Smart Serve Cafeteria Automation for Efficiency and Experience.

Amruta Kulkarni[1], Shivam H. Pisal[2], Nikhil N. Patil[3], Rushikesh S. Waghmare[4], Yash D. Kumbhar[5].

[1]*Lecturer, Computer Science and Engineering, Sharad Institute of Technology College of Engineering, Yadrav, Maharashtra, India.*

[2,3,4,5] *Student, Computer Science and Engineering, Sharad Institute of Technology College of Engineering, Yadrav, Maharashtra, India.*

ABSTRACT: Manual ordering in canteens is very time-consuming, and waits are usually quite long and also prone to order fulfillment mistakes. Here, in this paper, there is the concept of a Canteen Automation System, which sends order requests directly from the mobile application, streamlining the order process within canteens for a more fulfilling dining experience with its features as follows: e-menu selection order tracking in real time, and automatic billing. In the study presented below, modern technologies shall be demonstrated to be applied in improving the order speed and accuracy in serving dishes at schools and colleges. The paper also discusses the system's architecture, types of users, and efficiency and user satisfaction improvement benefits in the system.

KEYWOERDS: Canteen Automation, WEB Application, Order Management, E-Menu, Real-time Tracking.

1. INTRODUCTION

As the world is moving at a fast pace, quick service is getting more and more interest in most sectors of the service industries, including food services within canteens. The old traditional method of ordering is very much inefficient as it depends on human input, usually resulting in elongated waiting times, error in orders, and poor resource management. In addition to this, the increase in mobile use increases the opportunities of automating the order process with increased time reducing on man-power and thus enhancing overall efficiency. This paper introduces a CAS that takes advantage of mobile applications to improve processes related to food orders thereby enhancing user experience.

2. LITERATURE SERVEY

The literature on automation in canteen management highlights the adoption of digital technologies like cloud computing, cashless payments, and smart systems to streamline operations and enhance customer experience.

1. Cloud-Based Canteen Systems (2016): Improves scalability, real-time data access, and operational efficiency by managing inventory and orders on cloud platforms.

2. QR Code-Based Systems (2017): Speeds up transactions and enhances user convenience through digital payments and mobile ordering.

3. **E-Wallet Systems (2018): Enables faster, secure contactless payments, reducing queues and improving transaction tracking.

4. **Smart Canteen Systems: Utilizes wireless ordering, RFID, and TFT screens to automate processes like access control and payment in large canteen environments, particularly in universities.

Overall, these innovations aim to reduce manual errors, improve efficiency, and provide better customer service through automation.

3.OBJECTIVES

1. To enhance the efficiency of the orders for food and deliveries.
2. To ensure effective inventory management and waste free.
3. To ease payment processes and provide customers with the options of making varied payments.
4. To upgrade customer satisfaction through menu items tailored around preferences, likes, and dislikes, and diets.
5. Introduce an independent feedback mechanism on how the customers and others feel so that they

may communicate their ideas and suggestions for continuous improvement.

4. PROBLEM STATEMENT

To improve canteen operations, and streamline inventory management, order processing, and payment handling, fostering accuracy and efficiency.

5. METHODOLOGY

5.1 Methodology:

The canteen management system follows a structured methodology to cater to all the requirements of the canteen. It starts with collecting the requirements from the stakeholders and then moves on to designing the system followed by development of the software components that form the prerequisite for the system. Testing is done comprehensively that makes the system precise and reliable, and then it is implemented followed by educating the staff to use it effectively. Ongoing monitoring and maintenance procedures are ensured in order to guarantee continued system functionality and support. With this method, the canteen management system is implemented successfully.

Requirement Analysis
Determine the stakeholder requirements of the canteen from stakeholders.
System Design:
Determine a plan for software development, including a choice of technology, design of interface etc.
Software Development:
Code and program the system components with all requirements.
Testing and Validation:
Perform testing thoroughly to ensure that there will be precision and reliability in the system.
Deployment and Training:
Deploy the system and train staff for efficient usage.
Monitoring and Support:
Equip with provisions to track the system and provide support.

