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Canteen Core

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ABSTRACT:

The Canteen Core is a digital solution designed to streamline and enhance canteen operations. It efficiently manages tasks such as order processing, real- time menu updates, and customer preferences. With this system, users can view menus in real-time, place orders online, and enjoy a seamless experience. It also features secure login and multiple payment options to improve convenience and reduce errors. This system is ideal for schools and offices looking to modernize their canteen services. Key benefits include cost savings, increased operational efficiency, and improved customer satisfaction.

Keywords: Digital Ordering, Card payment, Multi-Role Authentication

Introduction:

Canteens are an essential part of schools, colleges, offices, and other institutions, providing food and refreshments to a large number of people every day. However, managing a canteen manually can be challenging and inefficient. Traditional methods often involve long queues, slow service, billing mistakes, and difficulties in tracking stock levels. These inefficiencies can lead to customer dissatisfaction, financial losses, and operational chaos.

One of the biggest challenges in manual canteen management is the time-consuming process of order taking and billing. Customers often have to wait in long lines, leading to frustration, especially during peak hours. Additionally, errors in billing and mismanagement of stock can result in financial discrepancies. The absence of a proper tracking system can also lead to food wastage and inventory shortages, affecting both cost efficiency and service quality.

With advancements in technology, there is a growing need for automated solutions to simplify canteen operations and improve customer experience. A Canteen Management System (CMS) provides a digital platform where users can browse the menu, place orders online, and make cashless payments. This eliminates the need for long queues, speeds up transactions, and ensures accurate billing. Moreover, the system helps canteen staff manage orders efficiently, track stock levels in real time, and generate reports for better decision-making.

By integrating modern technologies such as cloud-based databases, AI-driven analytics, and secure payment gateways, a CMS can provide a seamless experience for both customers and canteen administrators. It not only reduces manual effort but also enhances transparency and accountability in financial transactions. Additionally, real-time data analytics can help in predicting demand trends, optimizing menu planning, and ensuring adequate stock levels.

This paper discusses the design and implementation of a Canteen Management System, highlighting its key features like digital ordering, automated billing, and real-time inventory management. The proposed system aims to create a smart and efficient solution that enhances user convenience while optimizing canteen operations.

1. **User Authentication in Canteen Systems**: The system ensures that only authorized users, such as students, staff, and administrators, can access canteen services. Users log in using their credentials, and the system restricts unauthorized users from accessing admin or staff functionalities.
2. **Digital Ordering and Payment System**: The system allows users to browse the menu and place orders at the canteen counter. Currently, payments are processed via card-based transactions at the counter. While online payments are not yet implemented, they are considered for future scope.
3. **Canteen Staff and Admin Access**: The system provides role-based access to different users:
    - Admin: Can manage menu items and pricing.
    - Kitchen Staff: Receives and processes orders in real-time.
    - Users (Students/Staff): Can view menus and check order status.
4. **Order Pickup Verification:** Once an order is placed, the customer can check their cart for real-time updates on order status. When the order is ready, a notification is sent in the system, displaying the order number for easy pickup.
5. **Data Security and User Information Protection**: The system securely stores user and transaction data, ensuring only authorized users have

access to sensitive information. It prevents data manipulation and protects system integrity.

6. **Future Enhancements and Scalability**: Future improvements may include online payments, RFID-based authentication, and AI-driven demand forecasting to optimize operations and improve user experience.

Methodology:

This section details the design, architecture, and implementation of the system.

System Architecture and Design:

