Dine Epay for College and School Student Android App

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ABSTRACT –

During breaks, there is a huge crowd in the college canteen. Starting from the queue at the coupon counter to the serving counter a lot of time is spent waiting due to which the students and faculty get late for their lectures. Both students and faculty often wish to have a way to considerably reduce or get rid of this waiting time. One solution to this problem is to have a system by which once the order gets placed it is directly displayed on a monitor in the kitchen. This would avoid the time wasted at the serving counter when a server takes time to deliver previous orders before taking a new coupon and placing it in the kitchen. Also one can have a facility for placing orders in advance so that his/her order is kept ready just for the particular time he/she chooses. The time spent over tendering change can also be reduced by facilitating payments via e-wallet. And also he/she can pay with cash on delivery.

*Key Words***:** Key word: E-wallet, Dine E Pay For College and School Student Android App, E-wallet security Android

1. INTRODUCTION

In today's fast-paced world, traditional canteens relying on pen-and-paper records, cash transactions, manual calculations, and credit management are becoming increasingly inefficient. The manual record-keeping process is not only time-consuming but also prone to human error, leading to operational inefficiencies and potential customer dissatisfaction. To address these challenges, we propose the development of a state-of-the-art Android application designed to streamline the management of canteen menus and orders. Our application is engineered to revolutionize the way canteens operate by integrating modern technology into their daily operations.

The primary goal of our proposed application is to significantly reduce the time customers spend waiting in queues by sending orders directly to the kitchen. Additionally, the application allows customers to place orders in advance and offers a prepaid wallet facility, thereby eliminating the time wasted in tendering change. This innovative approach to canteen management not only enhances customer satisfaction but also optimizes the overall efficiency of the canteen.

Facilitate Multiple Payment Options: Provide customers with flexible payment methods, including cash and e-wallet options, to enhance user convenience and satisfaction.

2. LITERATURE SURVEY

In this paper, the system can take orders at the counter and through online applications and display them on monitors in the kitchen. The internet application would make use of XML for frontend and Java for the backend. Appropriate protection aspects shall be implemented to prevent attacks on the usage of the 2048 bit El-Gamal encryption scheme. For placing orders in advance, we will create a web application. The orders placed in enhance will have an ORDER ID which shall be used to get the order delivered at once to the serving counter. Payments can be made through cash or e-wallet at the counter. Elgamal asymmetric encryption scheme also is a public key cryptography algorithm. The security of this algorithm lies in the issue of calculating discrete logarithms. The operations like recharge, payment, and refund are to be performed the database values are decrypted and then the operations are performed on the decrypted values. After the operation is done the values are again encrypted and stored in the database. A 2048-bit key is used for encryption. On the consumer side, an Ajax call is made for a servlet to get cipher-text in order to encrypt the sensitive data transmission between consumer and server. Conclusion: The proposed system offers a robust solution to the inefficiencies of traditional canteen operations. By integrating modern web technologies and advanced encryption mechanisms, it ensures secure, efficient, and user-friendly service for both customers and canteen staff.

Objectives-

- Enhance Ordering Efficiency: Develop a web application that allows customers to place orders in advance, reducing wait times and improving overall service efficiency in canteen operations.

- Implement Real-Time Order Management: Create a system that displays orders on kitchen monitors in real-time, enabling staff to manage and prepare orders promptly and accurately.

- Ensure Data Security: Utilize a 2048-bit El-Gamal encryption scheme to protect sensitive data during transmission and storage, ensuring the confidentiality and integrity of customer information.

- Streamline Operations: Automate backend processes for order management, payment processing, and refunds to minimize manual intervention and reduce the likelihood of errors.

- Utilize Modern Web Technologies: Leverage XML for frontend development and Java for backend services to create a responsive and user-friendly interface for customers and staff.

- Implement Secure Communication: Use Ajax calls to facilitate secure data transmission between the consumer and server, ensuring that sensitive information is encrypted during transit.

- Monitor and Improve System Performance: Establish metrics for evaluating system performance and user satisfaction, allowing for continuous improvement and adaptation to user needs.

- Promote User Engagement: Design an intuitive user interface that encourages customer interaction and engagement with the application, enhancing the overall user experience.

