

Quick Queue-A Web based Platform for College Canteens

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Abstract— The Canteen Management System is a web-based platform designed to streamline food ordering, payment processing, and inventory management within college canteens. Traditional systems face issues like long queues, mismanagement of orders, and delayed service during peak hours. This project aims to enhance efficiency by enabling users to pre-order food, make online payments, and select delivery slots, reducing waiting time significantly. The system incorporates QR code-based authentication for secure access and cashless transactions. It also features a real-time inventory tracking system to help canteen owners to manage placed orders maintain transaction records and analyze feedback for further improvements. The platform is developed using HTML, CSS, Java-script, and MongoDB for the frontend and for backend operations, ensuring a seamless user experience. The system benefits both customers and canteen owners by minimizing manual efforts, reducing errors, and optimizing service speed. The system was evaluated by implementing and testing the system on a group of student participants. The student survey opinion indicated that over 90% found the system easy to use, highly reliable, and particularly effective during peak hours in the canteen. Additionally, a survey of canteen administrators reported over 90% satisfaction in key areas, including order interpretation, application reliability, and feedback analysis for further improvement.

Index Terms— Canteen Management System, Digital Payment, Online Food Ordering, Queue Management, Web-Based Application.

I. INTRODUCTION

Managing canteen operations efficiently is a challenge, especially in institutions with high student populations. Traditional canteen systems rely on manual order placement and cash transactions, leading to long queues, mismanagement, and service delays during peak hours. The Canteen Management System aims to resolve these issues by digitizing food ordering, payment processing, and inventory tracking through a web-based platform [1]. This system allows users to pre-order meals, select delivery slots, and make cashless payments, significantly reducing waiting times. The implementation of QR code-based authentication ensures secure access, while real-time inventory management helps canteen owners track stock levels efficiently. Developed using HTML, CSS, JavaScript, and MongoDB the platform ensures a smooth and intuitive user experience for both customers for processing and administrators.

By integrating automated notifications, digital wallets, and multiple payment methods, the system enhances convenience and operational efficiency.

This project not only simplifies canteen operations but also improves overall user satisfaction. Future developments could include AI-powered menu recommendations and real-time analytics, making the system even more effective. This scalable solution has the potential to be implemented across multiple institutions, revolutionizing the canteen experience by making food services smarter, faster, and more user-friendly.

II. EXISTING SYSTEM

An initial step towards achieving these objectives in canteen management system was implemented by Fendy Fonggo [2] in which they developed a web-based payment and ordering system for tenants in the canteen through communication equipment, so that tenants can minimize calculation errors in the payment or ordering process. A smart canteen management system was developed by Sujata Joshi [3] in which they used radio frequency identification to detect and authenticate the users of the system to gain access to the canteen management system application. They also developed digital wallets to automatically debit at the end of month or indicate low balance.

To overcome the time spent on canteen queue, Lalitha V [4] developed E-Canteen Management System based on Web Application wherein the registered person can able to view and place their food orders prior to their break time with facilitation of online payments. The user can select a particular slot on which he/she willing to take delivery of the food. The system was built using web technologies, including HTML, CSS, JavaScript for the frontend, and PHP for server-side scripting. Further development in this work is done by Ichchha Babu Bhattarai [5], using a QR code-based login and cashless payment system. It includes QR code generation and scanning functionalities for secure user authentication leading to significant improvements in operational efficiency and customer satisfaction. Revathi [6] developed Android-Based Canteen Management System that facilitates an intuitive experience, empowering users to access and manage canteen functionalities from their handheld devices. The system encompasses robust features, including real-time inventory monitoring, order processing, transaction tracking, and diversified payment options, ensuring convenience and efficiency in every transaction. Other important aspect is the ease of transaction and maintenance of its database which is addressed in [7 - 8] by creating an E-wallet recharge system and use of QR code technology.

The survey clearly reveals the need of advancements in the canteen management system which could further support a large crowd at peak times of service. Future enhancements could include an integrating of AI for menu recommendations and real-time data analytics, to make the system even more effective.

