International Journal of Computer Techniques–IJCT Volume 13 Issue 3, May-June - 2026

Open Access and Peer Review Journal ISSN 2394-2231 https://ijctjournal.org/

RESEARCH ARTICLE OPEN ACCESS

# Smart College Canteen App

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## Abstract:

The **need** for **better food service systems** in **schools** and **colleges** has **shown** that **traditional canteen** a not **working well**.These **old ways use manual ordering** and **cash transactions**, which can **lead** to **long lines**, **mistakes**, and **poor service management**. This **paper introduces** a Smart College Canteen App that **automates** and **improves** the **food order process using** a **mobile** and **web-based system**. The **app has features** like **real-time order tracking**, **queue estimation**, and **digital payment options** to **make** the **food service better** and **more efficient**. The **system has** a React **Native app** for **students**, a **web app** for **staff**, andNode.js **backend** witha **PostgreSQL database**. It **lets students order ahead**, **track** their **place** in the **queue**, and **get updates**. Staff can **manage orders** through a **central system**. Tests **show** that this **system** is **more efficient**, **saves time**, and **works better** than **traditional ways**. The **app offers** a **scalable** and **practical solution** to **update campus food services**.

*Keywords* — **Canteen Management, Mobile Application, Queue Optimization, Digital Payments, .**

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**I. INTRODUCTION:** With the **growth** of **mobile** and **digital tech**, **service areas** have **changed** a **lot**. In **educational institutions**, **canteens** are **important** but **often run manually**, **involving physical lines**, **spe aking orders**, and **cash payments**. These **traditional methods cause long wait times**, **order problems**, and **lack** of **clear queue tracking**. **Especially** during **busy times**, these **problems get worse**, **creating more crowding** and **poor service**.

By **using real-time data** and **user-friendly interfaces**, it's **possible** to **make service delivery much better**. This **paper presents** a Smart College **Canteen** App that **uses mobile technology**, a **strong backend**, and **real-time queue tracking** to **make canteen services smoother**.

The **system focuses** on **making** the **process more efficient**, **reducing mistakes**, and **improving** the **overall experience** for **users**

These conventional methods introduce several inefficiencies, including increased waiting times, order mismanagement, and lack of transparency in queue handling. During peak hours, these issues become more prominent, leading to congestion and reduced service quality.

This paper presents a Smart College Canteen App that integrates mobile technology, backend processing, and real-time queue estimation to streamline canteen operations. The proposed system focuses on improving efficiency, reducing manual errors, and enhancing the overall user experience.

## II. RELATED WORK

**Many studies** have **looked** into **improving canteen systems using digital methods**.
**Earlier systems mainly used web-based tools** for **online ordering** and **basic inventory control**. While these **systems helped** with **efficiency**, they were not **mobile-friendly** or **real-time**.
**Recent work** has **focused** on **apps** that **let people order food** from **anywhere**.
Although these **help reduce congestion**, **many** don't **have real-time queue tracking** or **flexible order management**
Some **systems** have **also introduced digital payment** to **reduce cash handling**.
Though this **speeds** up **transactions**, they don't **fully combine ordering**, **payments**, and **queue tracking** in one **system**.
Despite **progress**, **existing solutions still lack things** like **scalability**, **smart analytics**, and **handling high demand** during **busy times**.
The **new system addresses** these **issues** by **including real-time queue estimation**, **centralized order processing**, and a **user-friendly design** all in one **place**Recent studies have explored mobile-based solutions that allow users to place orders remotely. While these systems reduce physical queues, many of them do not incorporate real-time

## III. METHODOLOGY

The designed system uses a multi-layer architecture with three main parts: the input, processing, and application layers.

### A. Input Layer

The **input layer** is the **mobile app** that **users use** to **interact** with the **system**.
**Students** can **look** at **menus**, **choose food items**, and **place orders**. The **app collects user input** and **sends** it to the **server** for **processing**.

### B. Processing Layer

The **processing layer** is the **core**, **responsible** for **order management**, **queue estimation**, and **payments**.
The **backend** is **built** with Node.js, **handling incoming requests** and **assigning queue positions based** on the **order timing** and **kitchen capacity**. The **system keeps updating** the **queue based** on **real-time orders** and **kitchen status**..

### C. Application Layer

The application layer includes the staff dashboard and notification system.
Staff can check incoming orders, update order details, and manage their work effectively. Users get notifications when their food is ready to pick up, which helps manage lines and improves service flow.

## IV. RESULTS AND DISCUSSION

The system was tested on performance, usability, and efficiency across various situations, including busy times.

### A. Performance Analysis

The system had quick response times for placing and processing orders. Real-time queue estimation accurately predicted waiting times. Digital payments made transactions smooth and secure.

### B. User Experience

Users found waiting times shorter because they could order ahead. The interface was simple and easy to use. Real-time updates made it easier for users to track their orders.

### C. Discussion

Compared to traditional canteen systems, the new system improves efficiency and reliability a lot. Real-time data and digital payments help reduce errors and delays. The modular design also makes the system scalable, allowing it to work for bigger campuses or multiple canteens.

## V. CONCLUSION AND FUTURE SCOPE

This **paper introduces** a Smart College Canteen App that **modernizes traditional food service systems using mobile** and **web technologies**. The **system shows strong potential** for **real-world use** in **schools** and **colleges**. Its **scalable** and **flexible structure makes** it **adaptable** to **different environments**. **Future work** could **include**: AI-**based forecasting** for **better inventory management** **Connecting** with **campus** ERP **systems** **Supporting multiple canteens** **Adding advanced analytics** and **reporting features** **Offering personalized recommendations based** on **user preferences**The proposed solution demonstrates strong potential for real-world implementation in educational institutions. Its scalable architecture and modular design make it adaptable to different environments.

### Future Scope

Future enhancements may include:

- AI-based demand prediction for better inventory management
- Integration with campus ERP systems
- Multi-canteen support
- Advanced analytics and reporting features
- Personalized recommendations based on user preferences

## VI. REFERENCES

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