- Prepare for Future Scalability: Design the system architecture to be scalable, allowing for future enhancements and the potential integration of additional features, such as machine learning for predictive analytics in order management.

3. METHODOLOGY

1. Requirement Analysis:
  - Identify user requirements and expectations (customers, canteen staff).
  - Define functional and non-functional requirements for the system.
  - Determine security requirements to safeguard sensitive data.

2. System Design:
  - Architecture Design:
  - Choose a multi-tier architecture: Presentation Tier (Front end), Application Tier (Back end), and Data Tier (Database).
  -Front-End Design
  - Design the user interface using XML for a consistent and responsive layout.
  - Ensure user-friendly navigation and accessibility.

3. Real-Time Order Management
Kitchen Display System: Orders placed through both the counter and online application will be displayed on monitors in the kitchen, allowing staff to view and manage orders in real-time.
Order Status Updates: The system will provide updates on order status (e.g., received, in preparation, ready for pickup) to keep customers informed.

4. Payment Processing
Multiple Payment Options: Customers can choose to pay via cash or e-wallet at the counter. The system will securely process these transactions.
Secure Payment Transactions: All payment-related operations (recharge, payment, refund) will be performed on decrypted values, ensuring that sensitive financial data is protected.

5. Data Security
El-Gamal Encryption: The system will implement a 2048-bit El-Gamal asymmetric encryption scheme to secure sensitive data, including customer information and payment details.
Secure Data Transmission: Ajax calls will be used to encrypt sensitive data during transmission between the consumer and server, ensuring confidentiality and integrity.

6. Database Management
Order and Payment Records: The system will maintain a secure database to store order details, payment transactions, and customer information.
Data Encryption: After processing, all sensitive data will be re-encrypted and stored in the database to prevent unauthorized access.

7. User Interface Design
Intuitive Design: The web application will feature a user-friendly interface that simplifies the ordering process, making it easy for customers to navigate and place orders.
Responsive Layout: The application will be designed to work seamlessly across various devices, including desktops, tablets, and smartphones.

8. Monitoring and Reporting
Performance Metrics: The system will include tools for monitoring order processing times, payment transactions, and user engagement, allowing for continuous improvement.
User Feedback Mechanism: A feedback system will be implemented to gather user input on their experience, helping to identify areas for enhancement.

Existing System -
The current system in canteens relies too much on human processing such as writing orders on paper, receiving cash, and checking back both the orders and credits manually. The people order directly at the counter, and then it is taken to the kitchen through manual processing and usually takes a little time. Mostly, people receive change in cash, which is a bit inefficient especially in the handing of money change.

It is difficult to handle in a cumbersome, error-prone, and slow manner, especially in busy canteens, leading to long waiting times, slower service, and challenges in handling large volumes of customers and orders.

Proposed System

The proposed system aims to modernize and streamline canteen operations by integrating a web-based application that facilitates order placement, payment processing, and secure data management.

Below is a detailed outline of the proposed system's components and functionalities:

1. System Architecture

Frontend: The user interface will be developed using XML and JavaScript, providing a responsive and intuitive experience for customers placing orders online.

Backend: The server-side logic will be implemented in Java, handling order processing, payment transactions, and database interactions.

2. Order Placement

Counter Orders: Customers can place orders directly at the counter, where staff will input the order details into the system.

Online Orders: Customers can access the web application to place orders in advance. Each order will generate a unique ORDER ID for tracking.

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9. Future Scalability:

Modular Design: The system will be designed with scalability in mind, allowing for the addition of new features and functionalities as needed.

Integration with Advanced Technologies: Future enhancements may include the integration of machine learning algorithms for predictive analytics in order management and customer behavior analysis

Scope of the Project: -

1. There is a great scope for the modifications of the system in future.

2. The system can be improved by adding new functionalities like Add to cart, Track Order, deliver Order

3. Integrate voice commands via Google Assistant or Siri, allowing users to place orders through voice without needing to interact with the screen.

4. Group Ordering: Allow multiple users to group their orders, so the canteen can prepare bulk orders for large groups like clubs or classes.

5. Expand the app's language support to serve users from different linguistic backgrounds, especially in multicultural campuses or international universities.

