ANDROID APP FOR COLLEGE CANTEEN MANAGEMENT SYSTEM

N.Prabakaran ,R.Kokilavani, N.Yuvaraj* and G.M.Sathyaseelan

Department of Information Technology, J K K Natraja College of Engineering and Technology, Komarapalayam, Tamil Nadu, India.

ABSTRACT

The project titled "Android App for College Canteen Management System" aims to streamline the canteen operations in a college setting by leveraging an Android-based application. This system is designed to reduce crowd density during break times, minimize food wastage, and enhance the overall efficiency of the canteen management. By facilitating online food ordering, automated notifications, and real-time updates, the system reduces manual labor and paper-based processes. The app provides a user-friendly interface for both students and canteen staff, ensuring seamless interaction and efficient resource utilization. Future enhancements could include multilingual support and integration with additional payment systems.

Keywords: Android, Canteen Management, Online Ordering, Food Waste Reduction, Automated Notifications

1. INTRODUCTION

Managing a college canteen efficiently requires addressing several challenges, such as long queues, food wastage, and manual order processing. Traditional canteen systems rely heavily on pen-paper methods and cash transactions, leading to inefficiencies and delays. In a digital era, an Android-based application can offer a more streamlined solution by automating food ordering and management processes. This project aims to design and implement such an application to enhance the operational efficiency of college canteens. College canteens are often plagued by issues like long waiting times, mismanagement of orders, and food wastage due to inaccurate demand estimation. These issues not only cause inconvenience to students but also lead to significant losses for the canteen management. An automated system that can handle orders efficiently and provide real-time updates on food availability and order status can address these challenges effectively. By integrating technology into the canteen management process, we can achieve a higher level of efficiency and customer satisfaction.

Android, an open-source mobile operating system developed by Google, is widely used for developing mobile applications. Its flexibility, user-friendly interface, and vast developer community make it an ideal platform for creating a college canteen management system. Web applications, on the other hand, offer the advantage of accessibility from any device with internet connectivity, making them suitable for backend management and reporting purposes. Android's open-source nature allows developers to customize and enhance its features to suit specific needs. It supports a wide range of devices, from smartphones to tablets, making it accessible to a broad user base. Web applications complement mobile apps by providing a robust backend for data management and reporting. They enable administrators to manage the system from any location, facilitating better control and oversight.

The primary objectives of this project are:

1. To develop an Android application that facilitates online food ordering in college canteens.
2. To reduce crowd density during peak hours by streamlining the food ordering process.
3. To minimize food wastage through efficient inventory and order management.
4. To provide a user-friendly interface for both students and canteen staff.
5. To implement automated notifications for order status updates.

These objectives aim to create a comprehensive solution that addresses both the user experience and the operational challenges of managing a college canteen. By focusing on efficiency and user satisfaction, the project seeks to transform the traditional canteen management model into a modern, technology-driven system.

The methodology involves several stages:

1. **Requirement Analysis**: Identifying the needs of the canteen staff and students.
2. **System Design**: Developing the architecture, use case diagrams, and class diagrams.
3. **Development**: Coding the application using Android Studio and backend development using PHP and MySQL.
4. **Testing**: Performing unit testing, integration testing, and user acceptance testing.
5. **Deployment**: Implementing the system in a real-world canteen environment.

Each stage is crucial for ensuring that the final product meets the requirements and functions as intended. Requirement analysis helps in understanding the specific needs and challenges, while system design lays the foundation for development. Coding and testing ensure that the application is robust and free from critical bugs. Deployment involves rolling out the application in a live environment and monitoring its performance.

2. METHODOLOGY

2.1 System Architecture

The figure 2.1 system architecture is designed to integrate the various components required for canteen management. The architecture includes an Android-based mobile application for students and a web-based admin panel for canteen staff.
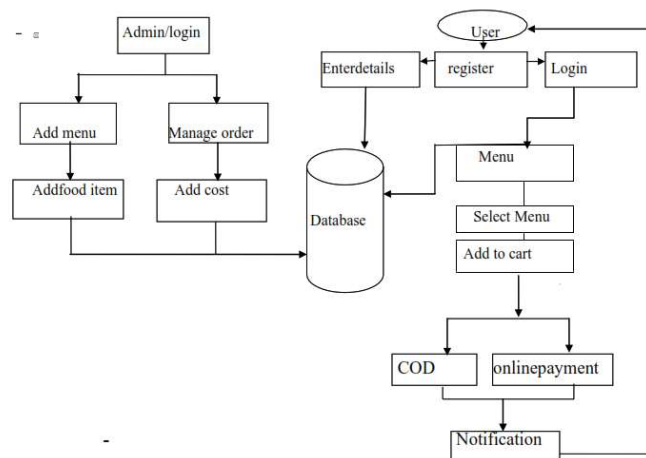

