

Product Availability Checking Portal For Ration Shop

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Abstract—Public Distribution Systems often face challenges such as limited transparency, inefficient inventory tracking, manual record handling, and difficulties in verifying real-time availability of essential commodities. Beneficiaries frequently experience inconvenience due to uncertainty about stock availability, leading to repeated visits to ration shops and reduced trust in the distribution process. To overcome these issues, this project proposes a Product Availability Checking Portal that provides a centralized digital platform for efficient and transparent ration management. The system integrates dedicated modules for customers, shopkeepers, suppliers, and shops, enabling secure registration, seamless communication, and coordinated operations among all stakeholders. It includes automated billing and stock management features that ensure accurate transaction recording, real-time inventory updates, and reduction of human errors and fraudulent activities. By allowing users to check product availability instantly, the portal minimizes delays and enhances user convenience. Additionally, the system supports administrative monitoring through structured data management, enabling better decision-making and improved control over distribution processes. Overall, the proposed solution enhances transparency, accountability, and operational efficiency, ensuring that essential commodities are distributed fairly and reach eligible beneficiaries in a timely and reliable manner.

Index Terms—shop-product checking-availability-stock checking

I. INTRODUCTION

The Public Distribution System (PDS) plays a vital role in ensuring the availability of essential commodities such as rice, wheat, sugar, and kerosene to eligible beneficiaries at subsidized rates. It serves as a key mechanism for food security and social welfare, particularly in developing regions where a significant complex. Additionally, the lack of real-time monitoring

and centralized data management can lead to issues such as improper stock allocation, delayed updates, and reduced transparency. These challenges may also create opportunities for errors and fraudulent practices, affecting the fair distribution of resources. Without a structured digital system, communication gaps between suppliers, shops, and customers further complicate the distribution process. Therefore, there is a need for an efficient, transparent, and automated solution that ensures real-time product availability tracking, accurate inventory management, and seamless coordination among all stakeholders involved in the system. The portion of the population depends on government-supported ration distribution. However, with increasing population and growing demand, managing the distribution process efficiently has become more. The project aims to bridge the gap between classic hardware constraints and modern game engine capabilities by implementing custom rendering techniques and efficient system architecture. This approach allows for a deeper understanding of real-time interactive systems while delivering an immersive gameplay experience.

Beneficiaries often require accurate and timely information regarding product availability, while shopkeepers and suppliers need effective tools to manage stock and transactions.

In recent years, digital technologies have significantly transformed traditional systems by improving transparency, accessibility, and operational efficiency. Web-based platforms and centralized systems enable real-time data sharing, streamlined communication, and better monitoring of resources. By integrating multiple stakeholders into a single platform, digital solutions help reduce manual efforts and enhance coordination. This project introduces a Product Availability Checking Portal that leverages modern

web technologies to create a unified system for customers, shopkeepers, suppliers, and administrators, ensuring efficient ration distribution and improved service delivery.

1.2 Problem Statement

Public distribution processes often face several challenges that affect their efficiency and reliability. Beneficiaries frequently encounter difficulties in knowing whether essential commodities are available at ration shops before visiting, leading to inconvenience, wasted time, and dissatisfaction. Shopkeepers may struggle with maintaining accurate stock records due to manual entry, which can result in discrepancies, delays, and mismanagement of inventory. System Design And Methodology

II. LITERATURE REVIEW

Fig. 1. The rapid advancement of digital technologies has significantly influenced the agricultural sector, leading to the development of various E-Commerce (EC) platforms and Recommendation Systems (RS) aimed at improving agricultural trade efficiency. Researchers have explored the integration of Web-Based Systems (WBS), Data Analytics (DA), and intelligent algorithms to enhance interactions between farmers and consumers while addressing inefficiencies in traditional marketplaces. Initial studies focused on agricultural EC platforms that allow farmers to directly sell their products to consumers. These systems provided fundamental features such as product listing, search, and online ordering. While they improved accessibility and reduced reliance on intermediaries, they lacked personalization and intelligent mechanisms to assist users in identifying suitable products. As a result, users often experienced difficulty in making efficient purchasing decisions due to the absence of tailored recommendations. To overcome these limitations, RS were introduced in both agriculture and general EC domains. Techniques such as Collaborative Filtering (CF) and Content-Based Filtering (CBF) have been widely applied to suggest products based on user preferences and behaviors. CF identifies similarities between users, while CBF relies on product attributes such as category, quality, and price. Although these methods enhanced user experience, they faced challenges like the Cold-Start Problem (CSP) and

insufficient data, especially in agricultural systems where user interaction data is relatively limited.

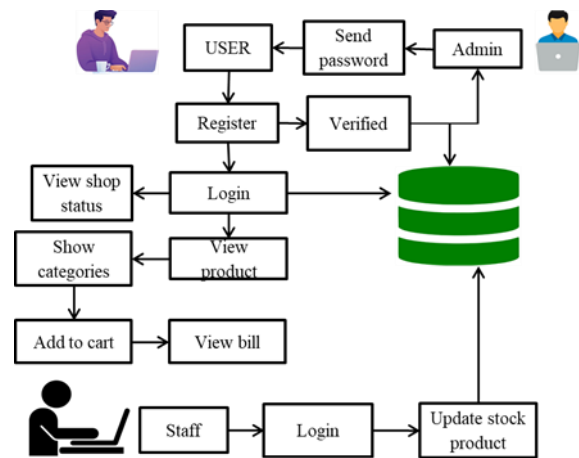


Fig. 2. Custom Rendering Pipeline with Vertex Snapping)

A. Asset Engineering in Blender

All 3D models were built with a strict polygon budget. For example, our main character's head was kept under 300 polygons. Instead of adding 3D details like wrinkles or facial features, we painted those details onto very small textures (128x128 pixels). We spent significant time mapping the 2D textures perfectly to the 3D models to ensure the pixels remained perfectly square and didn't stretch.