5.2 Architecture:

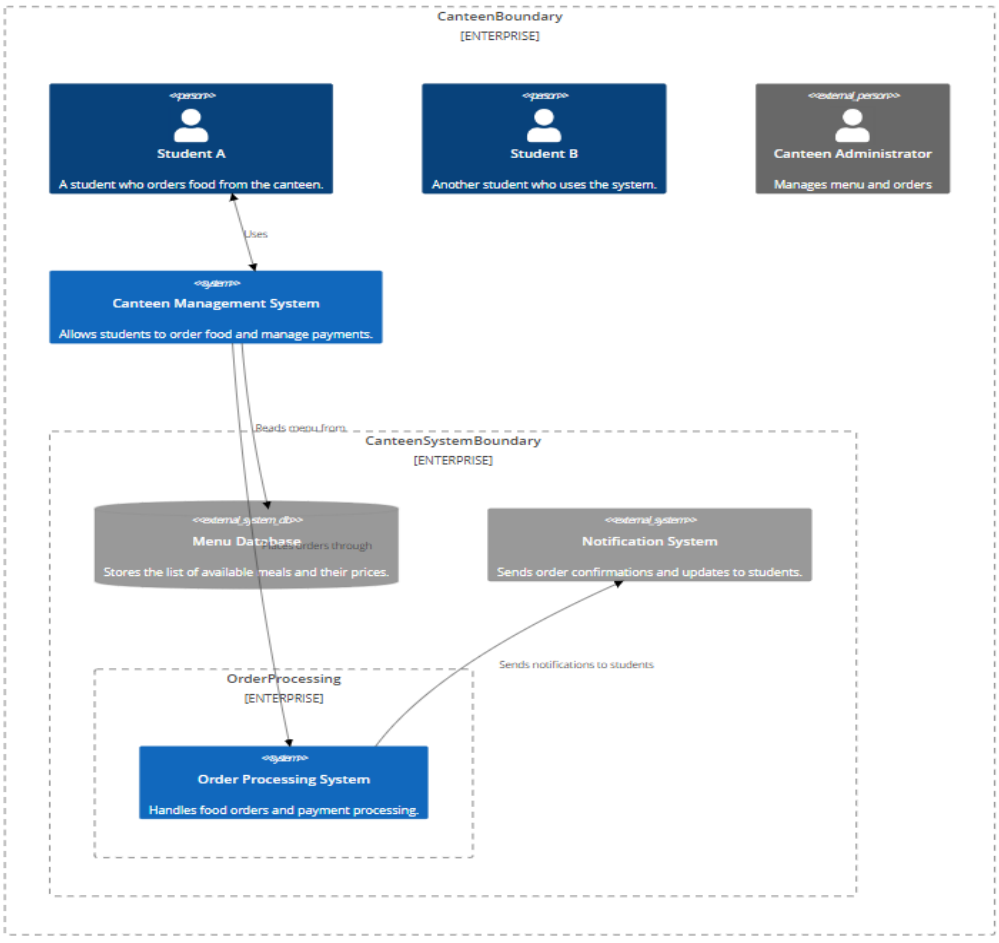

Fig5.2.1: Architecture

• Database: This will carry all the data of the system, such as customer data (customer name, contact address, address), canteen data (name, owner), menu items (name, description, price), order details (customer, item).

• Customer: Customers can view the menu, order the food, and make a payment

• Canteen Owner: The canteen owner can manage the menu, take orders, and view sales reports.

