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V - Total Cafeteria

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Abstract: ***The V – Total Cafeteria aims to modernize the current manual system with the help of computerized equipment and software applications, resulting in the efficient management of data. The hardware and software required for this purpose are easily accessible and user-friendly. The cafeteria in the institution witnesses a long queue during breaks, causing significant delays in food service and inconvenience to students and faculty. In order to eliminate this waiting time, a software solution is proposed where orders can be projected directly onto the cafeteria monitor once they are placed. This would eliminate the need for customers to wait in line at the payment desk, as the server can prioritize fulfilling previous orders before moving on to new ones. Additionally, online payment options can also be introduced to minimize time spent waiting for change. The project's primary objective is to automate the canteen management system, which involves managing canteen details, product information, order tracking, and user data. The project is solely accessible to the admin, who has complete control over the system.***

Keywords: V-Cafeteria, Canteen Management System, Automation, Online Payment, Administrative Access

I. INTRODUCTION

The college canteen is often plagued with long queues, causing students to spend a significant amount of time waiting for their orders to be taken and processed. However, a proposed software solution can effectively reduce the time spent waiting in line by sending orders directly to the kitchen, allowing customers to place orders in advance, and providing the option to use a card payment system that eliminates the need for tendering change. This frees up time that can be better spent on more productive activities.

Currently, the only payment option in most canteens is cash, which can be inconvenient for users who need to carry cash around and must pay the correct amount to avoid issues with receiving the correct change. To keep track of transactions, canteen owners typically maintain a register and provide consumers with coupons for their purchases. However, this paper-based system is prone to errors, loss, and damage.

The emergence of digital menus and touch screen applications has allowed for a more efficient and accurate ordering system. The new system eliminates the need for back-and-forth communication between the server and the terminal, and orders can be easily modified, transferred, or altered in real-time. The MERN Stack technology will be used to accomplish this.

The existing cash-based system is slow and inefficient, and online orders must be paid for in advance with an Order Id assigned for smooth delivery.

Payments can be made through a card, UPI, or by scanning a QR code. With this new system, students can enjoy a streamlined ordering process that eliminates long wait times and errors in transactions, and canteen owners can have an efficient method of managing and tracking their sales.

II. PROBLEM STATEMENT

The traditional way of ordering food in canteens faces numerous challenges that affect the efficiency and customer satisfaction. Customers have to wait in long queues to place orders and then wait near the counter until the order is prepared, which results in a poor customer experience. Moreover, maintaining efficiency and quality of food is also a significant challenge for canteen owners, especially during busy hours. There are various issues concerning the manual system used in canteens, such as miscommunication between the cashier and the customer during verbal communication, lack of support for food customization requests, and outdated menu display.

Miscommunication and misunderstandings occur frequently, especially during crowded and noisy hours, which affects the order accuracy and customer satisfaction. Food customization requests are not recorded, resulting in forgotten or miscommunicated requests. Menu display is outdated and lacks graphical illustrations for some items, making it difficult for customers to decide what they want. These challenges highlight the need for a more efficient and effective system to improve the customer experience and streamline the canteen's operations.

III. SYSTEM DESIGN

A. System Architecture and Components

The proposed system architecture is a web-based application developed using the MERN stack, which stands for MongoDB, Express, React, and Node.js. The system consists of several components that work together to provide an efficient and user-friendly experience for customers and canteen staff.

1) *Front-end Component:* Front-end Component: The front-end component of the system is developed using React, which is a popular JavaScript library for building user interfaces. The front-end component is responsible for rendering the user interface that customers and canteen staff will interact with. It communicates with the back-end component via HTTP requests and responses.
2) *Back-end Component:* The back-end component of the system is developed using Node.js and Express, which are server-side JavaScript frameworks. The back-end component is responsible for handling requests from the front-end component, processing the requests, and returning responses to the front-end component. It also interacts with the database component to retrieve and store data.
3) *Database Component:* The database component of the system is developed using MongoDB, which is a NoSQL document-oriented database. The database component stores all the data related to the canteen, including menu items, customer orders, and payment details. The back-end component interacts with the database component to retrieve and store data.
4) *Payment Component:* The payment component of the system is responsible for handling online payments made by customers. The payment component is integrated with third-party payment gateways like UPI and QR code scanners, which enable customers to make payments easily and securely.
5) *Authentication Component:* The Authentication System is responsible for verifying the identity of users who wish to log in to the system, and ensuring that only authorized users are allowed to access the system's features.