TABLE I. RENDERING AND ASSET CONSTRAINTS

Fig. 1. Flow diagram for product recommendation Recent research has incorporated Machine Learning (ML) and Data Mining (DM) approaches to improve recommendation accuracy and system performance. Techniques such as clustering, Decision Trees (DT), and Association Rule Mining (ARM) enable systems to analyses user behaviors and predict relevant products effectively. These methods allow dynamic and adaptive recommendations, improving user satisfaction. However, such systems often require large datasets and higher computational resources, which may limit their implementation in small-scale agricultural platforms. IN addition to recommendation techniques, several studies emphasize the importance of real-time Inventory Management Systems (IMS) and DA. IMS help farmers monitor stock levels, reduce wastage, and ensure accurate product availability. DA provides insights into consumer

preferences, demand patterns, and product performance, enabling farmers to make informed decisions. However, many existing platforms fail to integrate these features into a single cohesive system.

II. SYSTEM DESIGN AND METHODOLOGY

The Cart and Billing Module manages the process of selecting products and completing transactions within the system. Users can add products to their cart after viewing available items, and the system records details such as product name, quantity, and price. This allows users to review their selections before confirming the purchase. The module provides flexibility by enabling users to modify or remove items from the cart as needed. It simplifies the purchasing process by presenting all selected items in a single interface. The design ensures ease of use, allowing users to manage their selections without confusion. By providing a structured approach to product selection, the module enhances user convenience and improves overall system efficiency.

Once the user confirms the purchase, the module generates a detailed bill that includes product information, total cost, and transaction summary. This billing data is stored securely in the system database for future reference and auditing purposes. The module ensures accuracy by automating calculations, reducing manual errors. It also integrates with the inventory system to update stock levels immediately after each transaction. Notifications may be generated to confirm successful purchases. By providing clear and transparent billing information, the module builds user trust and ensures accountability. Overall, it plays a vital role in managing transactions efficiently and maintaining accurate financial records within the system.

5. Staff Module

The Staff Module is designed to support ration shop staff in managing daily operations efficiently through a digital interface. Staff members can log in securely and access features such as updating product details and monitoring stock levels. This module ensures that only authorized personnel can modify system data, maintaining accuracy and preventing unauthorized changes. It replaces manual record-keeping methods

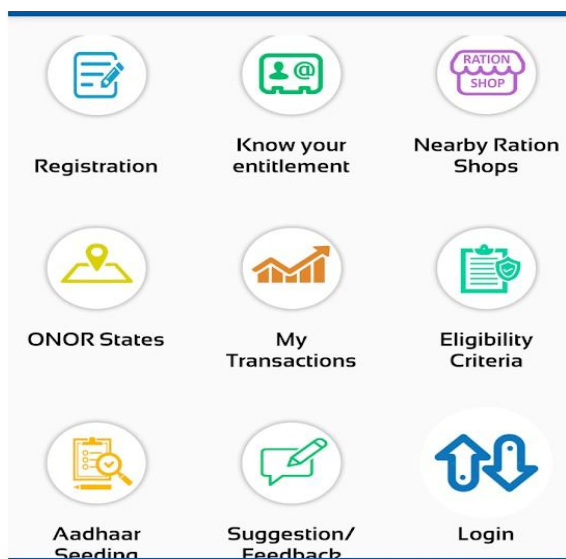
with a digital system, reducing workload and minimizing errors. Staff can easily manage product information, ensuring that the data displayed to users is always accurate. The module improves operational efficiency by centralizing all staff-related activities within a single platform.

In managing product details, staff members are responsible for maintaining accurate inventory records and ensuring timely updates. The module allows them to monitor stock levels and make necessary adjustments based on product availability. It also supports coordination with other modules such as billing and inventory management. By digitizing routine tasks, the module enhances productivity and reduces the chances of errors. It ensures that updates are reflected in real time across the system, benefiting both users and administrators. Overall, the Staff Module plays a crucial role in maintaining system reliability and ensuring smooth operation of ration shops.

6. Stock Management Module

The Stock Management Module is responsible for maintaining accurate and up-to-date records of product inventory within the system. It allows staff to add new stock, update quantities, and remove outdated or unavailable products. This ensures that the system always reflects the actual availability of items. The module eliminates the need for manual stock registers, reducing errors and improving data consistency. Real-time updates ensure that any changes in stock levels are immediately reflected across the system. This improves transparency and ensures that users receive accurate information about product availability.

In the module provides features such as low-stock alerts, enabling staff and administrators to take timely action for replenishment. It ensures synchronization with other modules such as product viewing and billing, maintaining consistency in data across the system. The module may also provide insights into stock usage patterns, helping in better planning and management. By automating inventory tracking, it reduces manual workload and enhances operational efficiency. Overall, the Stock Management Module plays a vital role in ensuring smooth ration distribution by maintaining accurate and reliable inventory records



III. CONCLUSION

The Product Availability Checking Portal for Ration Shop is designed to improve the efficiency, transparency, and reliability of the public distribution system. This project helps ration card holders easily check the availability of essential products such as rice, sugar, wheat, and kerosene through an online platform. By digitizing stock management and product tracking, the system reduces manual work, minimizes errors, and avoids unnecessary visits to ration shops. The portal also assists shop administrators in updating stock details quickly and maintaining accurate records. Users can access real-time information, which increases customer satisfaction and trust in the ration distribution process. Overall, the project provides a simple, secure, and user-friendly solution that supports effective ration shop management and better public service.

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