Virtual Queueing System For Ration Shop

AarthiK[1], Aarthika S[2], JananiD[3], JananiS[4]
[1, 2, 3, 4] Dept of Computer Science and Engineering
[1, 2, 3, 4] Vivekanandha College of Technology for Women, Tiruchengode, Namakkal, TamilNadu, India

Abstract- *Ration Shop's Virtual Queueing System is an online program that attempts to modernize and improve the way people access food and goods from government ration shops. Many people are frustrated with having to wait long periods of time in crowded ration stores because there were not enough people on staff, there were no accurate records kept as to how much product was available for purchase, and employees were not adequately trained on the procedures for distributing the products to the needy. By providing an internet-based application for the distribution of rations, the Virtual Queueing System connects shopkeepers with users with the enablement of an administrator in the coordinating effort to provide improved service quality. The administrator of the application is responsible for registering the shopkeepers, approving requests from users, maintaining a record of each shopkeeper's employee leave and managing each user's ration card. The shopkeeper can provide their availability of product by entering this information in real-time, reserving tokens for the user and updating users on the reservation status. Users may view the shopkeeper's available quantity of product, the shopkeeper's leave of absence status, reserve a token to receive the ration and track the status of their token reservation. Users may also apply and request for new ration cards or the addition/removal of family members, which the admin reviews and approves. The admin will then upload the new ration card for the user to securely download via the system. These processes have been digitized thereby reducing the amount of manual work, reducing waiting time, and preventing congestion at ration shops. The digitization of these processes has also improved transparency, accountability, and fairness in ration distribution. Overall, the Virtual Queueing System for Ration Shops is a user-friendly, efficient, and reliable option that improves public service delivery and provides users greater access to vital commodities.*

Keywords: Ration card(new card, add/ remove members), stock availability checking, token booking.

I. INTRODUCTION

The Virtual Queueing System for Ration Shop has been created to provide an online application that will improve the way public distribution systems are managed and accessed by many in order to create a better overall experience through increased efficiency as well as transparency. Traditionally if users went to a ration shop, users would have to wait in long lines, there are not any resources available to determine stocks of goods before going down to the shop; there may even be situations occurring where a shopkeeper could be on leave or not be open for business due to unforeseen circumstances, resulting in wasted time, overcrowded stores, and potentially unfair distribution of essential commodities. To fix all of these issues, the Virtual Queueing System provides a way for administrators, shopkeepers, and users to access a centralised, digital platform that has been designed to connect all of these parties in a secure and structured manner. There are three primary components of this system: Administrators, Shopkeepers, & Users. The Administrator is responsible for managing the system (add detail for new shopkeepers; maintain leave records for shopkeepers; verify users; upload ration cards). The shopkeeper is able to log into the system, update real-time stock availability; view token bookings; update token status; thus enabling better coordination and planning when delivering services. Users are able to register and log into the system, view the shopkeeper's leave detail, see what stocks of goods are available; and book tokens for the collection of their rations thereby reducing physical crowding and time spent waiting in line for their ration tickets. Queue management and ration card applications, including permits for new ration cards and requests for family members to be added or removed from ration cards, form much of the purpose of this system. Appropriate admin verification of submitted details is followed by uploading either an approved ration card or a corrected ration card that the user may download from within the system. The effectiveness of this digital method in terms of minimizing paper use, reducing the amount of manual error, and increasing levels of transparency in the end-to-end approval process is substantial. This versatile Virtual Queueing System also improves delivery of public services through efficient, user-friendly and reliable distribution of rationed goods while ensuring all individuals fair access to the resources that they require.

II. EXISTING METHODLOGY

The present ration shop service does not have a comprehensive service delivery model and still relies on manual processes, meaning users have to physically go into a shop and check if there is enough stock, apply for a ration card

to obtain their entitlements or update their family details with the shopkeeper. They also do not have any advanced notice of when their shopkeeper will be taking leave or how much stock is available, resulting in users visiting the shop unnecessarily and waiting in long lines. The physical process for token booking has resulted in users physically congregating and no effective crowd management at the token booking venue. The current application and verification process for the ration card application has also taken a very long time and is subject to numerous processing errors, as it still relies on an entirely paper-based administrative process. In general, the current system has low levels of efficiency, transparency and convenience for users and shopkeepers resulting in long delays in providing users with their required entitlements.