III. METHODOLOGY – FUNCTIONAL WORKFLOW

The flowchart of the system from the customer viewpoint is shown in Figure 1, represents the functional workflow of the web-based application to manage the canteen ordering system. The process begins with the user prompted to select one of three available canteens: Fruit Canteen, Main Canteen, or Kiosk Cafe. Upon selection of the required canteen option, the user is then prompted with the web-page that details the menu options available within the selected canteen. The user selects the desired menu which automatically gets added in the item selected list displaying its value amount. Once the order is confirmed, the system prompts the user to specify a preferred pickup time, which allows for scheduling flexibility and efficient order management. Subsequently, the system transitions to the bill computation module, which calculates the total payable amount based on the selected items.

The final step in the transaction flow involves the generation of a QR code, which serves as a digital token for order verification and pickup. The process terminates with the users' option to either place a new order or reorder, both of which redirect the user back to the canteen selection interface, thereby supporting multiple transactions within a single session. This flow ensures a structured, user-friendly, and efficient ordering experience suitable for deployment in institutional or commercial food service environments.

The second module of the system is the Admin Dashboard as shown in Figure 2. This module is the assistance to the administrator of the canteen. It provides the admin in getting access to two primary modules: User Choice Analytics and Review User Feedback. The User Choice Analytics module enables the administrator to analyze customer preferences by accessing the Display Item Analysis component, which presents insights such as the most frequently ordered items, seasonal trends, and peak demand periods. Simultaneously, the Review User Feedback module provides access to the Display User Feedbacks interface, where administrators can view and evaluate customer comments and ratings. These features support data-driven decision-making and continuous service improvement, helping ensure that menu offerings and customer satisfaction initiatives are aligned with actual user behavior and sentiment.

The complete system is designed using HTML, and MongoDB effectively integrated to design the interactive system. The front-end is organized using HTML for attractive and effective layout of items on the web-page. The back-end is powered by node.js and express.js, which handles user authentication, order processing, and database interactions. MongoDB supports for database management to store the customer related information like the placed orders, transaction details, feedback and reviews.

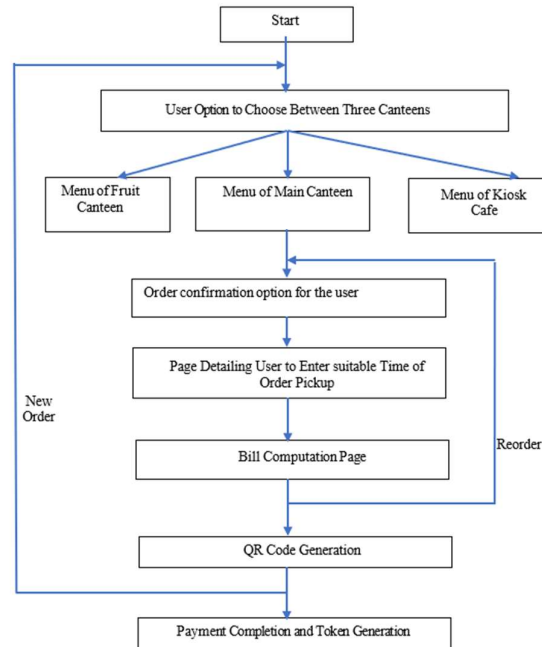


Fig 1. User Module Functional Workflow

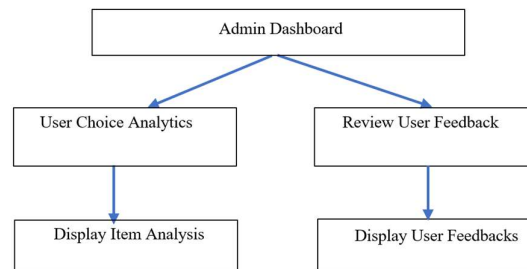


Fig 2. Admin Module Functional Workflow

IV. RESULTS AND DISCUSSIONS

As discussed earlier the system is proposed for management of three canteens. The three canteens are independent and offer different choices of menu. Figure 3. shows the homepage of the system as visible to the customers on their first login.

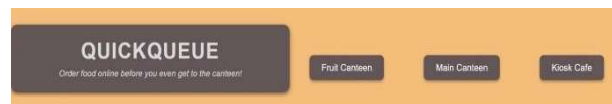


Fig. 3. Homepage of the Canteen Management System

The homepage provides a clear information to the customers about the different canteens- one canteen specifically related to ordering of fruits, one related to tea and coffee beverages and the third related to ordering a complete lunch. The customers can opt their order choice by just clicking on the required canteen option.