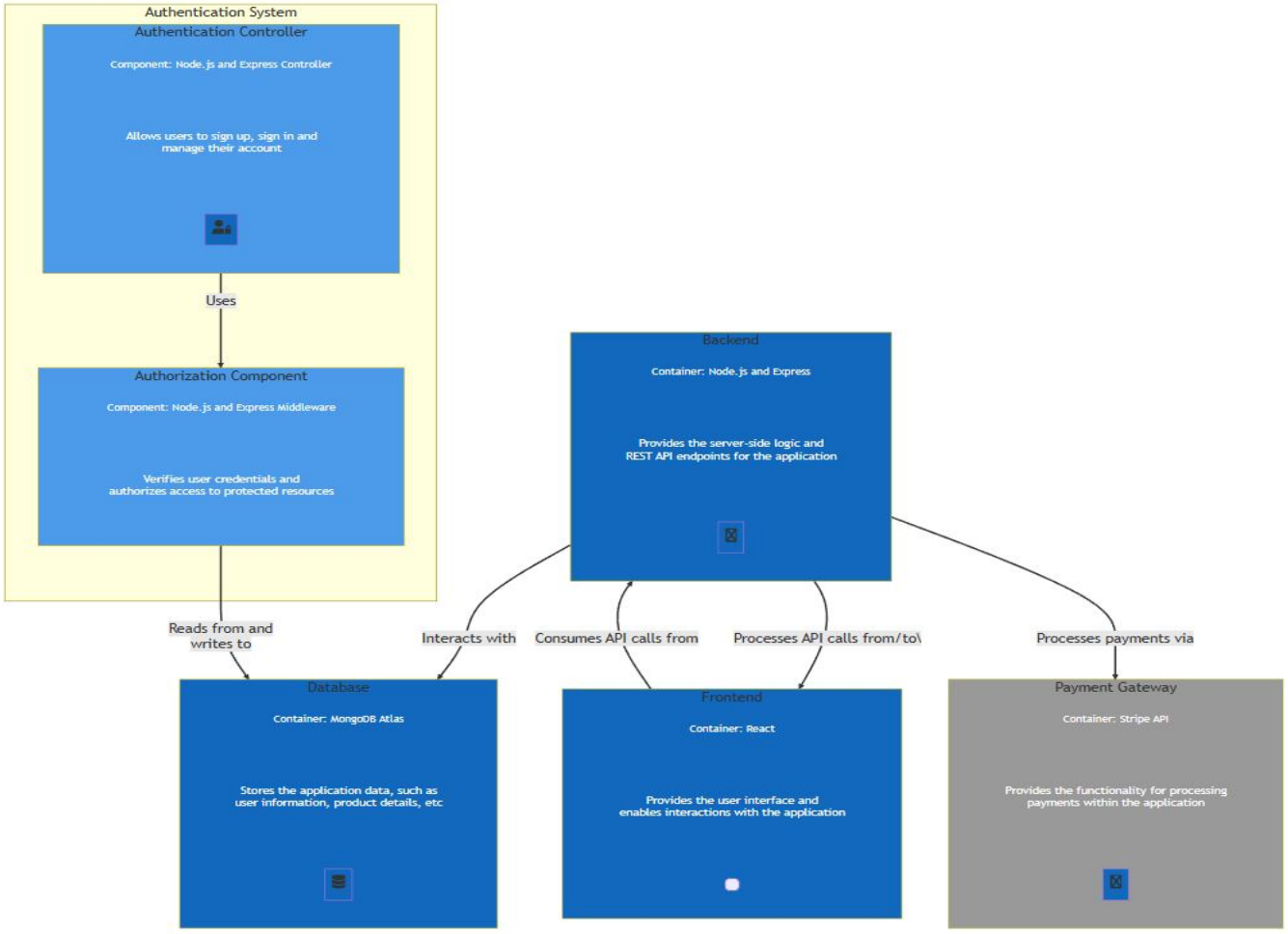


Fig.1 System Architecture

B. Tech Stack

The technology stack used for this project is the MERN stack, which includes MongoDB, Express.js, React.js, and Node.js.

MongoDB is a NoSQL database used to store the data for the application. It provides a flexible schema design that makes it easy to store data in a non-tabular format.

Express.js is a web application framework for Node.js that provides a set of features for building web applications, such as routing, middleware, and HTTP utility methods. It is used to build the server-side of the application, including handling HTTP requests, managing sessions, and connecting to the database.

React.js is a JavaScript library used for building user interfaces. It allows for the creation of reusable components and provides a declarative approach to building UIs. It is used to build the client-side of the application, including rendering views, handling user interactions, and communicating with the server-side.

Node.js is a server-side JavaScript runtime environment that allows for the execution of JavaScript code outside of a web browser. It is used to run the server-side of the application, handling requests from the client-side, communicating with the database, and serving data to the client-side.

In addition to the MERN stack, other tools and technologies are used, such as Bootstrap and CSS for styling the UI, Stripe for processing online payments, and Git for version control and collaboration among developers.

Overall, the technology stack and tools used for this project provide a robust and scalable solution for building a web application that can handle the needs of a canteen management system.

IV. METHODOLOGY AND MODULES

A. Methodology

The methodology for developing the website will involve the following steps:

1) *Needs Assessment:* Conduct a thorough needs assessment to identify the requirements and expectations of the canteen management system. This will involve reviewing existing canteen management systems, interviewing canteen managers and staff, and observing the existing manual system in place to determine the challenges they face in managing the canteen.
2) *Define Objectives and Scope*: Based on the needs assessment, define the project objectives and scope, taking into account the system's features and functions, the target audience, and the available resources. Determine the key features that the system must have, such as menu management, order management, inventory management, and reporting.
3) *Develop a Prototype:* Create a prototype of the system's user interface design, including the dashboard for the canteen manager, the order placement page for customers, and the inventory management page for staff. This will enable testing and validation of the system's usability and functionality.
4) *Develop Backend:* Develop the backend of the system using the MERN stack, which includes MongoDB as the database, Express as the web framework, React as the frontend framework, and Node.js as the server-side runtime environment. This will involve setting up the database schema, designing the APIs for the frontend, and implementing server-side validation and error handling.
5) *Develop Frontend:* Develop the frontend of the system using React, which includes creating the user interfaces for the dashboard, order placement page, and inventory management page. This will involve implementing user authentication and authorization, integrating with the backend APIs, and implementing client-side validation and error handling.
6) *Integrate Features:* Integrate all the features of the system to create a seamless user experience that allows for efficient management of the canteen. This includes integrating the menu management, order management, inventory management, and reporting features.

B. Modules

1) *Orders Module:* Customer's orders can be managed using this module.
2) *Product Module:* Used for the management of the products information
3) *Login Module:* This module of is for existing clients of the site. The user already registered here can login and view the available products and they can do the Purchase over here.
4) *Signup Module:* New customer can register and create account at this part of project. Here customer means student/staff who enters into the website
5) *Admin Module:* Used for managing and updating products and orders information
6) *Payment Module:* After selection of the products the user can pay their related amount for products selected in this module.