III. PROPOSED METHODOLOGIES

A web-based virtual queueing platform for ration shops automation of the ration distribution process. The platform includes a secure login system using identity verification, ensuring that only authorized users can access the system. The three main types of users in the system are admin, shopkeeper, and user/consumer. The administrative user manages the information of the shopkeeper, schedules and grants leave, verifies the user applications, and uploads the user's ration card(s) - all functions necessary for the distribution of rations. The shopkeeper updates the availability of stock (as to when there will be stock in the shop) as well as the token reservations for selected dates and manages each booking. Users can review the stock availability of the shop, see if the shopkeeper has availability of their products, reserve a token, apply for a ration card, and request changes regarding the family members associated with them. The central database will enable all parties to have a central location for accessing information on users, stocks, tokens, and ration cards. By allowing users to schedule their visits ahead of time, the digital platform reduces paperwork and the need for long waiting in line at ration stores, while also improving coordination among all stakeholders. Because users can see the progress of their requests and token bookings in real time, there is also improved transparency. Additionally, the platform allows shopkeepers to distribute their stock more efficiently and provides automated notifications or alerts to users with regard to their token schedule and stock availability. Overall, the digital platform provides a level playing field for all users by ensuring that essential materials are provided in a systematic and user-friendly manner.

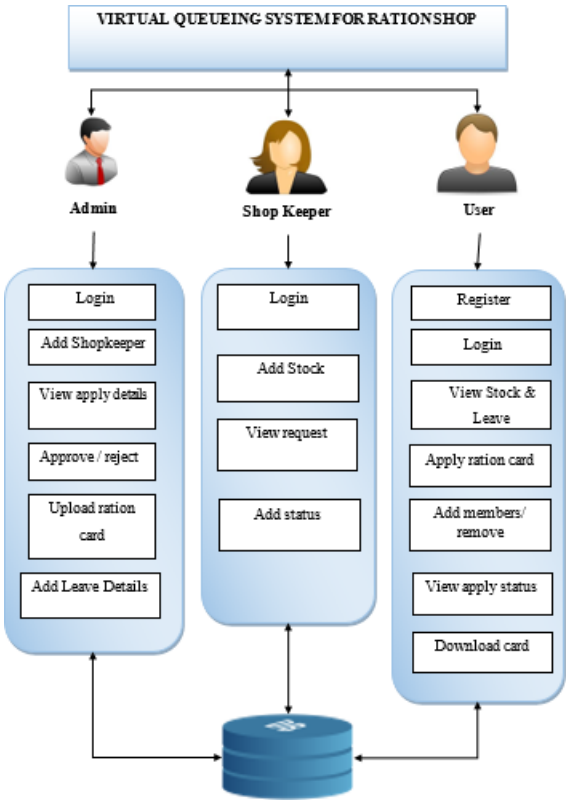


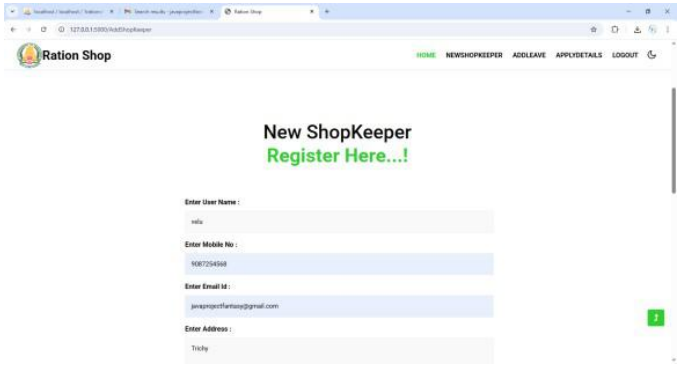
Figure 1: Architecture diagram represent the proposed methodology