5.3 Data Flow Diagram:

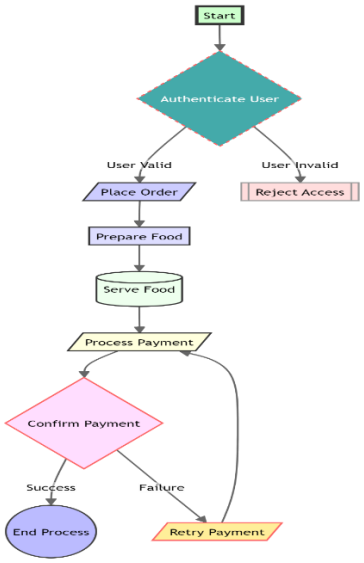

Fig 5.3 DFD

• System User Management: This component is tasked with creating and managing user accounts for the system. This might include canteen staff and customers.
• Login Management: This module is to control logins for users into the system. It ensures that only authorized persons have access to the system.
• Food Item Management: This module is used to control the food items that the canteen shall offer. It can be additions, deletions, amendments, and tracking the inventory levels.
• Sales Management: This module is used to account for the sales transacted by the canteen. This may include orders captured as well as the execution of payments and even reporting on how sales have been done.
• Customer Management: This component is used to manage customer information, such as their profiles and order history.

1.4 Activity Diagram:

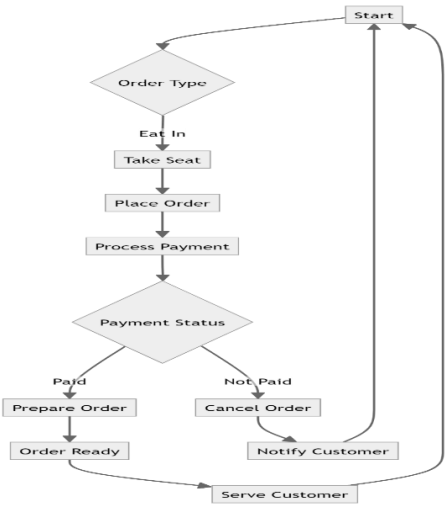

Fig 5.4. : Activity Diagram

Activity Diagram of Food ordering process in a canteen system.
The customer logins into the menu then selects their order to continue making it. Once selected, the system will provide all details about the order. The order is then accepted or declined by the customer. If the customer accepts, the order is automatically finalized and therefore processed, and thus the process ends. However, if the customer declines, then the process would loop, and the customer is required to make another selection for the order. This diagram illustrates the step of order selection-to-finalization to the extreme to ensure clarity about the order management workflow:.

6. Use Case Diagrams

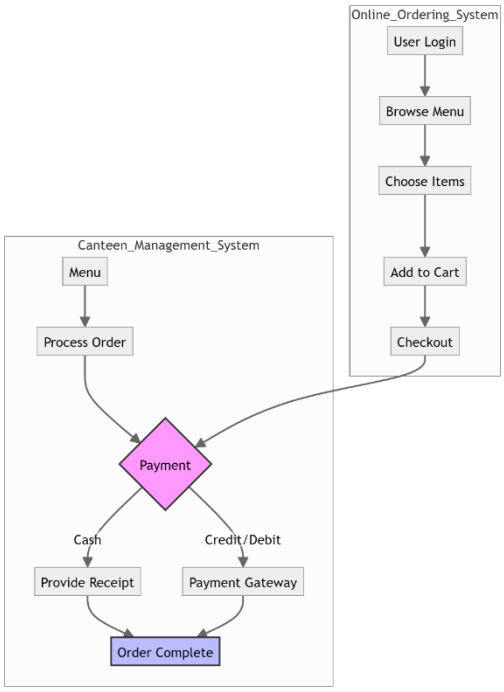

Fig2: Use Case Diagram

7. IMPLEMENTATION

1.Frontend pages.