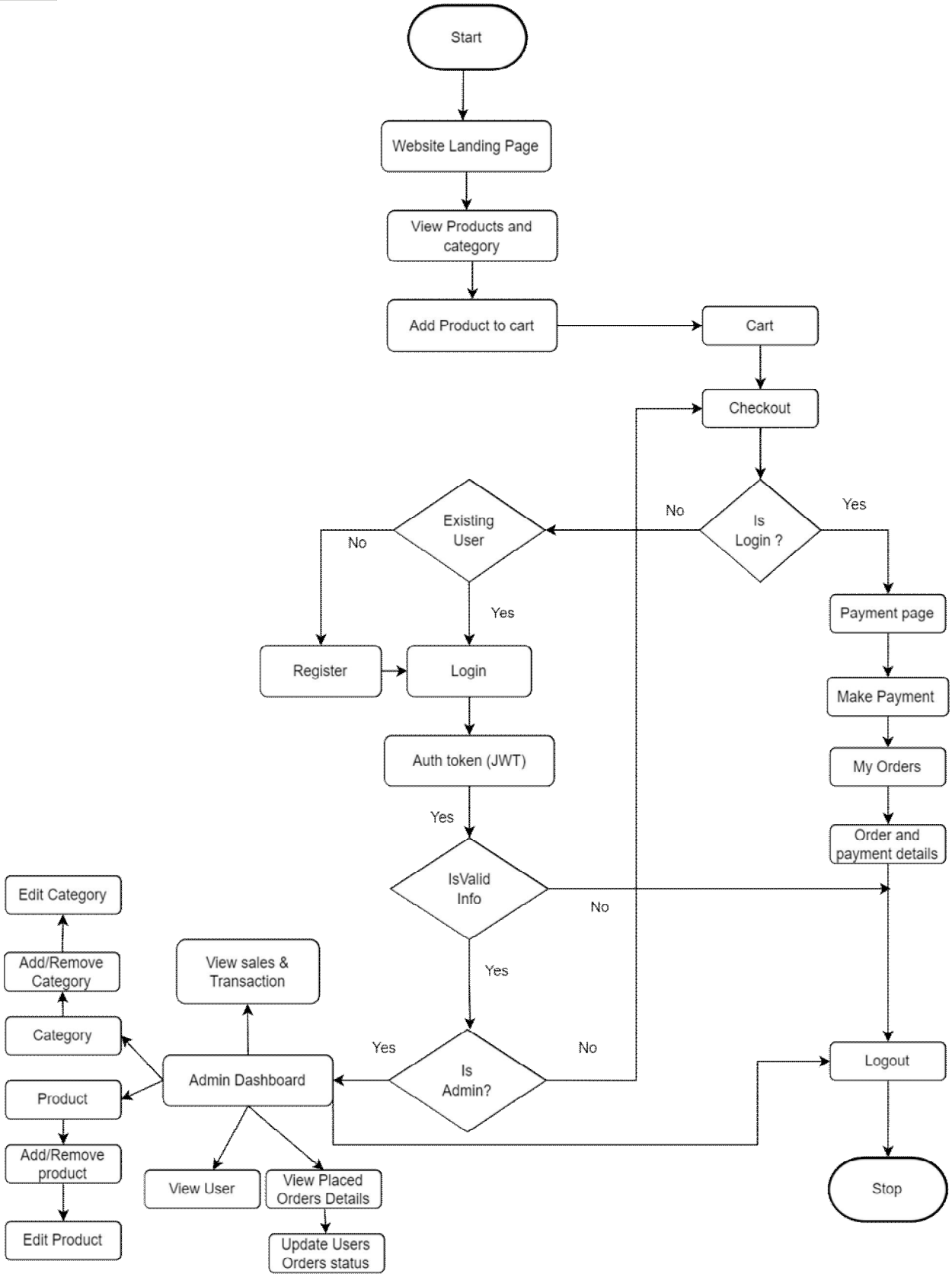


Fig.2 Flowchart

V. DIAGRAMS

A. Use Case Diagram

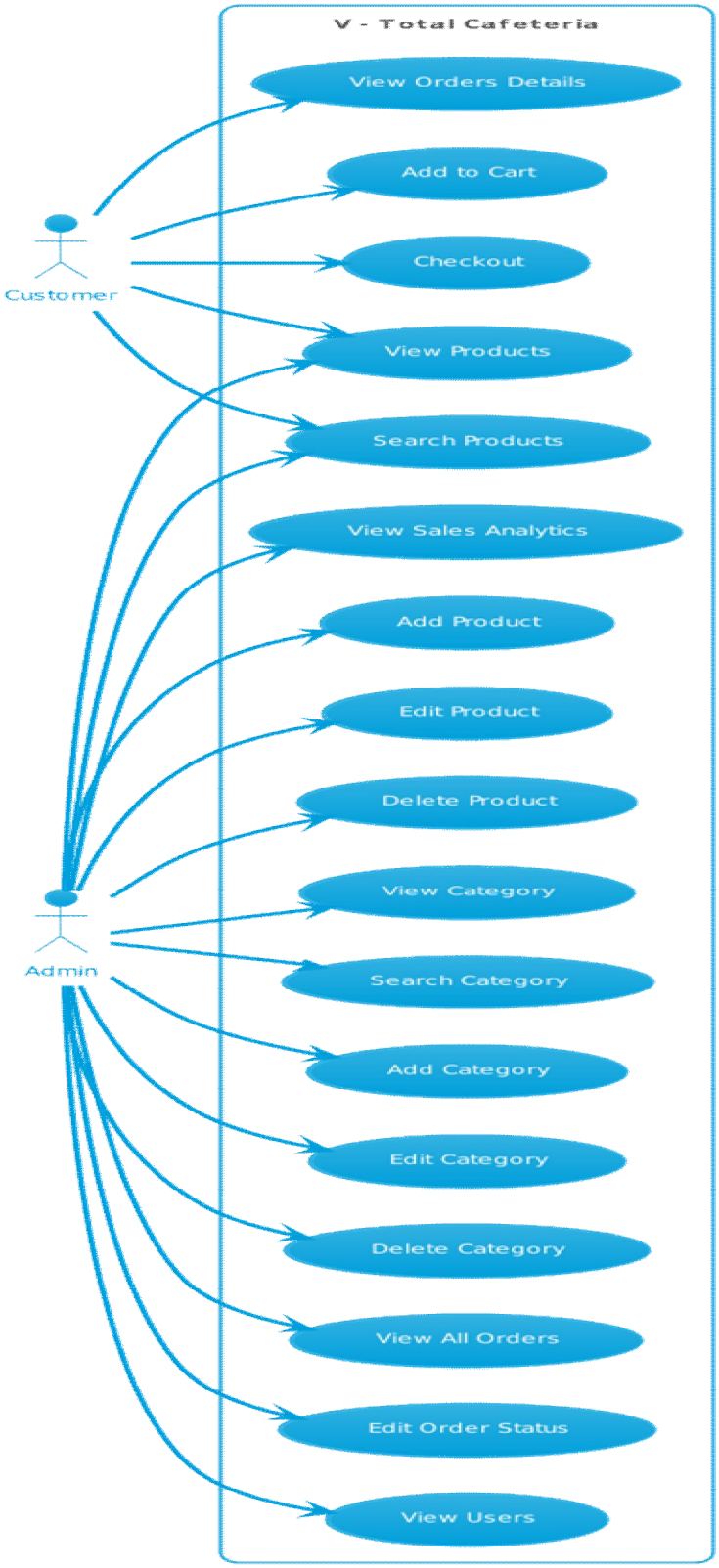


Fig.3 Flowchart

B. ER Diagram

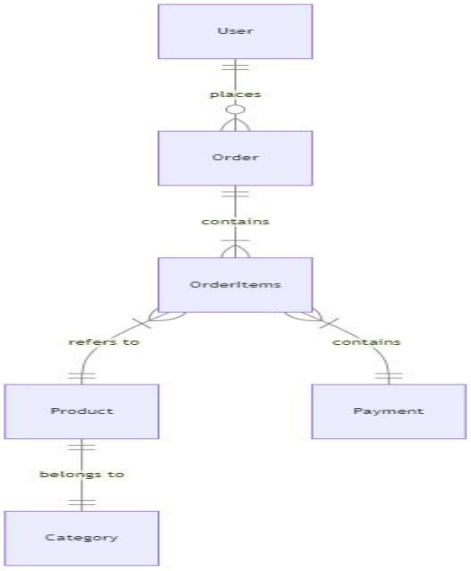