Figure 2.1 System Architecture

The architecture comprises several modules:

1. **User Interface (UI)**: The front-end component that interacts with users. It includes the mobile app for students and the web portal for canteen staff.
2. **Database**: A centralized repository for storing user data, menu items, orders, and transaction details.
3. **Application Logic**: The backend logic that processes user requests, manages data flow, and ensures seamless operation.

4. **Notification Service**: A module that sends real-time updates and notifications to users about their order status.

5. **Payment Gateway Integration**: Handles online payments and ensures secure transactions.

2.2 Hardware and Software Requirements

1. **Hardware Requirements**:
   - Processor: Intel dual-core processor
   - RAM: 4GB DDR2
   - Hard disk: 500GB
   - Keyboard: Standard 102 keys
   - Mouse: Optical mouse

2. **Software Requirements**:
   - Tools: CodeIgniter
   - Front-End: HTML, CSS, JavaScript
   - Backend: MySQL
   - Programming Languages: JDK 8 & PHP
   - Operating System: Windows

The hardware and software requirements are chosen to ensure optimal performance and compatibility. The system is designed to run on widely available hardware, and the software stack includes robust and scalable technologies.

Table 1: Hardware Specifications

Component	Specification
Processor	Intel dual-core processor
RAM	4GB DDR2
Hard disk	500GB
Keyboard	Standard 102 keys
Mouse	Optical mouse

Table 2: Software Specifications

Component	Specification
Tools	CodeIgniter
Front-End	HTML, CSS, JavaScript
Backend	MySQL
Programming	JDK 8, PHP
OS	Windows

2.3 System Components

1. **User Registration and Login**: Allows new users to create accounts and existing users to log in.
2. **Food Ordering**: Enables students to view the menu, add items to the cart, and place orders.
3. **Notification System**: Sends automated notifications to vendors and customers about order status.
4. **Vendor Management System**: Allows vendors to manage the availability of food items and view sales history.

Each component plays a vital role in ensuring the smooth operation of the canteen management system. The user registration and login module ensure secure access, while the food ordering module streamlines the ordering process. The notification system keeps users informed, and the vendor management system helps staff manage inventory and orders efficiently.

3. RESULTS AND DISCUSSION

3.1 User Registration and Login

The user registration and login module is designed to handle new user sign-ups and authentication. Users can register using their email addresses or Facebook accounts. The system also supports password recovery. The registration process requires users to provide basic information such as name, email, and contact number. Once registered, users can log in using their credentials. The system ensures secure authentication through encrypted passwords and session management. This module also includes a password recovery feature, allowing users to reset their passwords if forgotten.
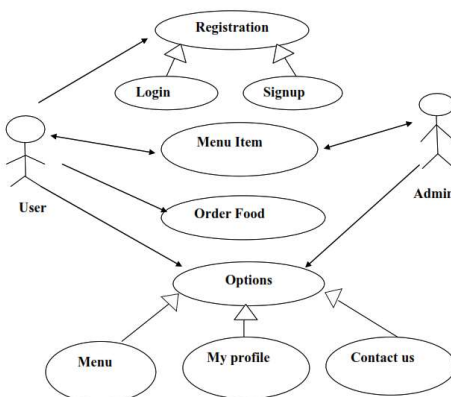
Figure 3.1 User Registration and Login

3.2 Food Ordering

The food ordering module provides a digital menu from which students can select items and place orders. This reduces the need for physical menus and manual order taking, significantly cutting down on wait times.

Users can browse the menu, view item details, and add selected items to their cart. The module supports real-time updates, ensuring that users only see available items. Once the order is placed, the system processes the payment and sends a confirmation notification to the user. The order details are then forwarded to the canteen staff for preparation.