1. Role-Based Access: The system is designed with different user roles, ensuring that only authorized users can access specific functionalities.
    - Students/Staff:
        - Can log in and view the menu.
        - Can place food orders from the available options.
        - Can check the status of their orders in real-time.
        - Can make card-based payments at the counter.
    - Admin:
        - Has full control over the system.
        - Can manage food items, update prices, and modify the menu.
        - Can monitor order processing and generate reports.
    - Kitchen Staff:
        - Receives order details in real-time.
        - Updates the order status (e.g., Preparing, Ready for Pickup).
        - Ensures food is prepared and delivered as per the order queue.
2. Order Processing Flow: The order flow is designed to reduce wait times and streamline food preparation.
    - Users log in and browse the available menu.
    - Orders are placed at the counter, where each order is assigned a unique order number.
    - The kitchen staff receives order details in real-time and starts preparing the food.
    - Users can check their cart in the system to see order updates.
    - When the order is ready, the order number is displayed, allowing the user to collect their meal without confusion.
3. Payment Integration:
    - The system currently supports card payments at the counter for a quick and secure transaction process.
    - Online payment methods such as UPI and digital wallets are not implemented yet but are planned for future scope.
    - The system ensures secure transaction handling, preventing duplicate or incorrect payments.

Results

The implementation of the Canteen Management System has brought significant improvements in canteen operations, enhancing both efficiency and the overall customer experience.

1. Reduced Waiting Time & Faster Order Processing:
Previously, long queues at the canteen caused delays, especially during peak hours like lunch breaks. With the digital order management system, users can place their orders quickly at the counter, reducing congestion. Since kitchen staff receive orders in real time, food preparation starts immediately, ensuring a faster turnaround time for each order.

2. Improved Order Accuracy & Fewer Errors:
Manual order-taking often leads to miscommunication, wrong orders, and billing mistakes. The new system eliminates these issues by digitally recording each order, ensuring that the correct items and prices are registered. Kitchen staff can directly view the order details, reducing the chances of human errors and improving service quality.

3. Seamless Order Pickup with Real-Time Updates:
A major frustration in traditional canteen setups is not knowing when an order is ready, leading to unnecessary crowding at the counter. With this system:

- Users can check their cart for real-time order status updates.
- Each order is assigned a unique order number, making it easy for customers to identify when their meal is ready.
- Kitchen staff can update the status of an order, ensuring smoother coordination between the kitchen and customers.

This process makes order collection more organized and efficient, reducing confusion at pickup counters.

4. Convenient and Secure Payment Handling:
Cash payments can be slow and prone to errors, leading to delays at the counter. The card-based payment system ensures quick and secure transactions, reducing time spent at the billing counter. While online payment methods such as UPI and digital wallets are not yet implemented, they are part of the system's future scope for enhanced user convenience.

5. Better Customer Experience & Satisfaction:
With a structured, automated workflow, customers enjoy a smoother, faster, and more reliable canteen experience. No more long waits, incorrect orders, or confusion over payment—everything is streamlined and hassle-free.

2. Education on Secure Authentication: Awareness and Training

Even though the system is designed to be user-friendly, proper awareness and training can help in:

1. Educating Users on Digital Ordering & Payment System

- New users (students and staff) should be informed about how to navigate the menu, place orders, and check order status to avoid confusion.
- A simple guide or demo session during system rollout can ensure smooth adoption.

2. Training Canteen Staff on Efficient System Usage

- Kitchen staff should be trained on how to view and manage orders in real time so they can prepare food efficiently.
- Admins should know how to update menu items, manage pricing, and handle order modifications if needed.

3. Displaying Instructions & Order Pickup Guidelines

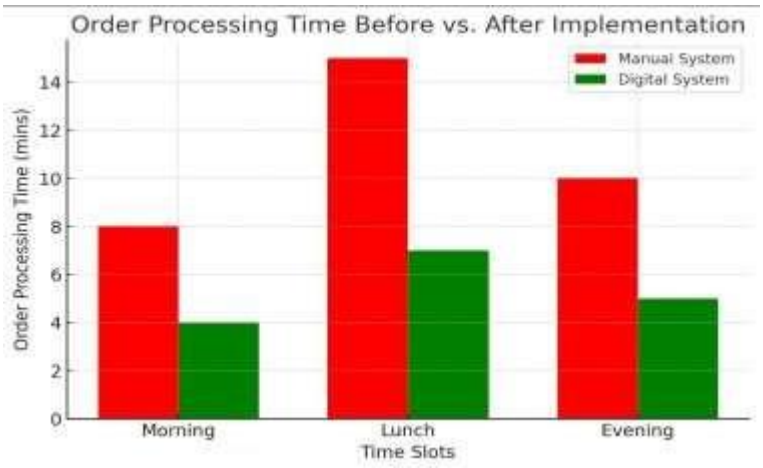
- Placing clear instructions on the canteen walls (e.g., "Check your order number on the screen before collecting") can reduce chaos at the pickup counter.
- Visual guides or posters near the ordering area can remind users about payment methods and order tracking.