Fig.4 Entity Relationship (ER) Diagram

C. Sequence Diagram

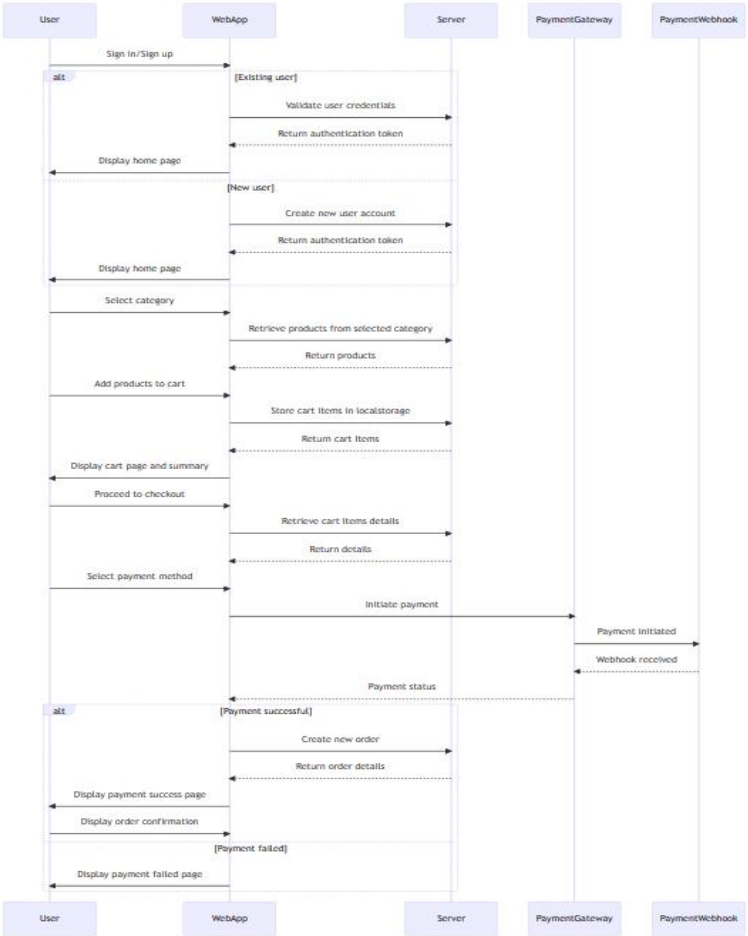


Fig. 5.1 Sequence Diagram - Client Side for Ordering.

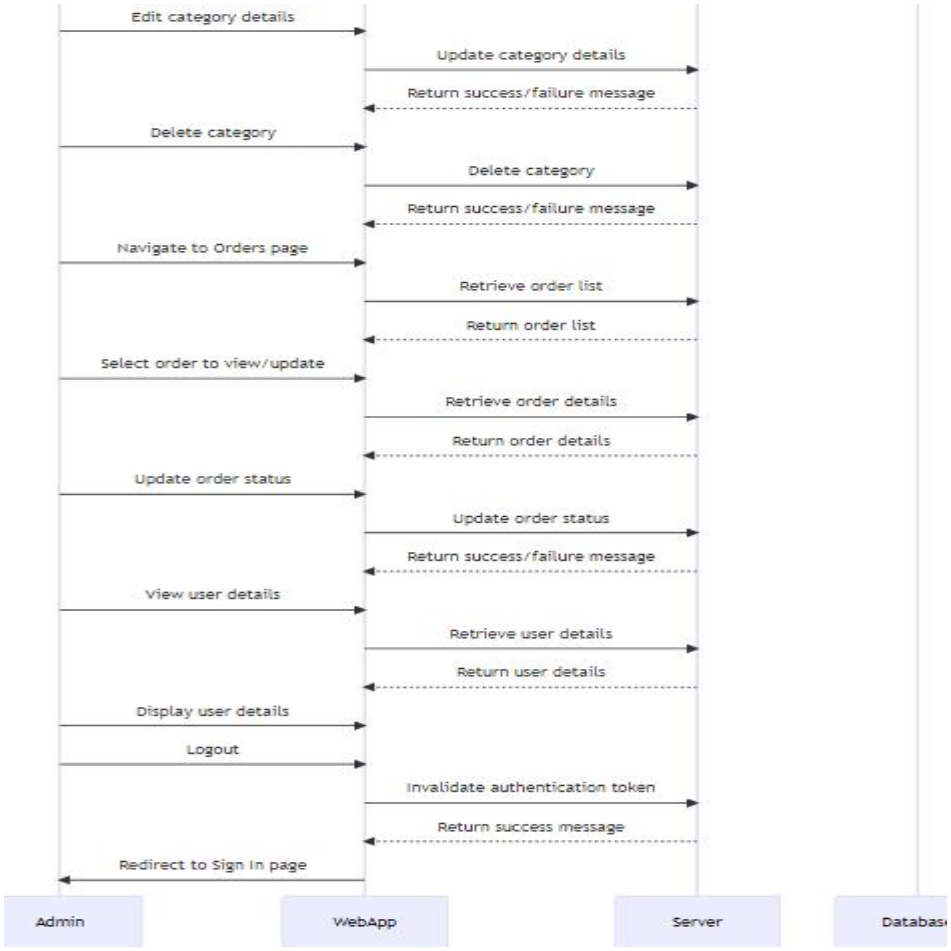
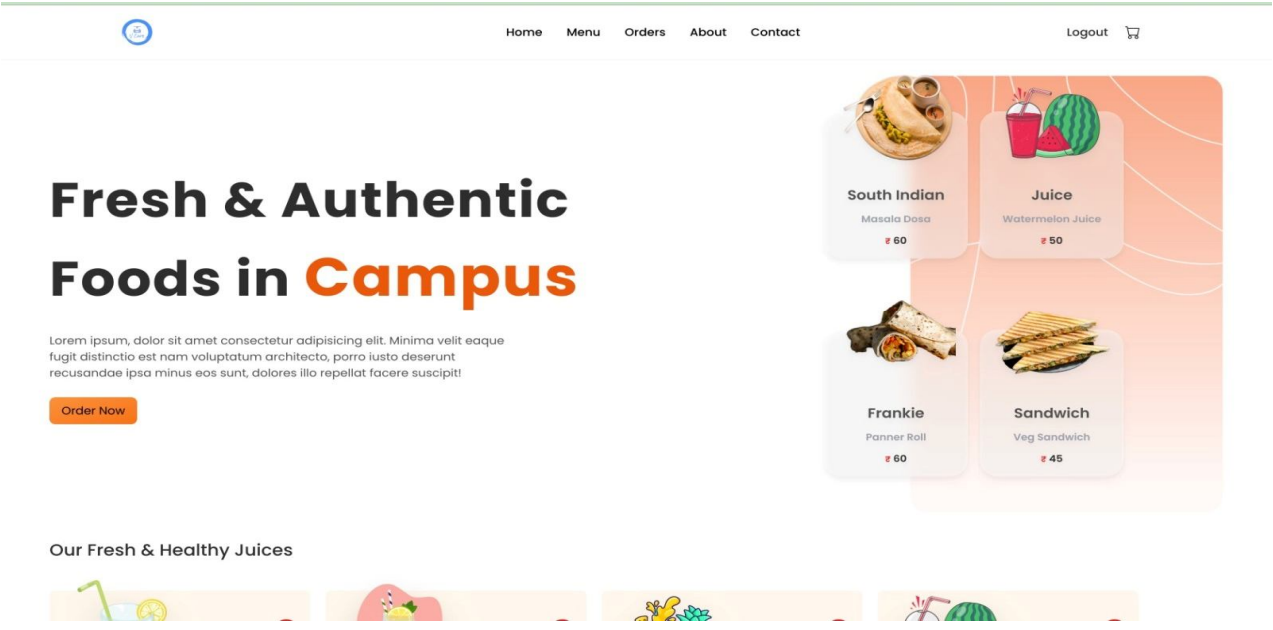