IV. METHODOLOGY

Development of Virtual Queueing System for Ration Shop utilizes structured Software Development Lifecycle. This starts by analysing requirements so each of the administrators, shopkeepers and users can have their own individual needs taken care of during development. Once the requirements are addressed then design work occurs which defines the overall architecture, structured database and how modules will interact. After designing an entire system becomes a reality via a Web based Application that incorporates role based access for Admin, Shopkeeper and User Roles. All elements of this Application rely upon accessing one Central Database that contains User Details, Stock Details, Token Booking Details and Ration Card Records. Functional Testing using business scenarios is performed; verifying correct updates happen with respect to stock, Tokens, Application Processing, etc. After completion of Functional Testing the Application may then be Deployed into Production with a combination of Maintained Protocols for continuing to operate the Application smoothly, prevent Unauthorised Access /Maintain Security; and Establish Reliability.

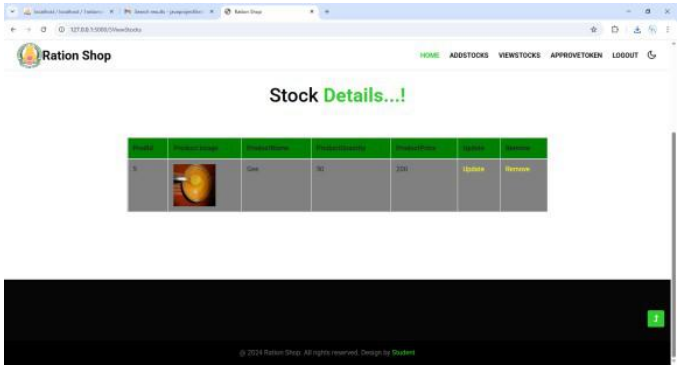
Admin Interface Module

The admin interface module allows the administrator to manage the entire system effectively. The admin can log in securely and add shopkeeper details, manage leave schedules, and monitor overall system activities. This module also handles ration card applications by verifying user-submitted details and approving or rejecting requests. Additionally, the admin can upload approved ration cards and update corrected records. It ensures centralized control, data management, and smooth functioning of the system.



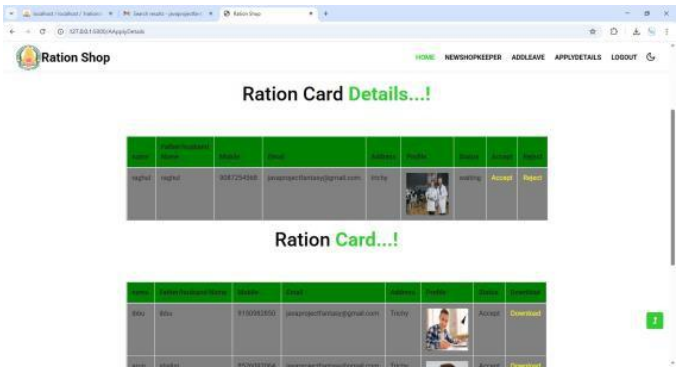
Shopkeeper Interface Module

The shopkeeper interface module enables shopkeepers to log in and manage ration shop operations efficiently. Shopkeepers can update stock availability details regularly, ensuring users have accurate information. They can view token booking requests made by users and update the status of tokens accordingly. This module helps in managing daily distribution activities. It ensures proper coordination between users and ration shop operations.



