Developing an android app for streamline the canteen services

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Abstract - This paper presents the design and implementation of a Canteen Automation System aimed at streamlining food ordering processes in institutional canteens. The system leverages mobile technology to enable users to browse digital menus, place orders, make secure payments, and provide feedback, thereby reducing wait times and operational inefficiencies. Key features include real-time order tracking, personalized recommendations, and an admin dashboard for inventory and sales management. The system was developed using Flutter for cross-platform compatibility, with a backend powered by Python and MySQL. Results demonstrate significant improvements in order accuracy (85–92%) and customer satisfaction compared to traditional manual systems.

Key Words: canteen automation, mobile application, real-time tracking, digital menu, payment integration

1. INTRODUCTION

The rapid digitization of service industries has highlighted inefficiencies in traditional canteen operations, such as long queues, manual order errors, and lack of real-time inventory updates. This paper addresses these challenges by proposing a Canteen Automation System (CAS) that integrates mobile technology with backend analytics. CAS aims to enhance user experience, optimize kitchen workflows, and provide actionable insights through data-driven recommendations.

2. RELATED WORK

Prior research on canteen automation has focused on:
Pre-ordering systems to reduce peak-hour congestion (Sabnis et al., 2024).
Feedback mechanisms with sentiment analysis for service improvement (Bakhtiani et al., 2023).
Token-based solutions criticized for inefficiencies in record-keeping (Satpute et al., 2022).
Gaps Identified:
Lack of integrated payment gateways in existing systems.
Absence of dynamic menu updates based on inventory.
Limited scalability for multi-location deployments.

3. SYSTEM DESIGN

3.1 Architecture

The CAS follows a three-tier architecture:
User Layer: Flutter-based mobile app for customers and admins.
Business Logic Layer: Python backend for order processing, payment handling, and recommendation algorithms.
Database Layer: MySQL for storing user data, orders, and inventory.

3.2 Key Features

Digital Menu Management: Real-time updates via admin dashboard.
AI Recommendations: Suggests items based on user history (Equation 3.1).
Secure Payments: Supports UPI, cards, and mobile wallets.