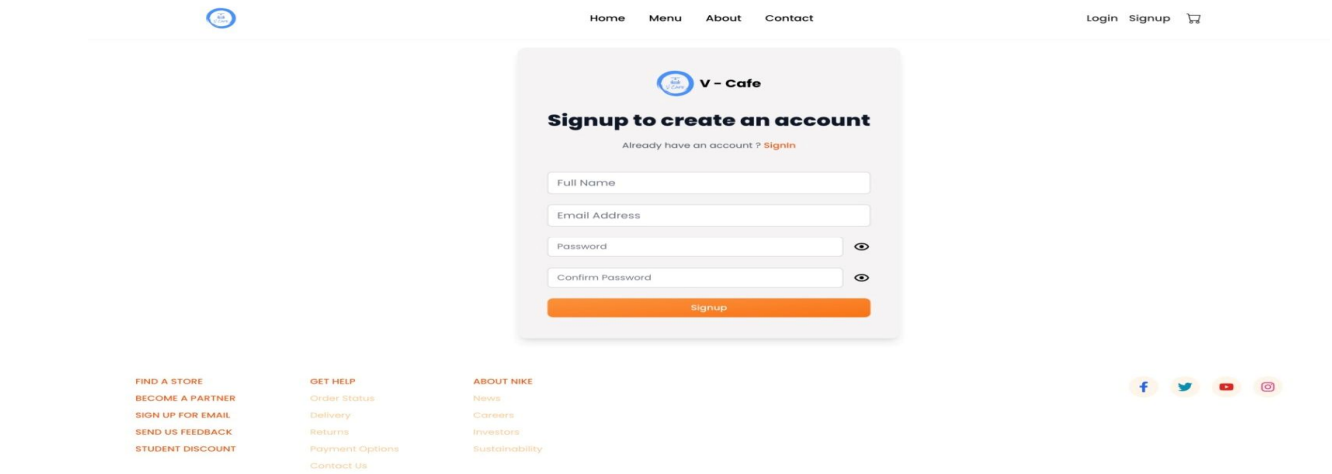
Fig. 5.2 Sequence Diagram - Admin Side for CRUD Operations.