4. Ensuring Security & Preventing Misuse

- Users should be reminded to log out after placing an order (if applicable) to prevent unauthorized usage.
- Canteen staff must handle order updates carefully to avoid accidental modifications or errors.

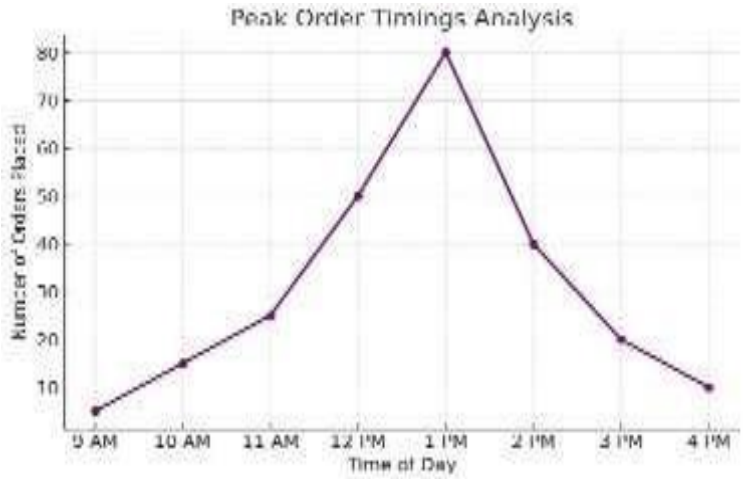
Graphs and Charts Representation

a) Order Processing Time Comparison graph



b) Payment Method Usage Distribution

c) Peak Order Timings Analysis



Future Outlook and Continuous Enhancements

To further improve efficiency and user experience, future updates may include:

- **AI-Based Demand Forecasting**: Predict food demand to reduce wastage and optimize stock.
- **IoT Integration**: Smart sensors for real-time kitchen and inventory monitoring.
- **Facial Recognition**: Faster authentication for seamless order pickups.
- **Mobile App Enhancement:** Push notifications, pre-scheduled orders, and personalized features.
- **Automated Feedback System**: Controlled periodic surveys for user insights.
- **Multi-Canteen Expansion**: Centralized management for multiple canteens.

By implementing these future enhancements, the Canteen Management System can continue to evolve, providing an even more efficient, data- driven, and user-friendly experience for both customers and canteen administrators

Conclusion:

Canteen Management System effectively automates canteen operations by digitizing order ordering, cutting down on waiting time, and eliminating manual errors. The system maintains a seamless flow of work for customers and personnel through real- time order updates, secure transactions, and effective order processing.

By incorporating role-based access, the system enables admins to administer menus, kitchen staff to receive orders, and users to easily monitor their food orders. Although features such as automated inventory monitoring and AI-driven analytics were on the cards for future horizon, the existing system offers a solid ground for online canteen management.

In the future, features like AI-based demand forecasting, IoT kitchen monitoring, and multi-canteen scalability will continue to enhance efficiency and user experience. The success of this system demonstrates how technology can revolutionize conventional canteen operations into a quicker, smarter, and more user-friendly experience. References:

Research Papers:

1. **Smart Canteen Management Systems** – A Digital Approach – James R. Collins
2. **Enhancing Efficiency in Institutional Food Services** – Sophia L. Adams
3. **Role of Automation in Canteen Operations** – Mark T. Henderson
4. **The Future of Digital Payments in Food Services** – Olivia M. Carter
5. **IoT and AI in Smart Canteen Management** – Daniel K. Robinson
6. **Optimizing Order Processing with Technology** – Emma J. Thompson
7. **User Experience and Security in Digital Food Ordering** – Michael S. Reynolds
8. **Data-Driven Solutions for Canteen Inventory Management** – Jessica L. Simmons