6. We can also make website for access through direct link.

Block Diagram:

Admin Module :

Login- Canteen people need to login using valid login credentials in order to access the Application. Add / Manage Items- Can add new food items with details such as name, image, cost, description, etc. and also can manage added details. Add Wallet Balance- Canteen people can add balance in a student's wallet. View / Update Orders- Can view all the canteen orders received from the student.

User:

Register- Students need to register first with basic registration details and need to create a valid login id and password.
Login- Students need to login using their valid login credentials in order to access the android application.
View Items- All the food items will be displayed to the student at once with description and cost.
Add to Cart- Single or multiple food items can be added to cart by selecting quantity.
Order and Pay- Order can be placed on selected food items by using option E-wallet.
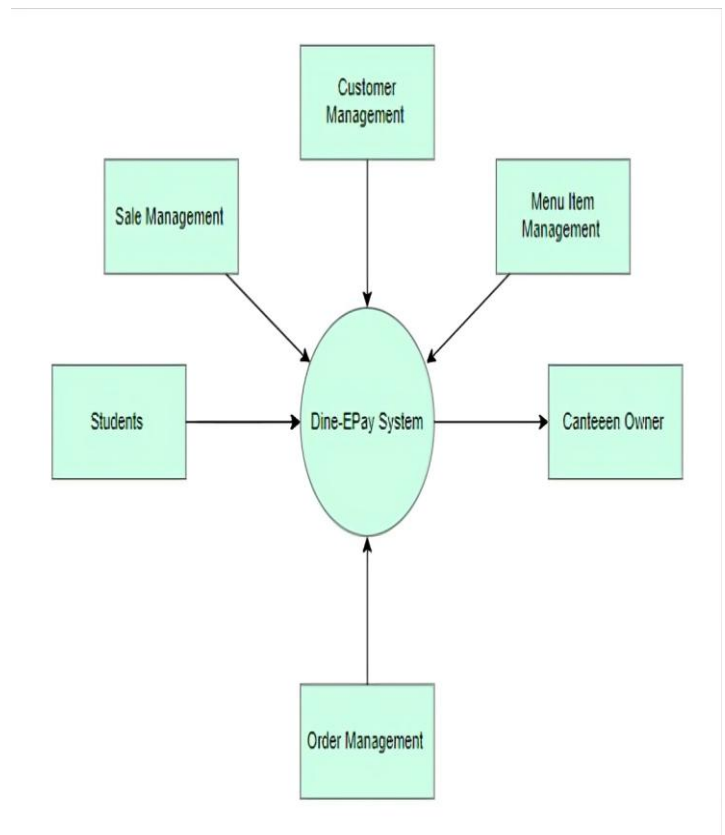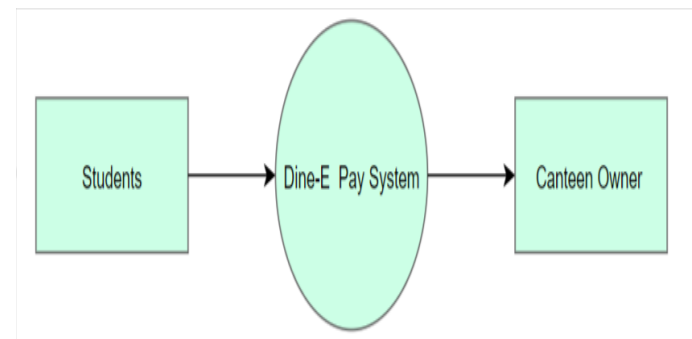Refill Wallet- Students can refill their own wallet anytime.
Order History- All the past and recent orders will be displayed.
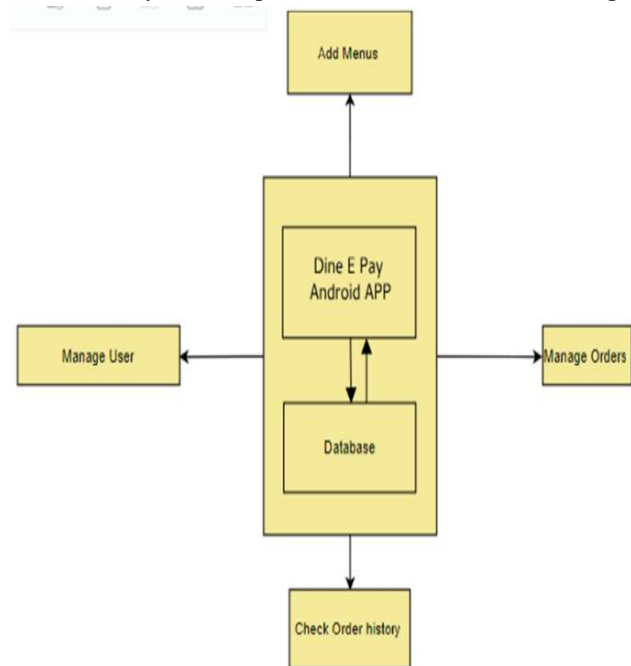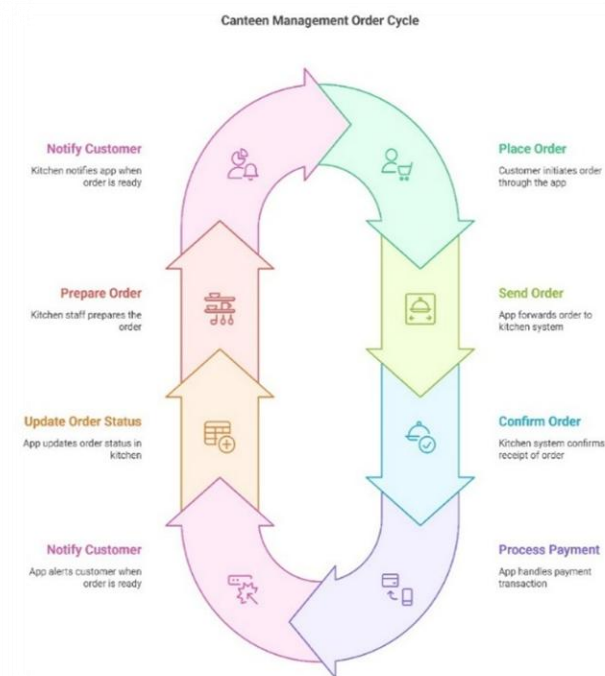
Data Flow Diagrams:

DFD Level 0 -

DFD Level 1

In add to cart module customers can add their product in add to cart. After add to cart customer can redirect to payment process. After payment process products are delivered to customer address.

Flow Architecture Diagram

Canteen Management Order Cycle

1. Customer Interaction: The customer initiates the process by placing an order through the mobile application

2. Order Transmission: The mobile application sends the order directly to the Kitchen Management System, ensuring that the kitchen is aware of the incoming orders in real-time.

3. Payment Processing: The application facilitates payment processing through a secure Payment Gateway, allowing customers to make transactions seamlessly.

4. Order Confirmation: Once the order is received and payment is confirmed, the application notifies the customer, enhancing their experience by keeping them informed.

5. Menu and Wallet Management: Customers can view the menu, check their wallet balance, and even pre-order items, making the ordering process more efficient.

6. Kitchen Operations: The Kitchen Management System updates the order status and communicates with kitchen staff to prepare the order, ensuring a smooth workflow.

7. Final Notification: Once the order is ready, the kitchen notifies the application, orininforms the customer, completing.

This flow architecture diagram illustrates how the proposed application integrates various components to create a streamlined and efficient canteen management system, ultimately enhancing the dining experience for customers and improving operational efficiency for canteen operators.

Requirement Analysis: -
Hardware Requirement for Development of Project: (minimum)

1. RAM: 4 GB Processor: Intel CORE i3
2. Hard Disk: 64 GB

Software Requirement for Development of Project: (minimum)

1. Operating System: Microsoft Windows-10.
2. Software Package: MySQL, Android Studio.
3. Front End: XML, HTML
4. Backend: Java
5. Database: MySQL

Conclusion: -

This system offers significant advantages for businesses of all sizes, from small to large. Its user-friendly interface means that employees can easily navigate the application without needing extensive training, boosting productivity .Administrators benefit from real-time monitoring, allowing them to keep track of operations, inventory, and sales performance, which leads to better management decisions. The system's automation reduces the need for manual data entry, minimizing errors and streamlining processes.This study focuses on the challenges faced by large institution canteens and suggests this system as an effective solution to improve efficiency and enhance customer service.

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