many of the inefficiencies found in traditional public distribution methods. SRationary ensures accessibility and ease of use for a wide range of users. The admin dashboard further enhances management efficiency by streamlining verification, tracking donations, and overseeing slot bookings. Overall, Rationary not only improves transparency and convenience but also encourages social impact through its structured donation system, making it a reliable platform for the future of ration services.

VII. DISCUSSIONS

The primary purpose of Rationary is to digitally transform the ration distribution process for Ration cardholders, ensuring accessibility, efficiency, and transparency. The system aims to reduce overcrowding at ration centers by providing an organized slot booking mechanism that streamlines the collection process. Additionally, it simplifies family management by allowing users to update their family details online, eliminating the need for physical visits to government offices.

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