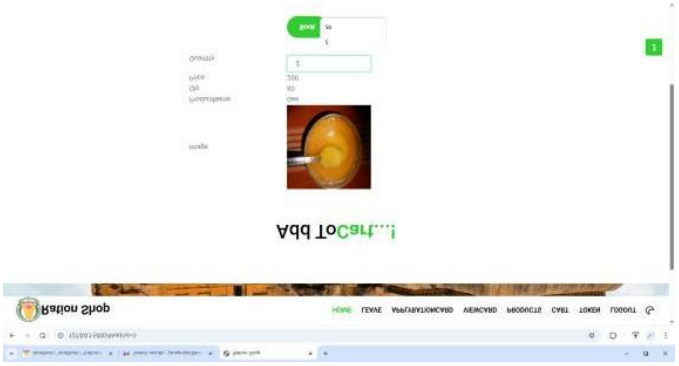
Customer (User) Interface Module

The customer interface module provides users with access to system functionalities through registration and login. Users can view stock availability, check leave details, and book tokens for ration collection. They can also track token status and download ration cards after approval. Additionally, users can request changes such as adding or removing family members. This module enhances user convenience and accessibility.



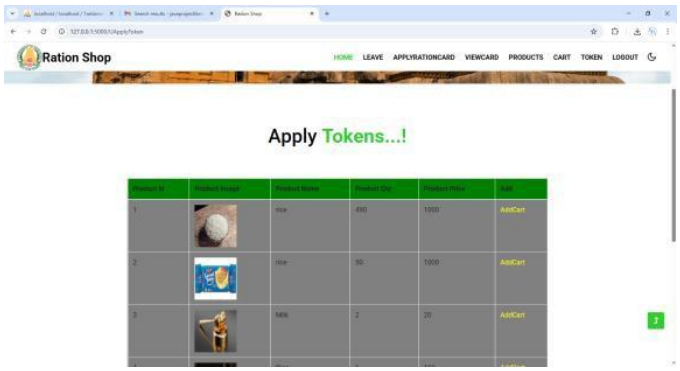
Stock Module

The stock module is used to manage and display the availability of ration items. Shopkeepers update stock details such as quantity and type of items available in the shop. Users can view this information before booking tokens, helping them plan their visits. This module ensures transparency in stock distribution. It reduces confusion and improves service efficiency.



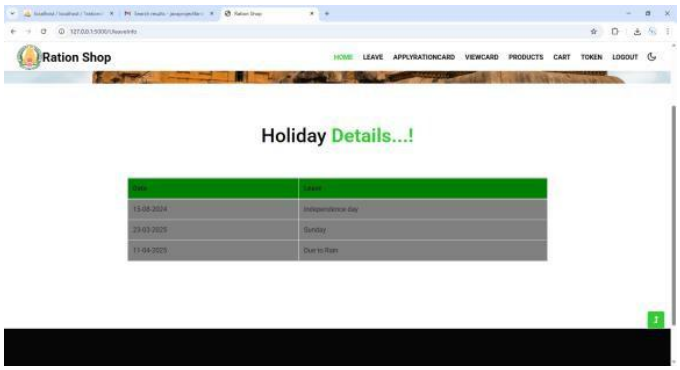
Token Booking Module

The token booking module allows users to reserve a time slot for collecting ration items. After checking stock availability, users can book tokens through the system. The shopkeeper can view all bookings and update their status (approved, pending, or completed). Users can track their token status in real time. This module helps reduce overcrowding and ensures an organized queue system.



Leave Module

The leave module enables the admin to manage shopkeeper leave schedules. The admin can add and update leave details, which are then visible to users. This helps users know when the shop is closed and plan accordingly. It ensures better communication between the system and users. The module improves service transparency and avoids inconvenience.



Apply Ration Card Module

The apply ration card module allows users to submit applications for new ration cards online. Users upload required documents and details through the system. The admin reviews the application, verifies the information, and approves or rejects it. Once approved, the ration card is generated and uploaded for user download. This module simplifies the ration card application process and reduces manual effort.