VI. RESULTS

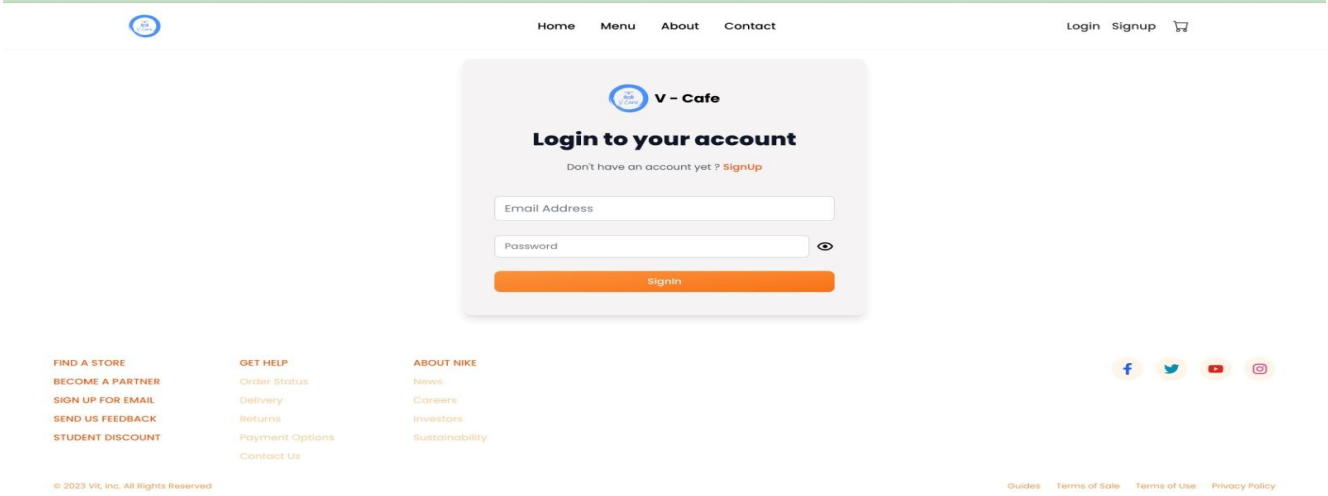
A. *Landing Page*



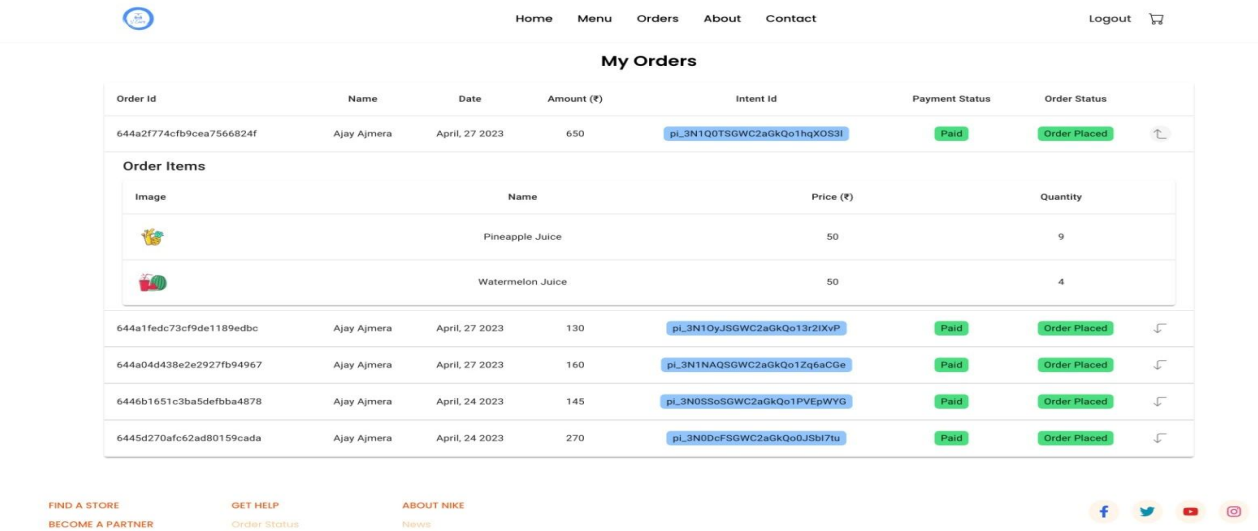
B. User Sign up page



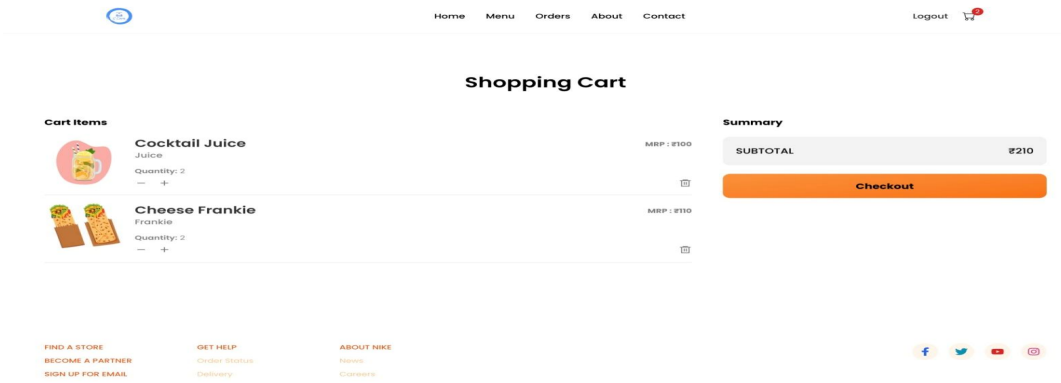
C. User Sign in Page



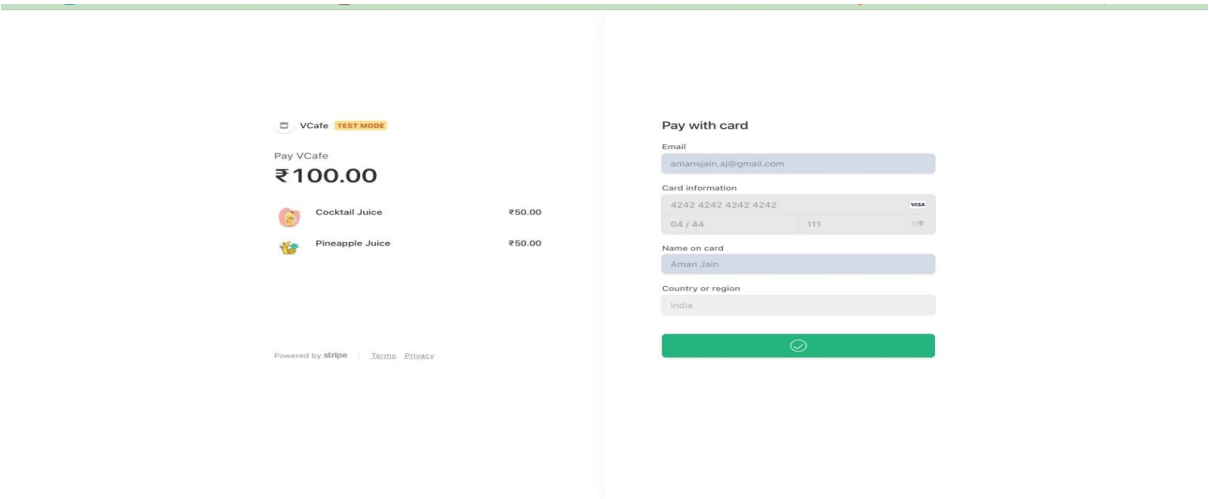
D. Order Page



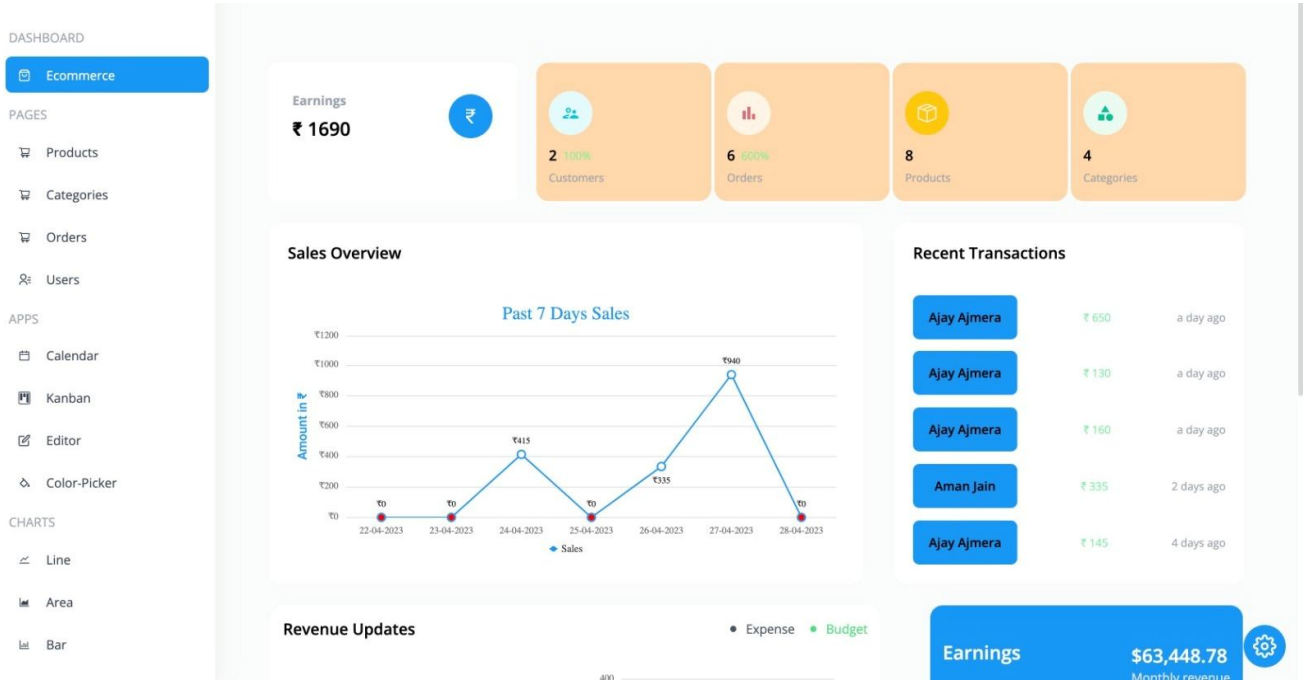
E. Cart Page



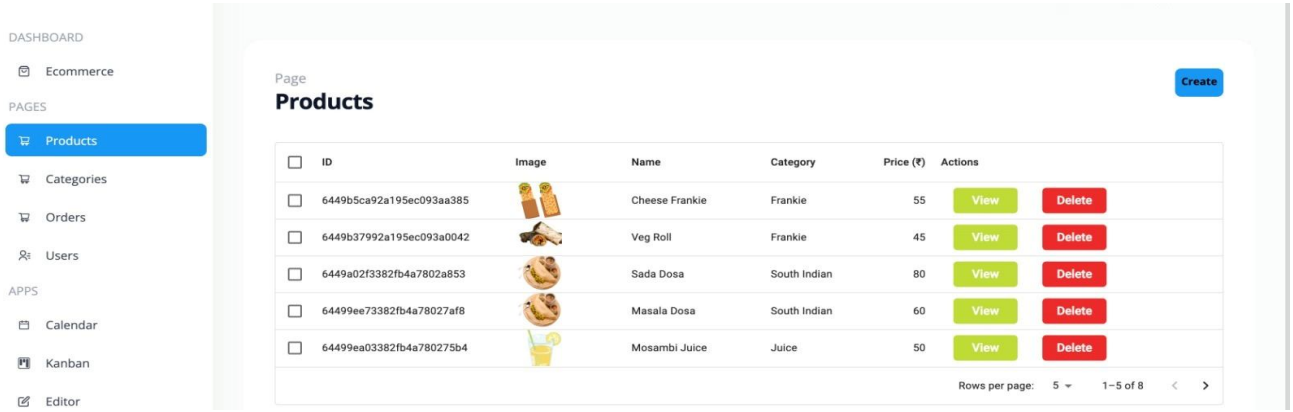
F. Checkout Page



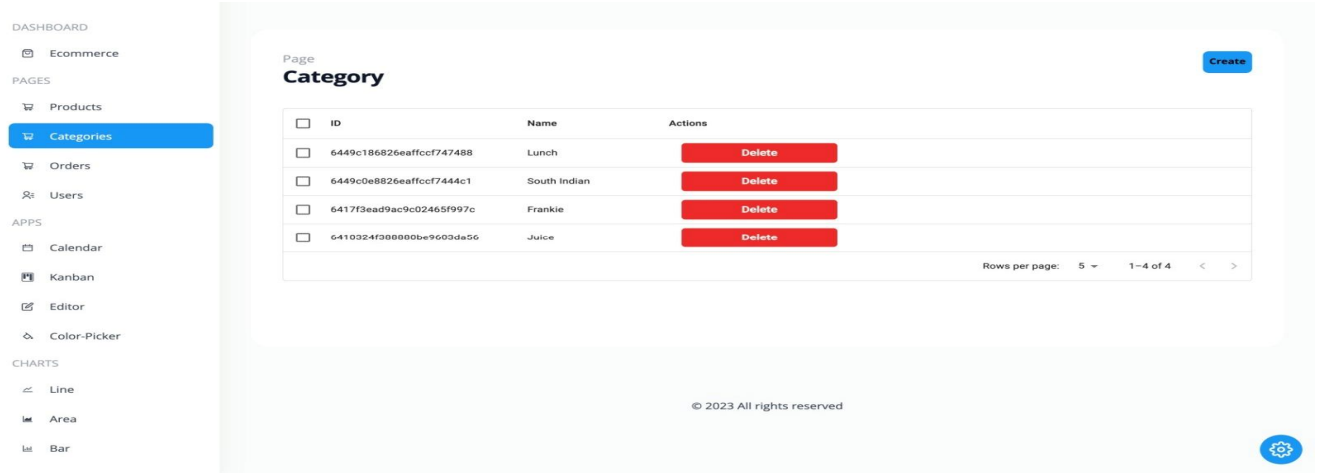
G. Admin Dashboard



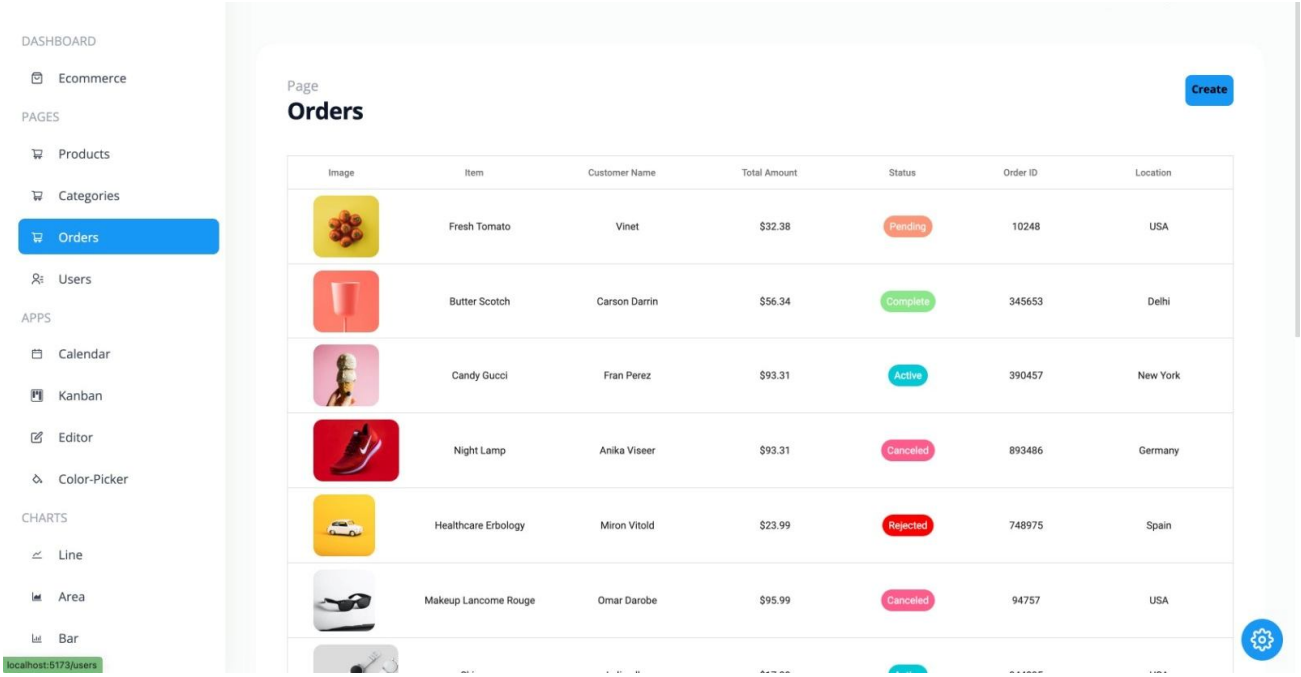
H. Product CRUD Page



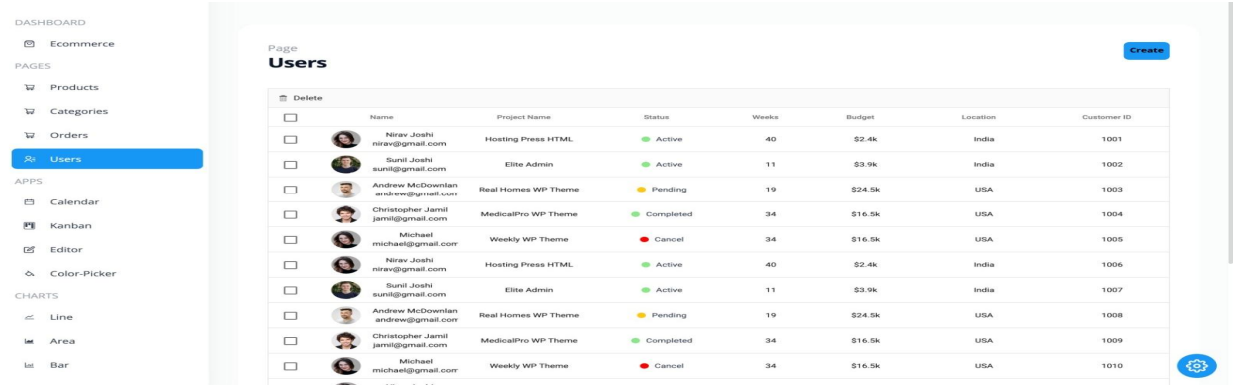
I. Categories CRUD Page



J. View All Orders Page



K. View All Users Page