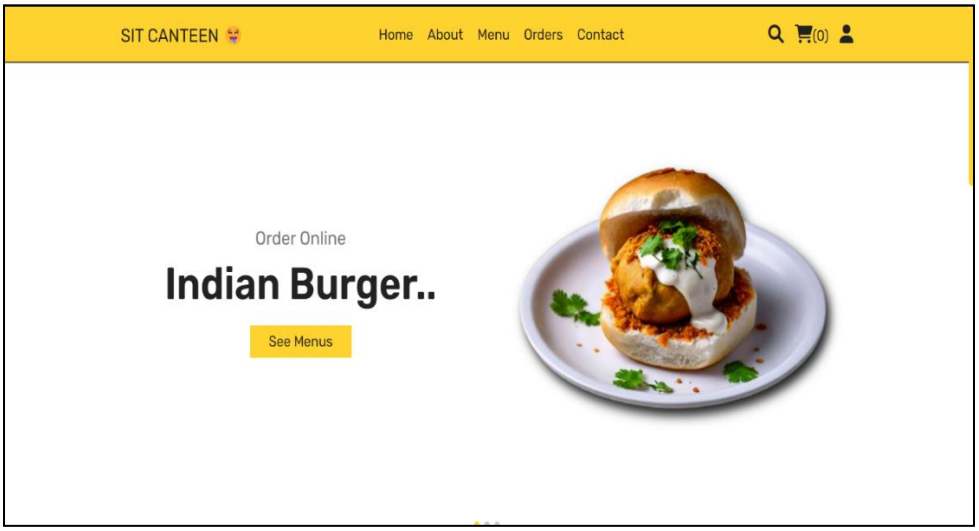

Fig1.1: Frontend Page

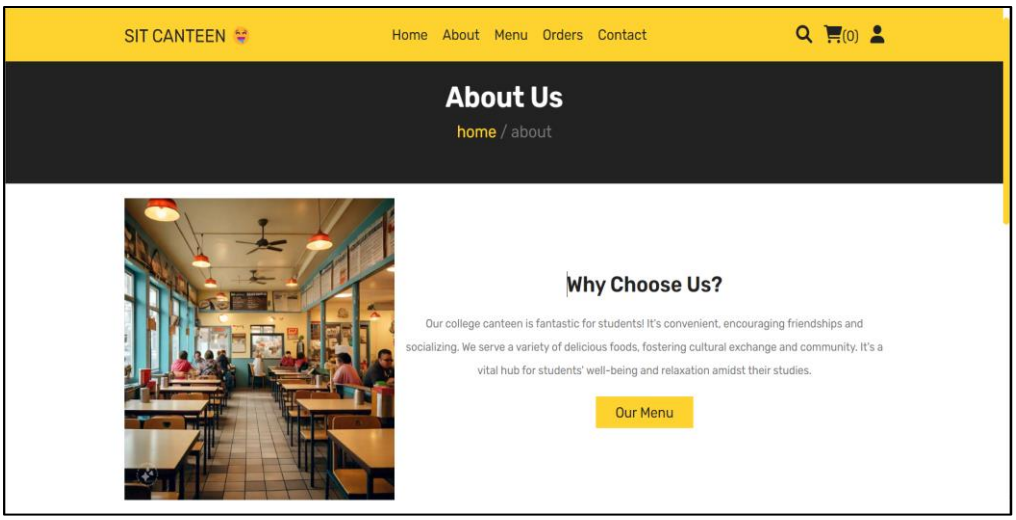

Fig 1.2: Frontend Page

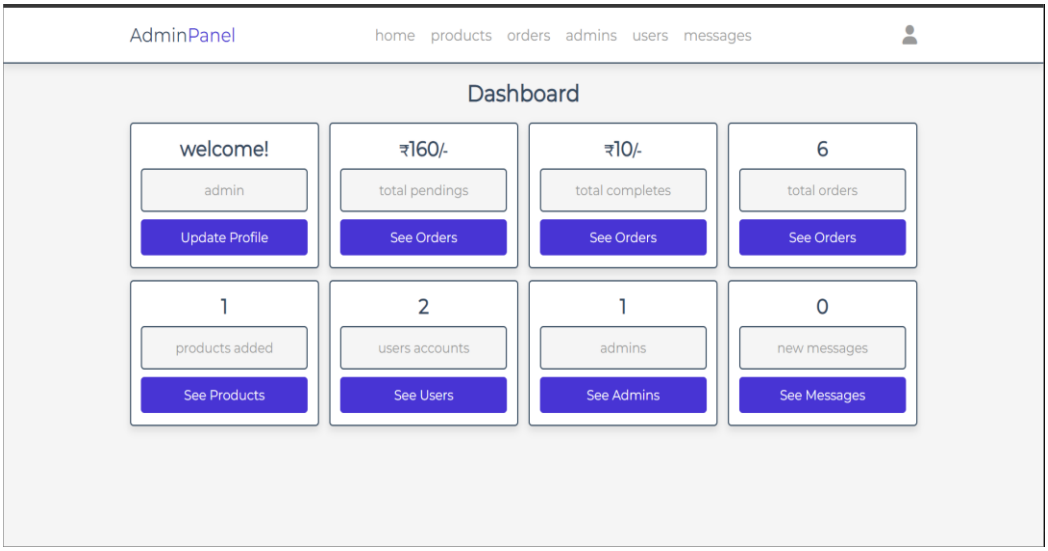

Fig 1.3: Admin page

2. Backend System

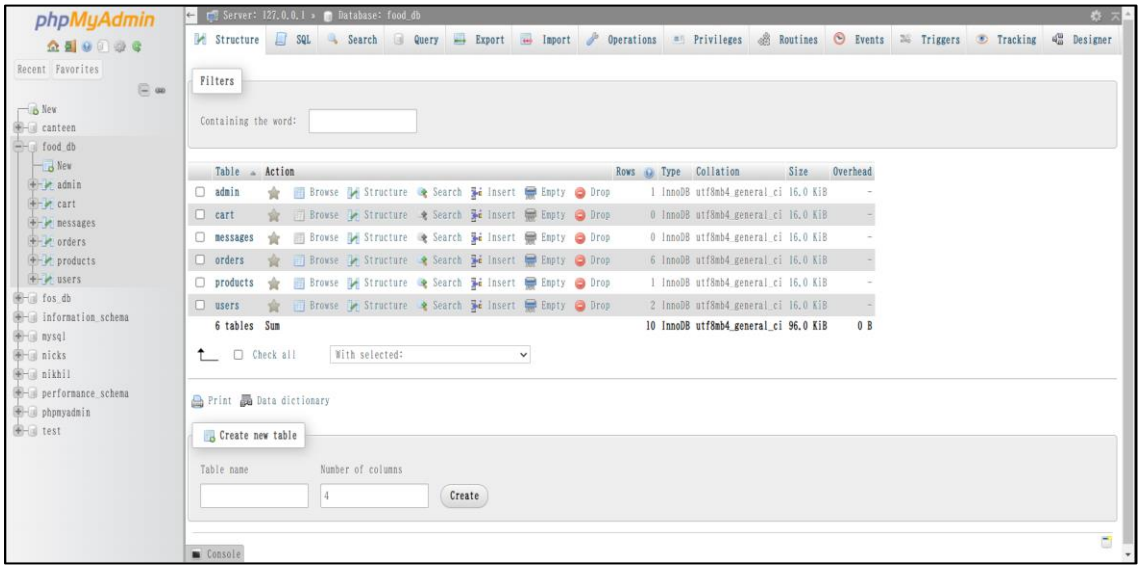

Fig 1.2: Database

8. CONCLUSION

In general, the canteen management system has greatly improved efficiency and effectiveness in the operations of the canteen. Because the processes in order processing and inventory management have been made more efficient, the transactions involving the staff and customers are now much smoother and faster. Simplified user interfaces and features support customers in higher satisfaction rates and thus retention as well as word-of-mouth. Generally, the management system of the canteen seems to be a good investment in terms of an upgrade due to the total increase in productivity and improvement in the overall dining experience of all the concerned stakeholders.

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