V. EXPERIMENTAL RESULTS

The Experimental Results of the Ration Card Indicator System proves that the developed system has increased the efficiency, transparency, and accessibility of ration distribution services. During testing, the Admin Module was able to safe the process of Shopkeeper Registration and Leave updates without an issue, as well as maintaining proper communication between the various Stakeholders. The Shopkeeper Module was able to accurately save stock entry information, as well as maintain the Token status and with minimal manual error so that the user will be able to obtain or view Ration details in real time. The user was able to check stock availability, check on the shopkeeper's leave status, and book Tokens quickly and easily, thus reducing their wait time at the ration shop, which reduces overcrowding at the Ration shop. The Token booking and Updated Process was functioning appropriately during testing and demonstrated minimal delay when changing the status of the booking. The system was also able to correctly process Request/S for New Ration Cards and Member Add/Remove requests for the Ration Cards with Admin verification and approval being done correctly. The ration card upload and download functioned successfully as designed, allowing the user to access their Digital Ration Card securely. Acceptable performance testing results indicated that the system can process multiple user requests simultaneously with minimal lag, which will ensure that scalability of the LRS. The overall Results of the LRS demonstrate that the user will have increased convenience, decreased manual work load, decreased errors and an overall more organized and transparent ration distribution process.

VI. CONCLUSION

The Virtual Queueing System for Ration Shop creates a functional and clear electronic way to help enhance ration distribution services. The ability to book tokens online and see up-to- date stock levels in real time reduces the amount of time spent waiting in line for food at a Ration Shop. This system promotes an increased level of communication between the administrator of the Ration Shop, the storekeeper at the Ration Shop, and the customer going to the Ration Shop; thus creating a better means for a user, through improved access to and the convenience of using this system. In addition, the system provides users with the ability to view and download the status of their request for food (token) as well as their ration card. Ultimately, the Virtual Queueing System at Ration Shop will improve access to and usage of food from the government by modernizing the Public Distribution System to provide a fair, reliable, and easy to use means of obtaining food.

VII. FUTURE WORK

A mobile application could be created to allow individuals to access and use the Virtual Queueing System for Ration Shop in real-time. In order to provide an easy means to authenticate users, it would be beneficial to integrate with legitimate government databases (e.g., Aadhaar and national food security systems) to decrease fraud. Using GPS- enabled

location services to identify available ration shops in close proximity to users would lead to greater customer satisfaction. Sending automated notifications via SMS and WhatsApp would also enhance communications. Using predictive data analytics to anticipate stock levels would allow for better allocation of stock to users. Additionally, the multilingual support for this application would assist users from many different areas of the world.

REFERENCES

[1] Malathi, D., et al. "A Design Framework for Smart Ration Shop Using Blockchain and IoT Technologies." Intelligent Automation & Soft Computing 32.1 (2022).
[2] Sathya, S., et al. "Web Based Ration Provisioning System in Public Distribution Shop." E3S Web of Conferences. Vol. 399. EDP Sciences, 2023.
[3] Varsha, S., et al. "Smart ration distribution system using RFID or biometric." International Journal for Research in Applied Science and Engineering Technology (IJRASET) 10 (2022).
[4] Selvam, R. "Design and Implementation of Automated Food-Ration Material Distribution System." Current Journal of Applied Science and Technology 42.27 (2023): 32-37.
[5] Keerthana, A. V., et al. "Digitized Ration Products Distribution Using Android Application." International Journal on Orange Technologies 4.4 (2022): 24-42.
[6] Kiruthika, J. K., et al. "Ration Goods E- Check." Annals of the Romanian Society for Cell Biology 25.5 (2021): 3393-3399.
[7] Krishnan, R. Santhana, et al. "IoT based smart rationing system." 2021 third international conference on intelligent communication technologies and virtual mobile networks (ICICV). IEEE, 2021.
[8] Avinash, N. J., et al. "Android App and RFID Based Smart Ration Distribution System." 2021 IEEE International Conference on Mobile Networks and Wireless Communications (ICMNWC). IEEE, 2021.
[9] Kadu, Anil, et al. "Design and Development of Low Cost Automated Ration System Using IoT." IJRASET (2023).
[10] Seenivasan, D., J. K. Harini, and P. Nandhini. "Virtual Queuing Ration Distribution in Cloud Environment." International Journal of Health Sciences 6.S5: 2703-2713.