VII. CONCLUSIONS

In conclusion, the development of a V -Total Cafeteria using the MERN stack has resulted in a comprehensive and efficient solution for managing food orders and inventory in canteens. The system provides benefits to both canteen operators and customers by streamlining the ordering process, reducing errors, and increasing efficiency.

The MERN stack allowed for the development of a modern, responsive, and user-friendly web application with robust functionality, including real-time order tracking, inventory management, and reporting. The use of Node.js, Express, React, and MongoDB ensured seamless integration of the frontend and backend components of the system, resulting in a more cohesive and scalable solution.

Overall, the canteen management system has the potential to revolutionize the way food orders are managed and processed in canteens, leading to improved customer satisfaction and increased profitability for canteen operators. With further enhancements and improvements, the system can be customized to meet the unique needs of different canteens, making it a valuable asset for the food industry.

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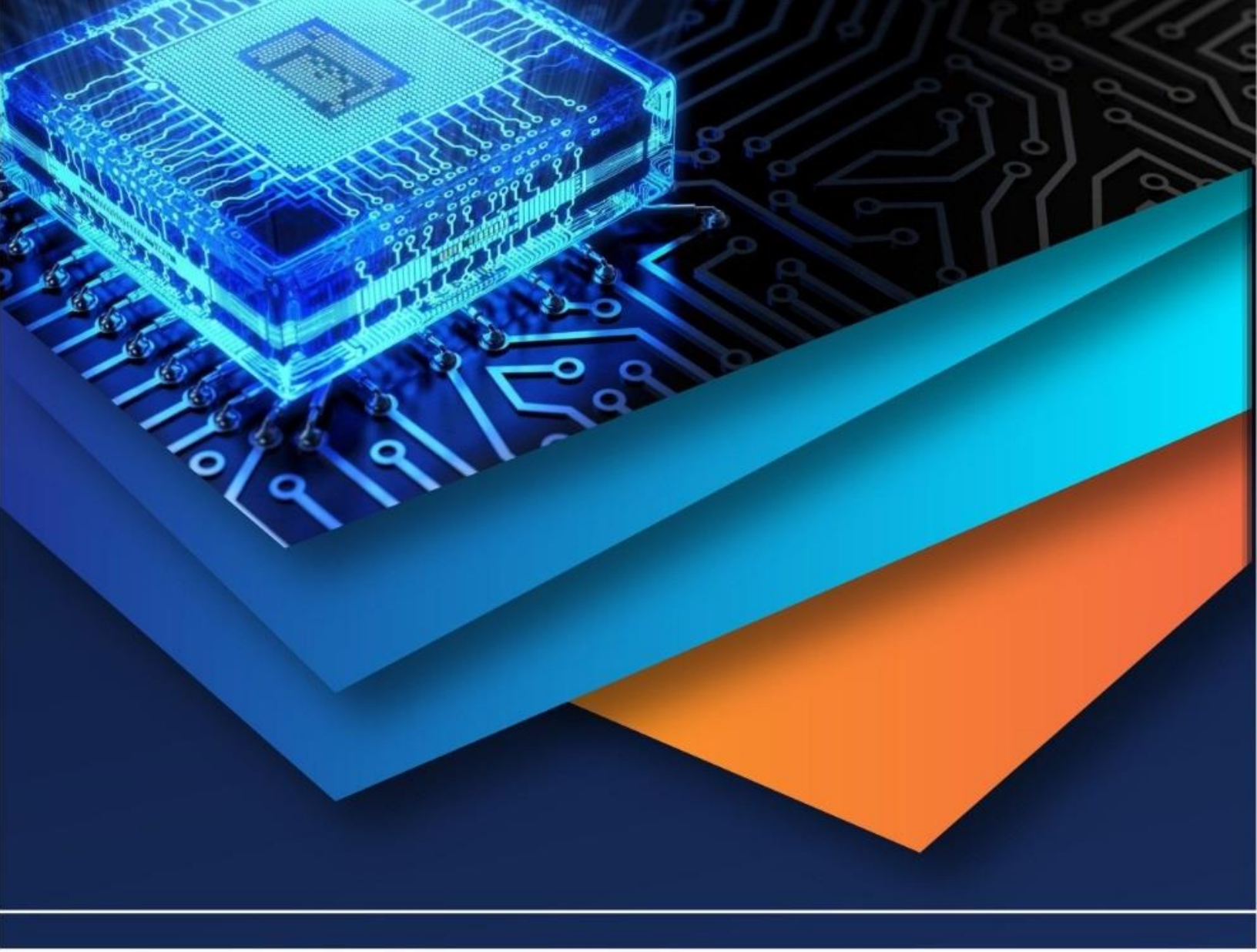

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