3.3 Notification System

Automated notifications are sent to vendors when an order is placed, and to customers when their order is ready or if there are any changes. This ensures clear communication and reduces the likelihood of errors. The notification system uses push notifications to inform users about their order status. For vendors, notifications include new order alerts and updates on inventory status. For customers, notifications include order confirmation, preparation status, and pickup alerts. This real-time communication helps in managing expectations and improving the overall user experience.

3.4 Vendor Management System

The vendor management system allows canteen staff to update the availability of food items, manage orders, and view sales statistics. This helps in maintaining an efficient inventory system and reducing food wastage. Canteen staff can log in to the admin panel and manage the menu by adding, editing, or deleting items. They can also view order histories and generate sales reports. The system provides insights into popular items and peak ordering times, helping staff plan better and reduce wastage. This module ensures that the canteen operates smoothly

and efficiently.

4. CONCLUSION AND FUTURE SCOPE

4.1 Conclusion

The Android app for college canteen management successfully addresses the issues of long queues, manual order processing, and food wastage. The app's user-friendly interface ensures that both students and canteen staff can use it with ease. The implementation of automated notifications and real-time updates enhances the overall efficiency of the canteen operations.

The system's impact is evident in reduced waiting times, improved order accuracy, and better resource management. By automating key processes, the system frees up staff to focus on food preparation and customer service. The app's success demonstrates the potential of technology to transform traditional operations into efficient, modern processes.

4.2 Future Scope

Future enhancements to the system could include:

1. Multilingual support to cater to a diverse user base.
2. Integration with additional payment systems for greater flexibility.
3. Advanced data analytics for better inventory management and sales forecasting.
4. Mobile app support for iOS devices to widen the user base.

These enhancements would further increase the system's utility and applicability, making it a comprehensive tool for canteen management. Multilingual support would make the

app accessible to non-English speaking users, while additional payment systems would offer more convenience. Advanced analytics would provide deeper insights into operations, helping in better decision-making. Expanding to iOS would ensure that the app reaches a broader audience.

REFERENCES

1. Vatcharakomonphan, B., & Chaksangchaichot, C. (2019). vCanteen: A Smart Campus Solution to Elevate University Canteen Experience. 5th IEEE International Smart Cities Conference (ISC2). DOI: https://doi.org/10.1109/ISC246649.2019

2. Khan, T., & Yunus, D. (2016). Cloud-Based Canteen Management System. International Journal for Research in Engineering Application & Management (IJREAM), 2(8), 1822. DOI: https://doi.org/10.1109/IJREAM.2016.1122

3. DAccess Security Systems Pvt. Ltd. Canteen Management System. [Online]. Available: https://www.daccess.co.in/canteen-managementsystem.php [Accessed April 2019].

4. Patel, M. (2019). Online Food Order System for Restaurants. [Online]. Available: https://scholarworks.gvsu.edu/cgi/viewcontent.cgi?article=1222&cistechlib [Accessed April 2019].

5. GloriaFood. Online Food Ordering System for Restaurants. [Online]. Available: https://www.gloriafood.com/online-food-ordering-system-for-restaurants/ [Accessed April 2019].

6. Hassan, N. (2019). The Dell Canteen Goes Online. [Online]. Available: https://medium.com/@nihalhassan/the-dell-canteen-goes-online-ce58b574ce89 [Accessed April 2019].

7. Khan, T., & Yunus, D. (2016). Cloud-Based Canteen Management System. International Journal for Research in Engineering Application & Management (IJREAM), 2(8), 1822. DOI: https://doi.org/10.1109/IJREAM.2016.1122

8. Mall, L., & Shaikh, N. (2017). Canteen Management System Using RFID Technology Based on Cloud Computing. International Journal for Research in Engineering Application & Management (IJREAM), 6(4), April. DOI: https://doi.org/10.1109/IJREAM.2017.1222

9. Jakhete, M.D., & Mankar, P.C. (2015). Implementation of Smart Restaurant with E-Menu Card. International Journal of Computer Applications, 119(21). DOI: https://doi.org/10.1109/IJCA.2015.11921

10. Katkar, A., Juvekar, K., & Rohira, N. (2019). Canteen Management System Using the E-Wallet. International Journal of Advanced Research, Ideas and Innovations in Technology. DOI: https://doi.org/10.1109/IJARIIT.2019.1122