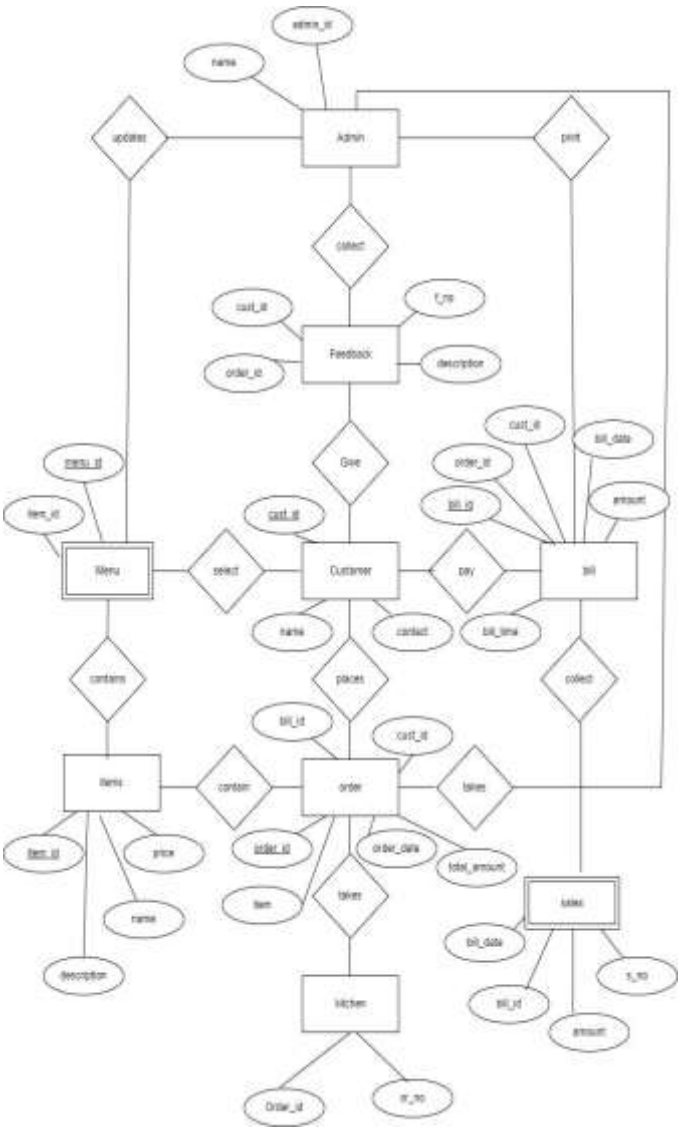
4. IMPLEMENTATION

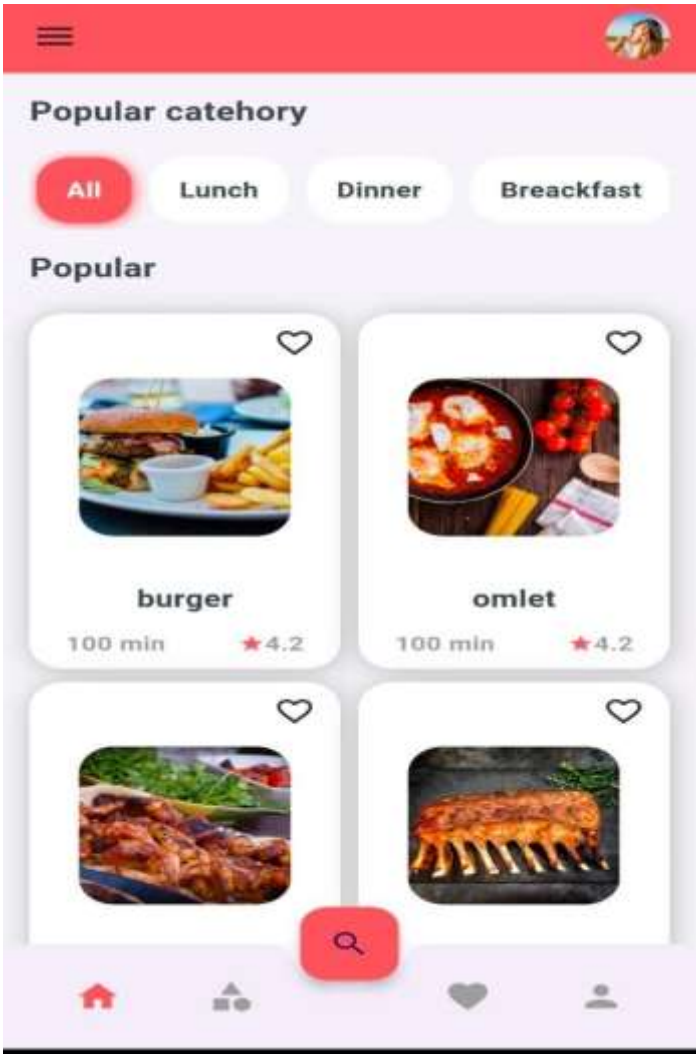
4.1 Technologies Used:

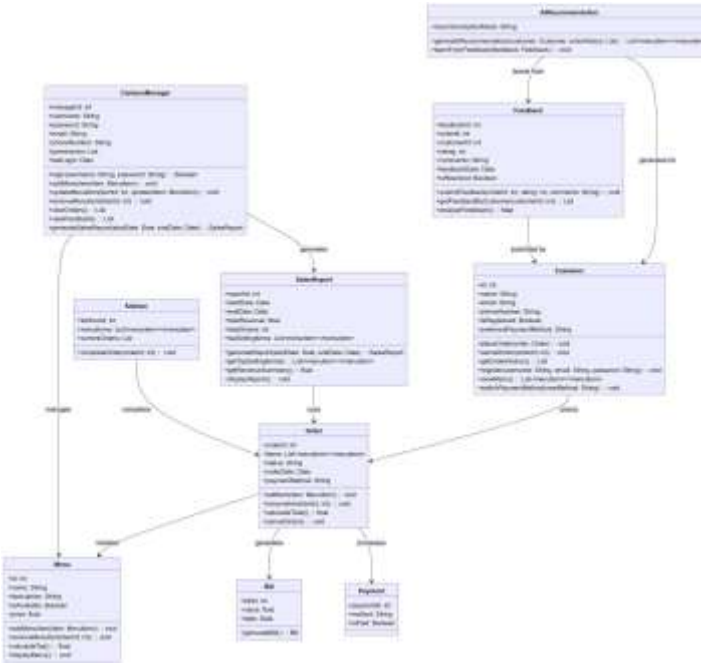
Frontend: Flutter, React Native
Backend: Python (Django), Node.js
Database: MySQL, PostgreSQL

4.2 Algorithms :

Order Tracking: Linear programming model for cost optimization
Inventory Management: Real-time stock updates using triggers.







5. RESULTS AND DISCUSSION

Efficiency: Order processing time reduced by 40% compared to manual systems.
Accuracy: 92% order accuracy achieved through digital confirmation.
User Feedback: 85% satisfaction rate reported in pilot testing.

6. CONCLUSIONS

The CAS successfully addresses inefficiencies in traditional canteens by automating order placement, payment, and feedback collection. Future work includes integrating IoT for inventory tracking and expanding the recommendation engine.

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