The further discussion of the system is made for the selection of Fruit Canteen. Figure 4 shows the webpage of menus offered by the Fruit canteen.



Fig. 4. Page Designed for Fruit Canteen

Customers can conveniently place food orders directly from the canteen through this web-based application. The user can browse the menu displaying all available food items along with their respective prices. When a customer chooses a food item, it is added to the cart by default, enabling them to modify the quantity as needed. Figure 5 shows the page prompted after the customer selects the items and clicks the place order.



Fig. 5. Order Confirmation Page

After successfully placing the order, the customer will receive a notification with order details. As shown in Figure 6, when the user clicks on "Confirm Order of Fruit Canteen," they are redirected to the next page, where a message confirms that the order has been placed.



Fig. 6. Payment Details Page

The customer can collect their order in minimum time during peak rush hours of canteen access. Canteen owners can track sales, manage food items, customer payments, analyze feedback to ensure efficient operations. This web-based canteen management system benefits both the owners and the customers.

V. EVALUATE SYSTEM PERFORMANCE – STUDENT OPINION SURVEY

To evaluate the effectiveness of the system performance, a student opinion survey was conducted. A total of 85 students participated in the survey. The students were made to use the canteen management system for a period of consecutive two weeks. The participants were provided with a structured set of questionnaires designed to evaluate the system's performance as shown in Table I.

TABLE I. STUDENT OPINION SURVEY

Questionnaires		Responses (in Percentage)			
		Satisfied and accepted	Moderately satisfied and accepted	Not completely satisfied and somewhat accepted	Dissatisfied and not accepted
Ease of use	For menu selection and order placement	96	2	2	--
	For making payment	88	5	3	4
Effectiveness in peak hours		93	3	3	1
Reduced waiting time using - Token Pickup system		92	4	3	1
Reliability of the system		92	3	3	2

As observed from the survey results presented in Table I, students evaluated the system on various aspects. It was observed that 96% students found the web application system easy to use with respect to menu selection and order placement, while 88% found the system convenient in making the payment of the ordered items. The objective of the application was to assist the users in getting quick and appropriate service during the peak hours of canteen. In this regard, the survey revealed that 93% students found the application was very effective during peak canteen hours and 92% students found that it reduced their waiting time in getting the service from the canteen. With the use of token generated after making the payment of the ordered items, the participants found it very convenient to collect the order with minimum waiting time. Also, 92% students found the designed application very reliable.

Table II reveals the survey of the canteen administrators for evaluating the performance of the system. Five canteen administrators were surveyed.

TABLE II. CANTEEN ADMINISTRATOR OPINION SURVEY

Questionnaires		Responses (in Percentage)		
		Satisfied and accepted	Moderately satisfied and accepted	Dissatisfied and not accepted
Ease of use w.r.t	Order reception	97	2	1
	Transaction Record	92	5	3
Tracking Token and Order Service		95	3	2
Reliability and Usability of the System		94	4	2
Feedback analysis		92	6	2

A very positive response was observed from all the canteen administrators in using the web-based canteen management system. Specifically, 97% reported clear interpretation of customer orders and 92% found transparency in payment transaction with no errors. Additionally, all the canteen administrators reported a satisfaction of more than 90% in evaluating the system for aspects of servicing the received orders, reliability of the application and feedback analysis.

VI. CONCLUSION

The congestion within the college mess has become a growing concern in almost all higher educational institutes having large student intake. This has often led to longer wait times and reduced efficiency in food service operations. To mitigate these challenges, the proposed system introduces a web-based solution designed to streamline the food ordering process, thereby reducing physical queuing and optimizing service delivery.

The proposed web-based platform for canteen management system significantly improves efficiency by digitizing food ordering, payment processing, and inventory tracking, minimizing manual effort and reducing long queues. It enhances the customer experience by enabling faster service and real-time order tracking. With digital integration, canteens can function more seamlessly, securely, and sustainably. Future innovations can further refine the system, making food services smarter and more user-centric.

Further advancements would be to develop a centralized management system which could support multiple canteen outlets within an organization. Extension with support of Android and iOS can assist diverse users with more flexibility and platform independency. Customer analysis can be performed using machine learning to know about preferred items and possible predictions during peak hours.

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