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DESIGN AND DEVELOPMENT OF CSK QUICKBITE: A WEB-BASED FOOD DELIVERY SYSTEM

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ABSTRACT
The Online Food Ordering System has emerged as a vital solution in the modern food service industry, offering convenience, efficiency, and enhanced customer satisfaction. With the increasing reliance on the internet and mobile technologies, users now prefer ordering food online over traditional methods. This system enables customers to browse digital menus, place orders, make secure payments, all through an intuitive web interface. It simplifies restaurant operations, improves communication, and enhances the overall food delivery experience. This paper presents the development of a full-featured online food ordering application using the MERN stack—MongoDB, Express.js, React.js, and Node.js. The application supports core functionalities such as user registration, authentication, menu browsing, cart management, and secure payment processing via multiple methods including online transactions and cash on delivery. This project demonstrates the potential of the MERN stack in building dynamic, responsive, and secure web applications tailored for the food delivery domain.

Keywords:
Online food ordering, MERN Stack, Authentication, Secure Payments, Responsive design.

I. INTRODUCTION

The rapid growth of internet technologies has significantly transformed the way people live, work, and interact, with online food ordering emerging as a key example of this digital revolution. With consumers increasingly seeking convenience and efficiency, online food ordering systems have become an indispensable part of modern lifestyles. These systems allow customers to browse digital menus, place orders anytime and anywhere, and have food delivered directly to their doorstep, overcoming the limitations of traditional ordering methods.

The COVID-19 pandemic further emphasized the importance of contactless food delivery, making online ordering systems a safer and more preferred alternative by enabling social distancing and minimizing physical interactions. Additionally, promotional offers and discounts offered through these platforms enhance cost-effectiveness, encouraging more users to adopt online ordering.

This project focuses on developing an Online Food Ordering System using the MERN stack—MongoDB, Express.js, React.js, and Node.js—a powerful and flexible technology stack well-suited for building scalable, responsive, and dynamic web applications. The MERN stack facilitates the creation of a seamless user interface for customers to browse menus, place orders, and track their delivery status in real-time. Simultaneously, it provides restaurant owners with efficient tools to manage orders and customer data securely.

The application aims to simplify the food ordering process, ensure data security through user authentication, and support multiple payment options, thus improving the overall user experience. By leveraging modern web technologies, this system addresses the operational challenges faced by restaurants while meeting the growing demand for convenient online food services.

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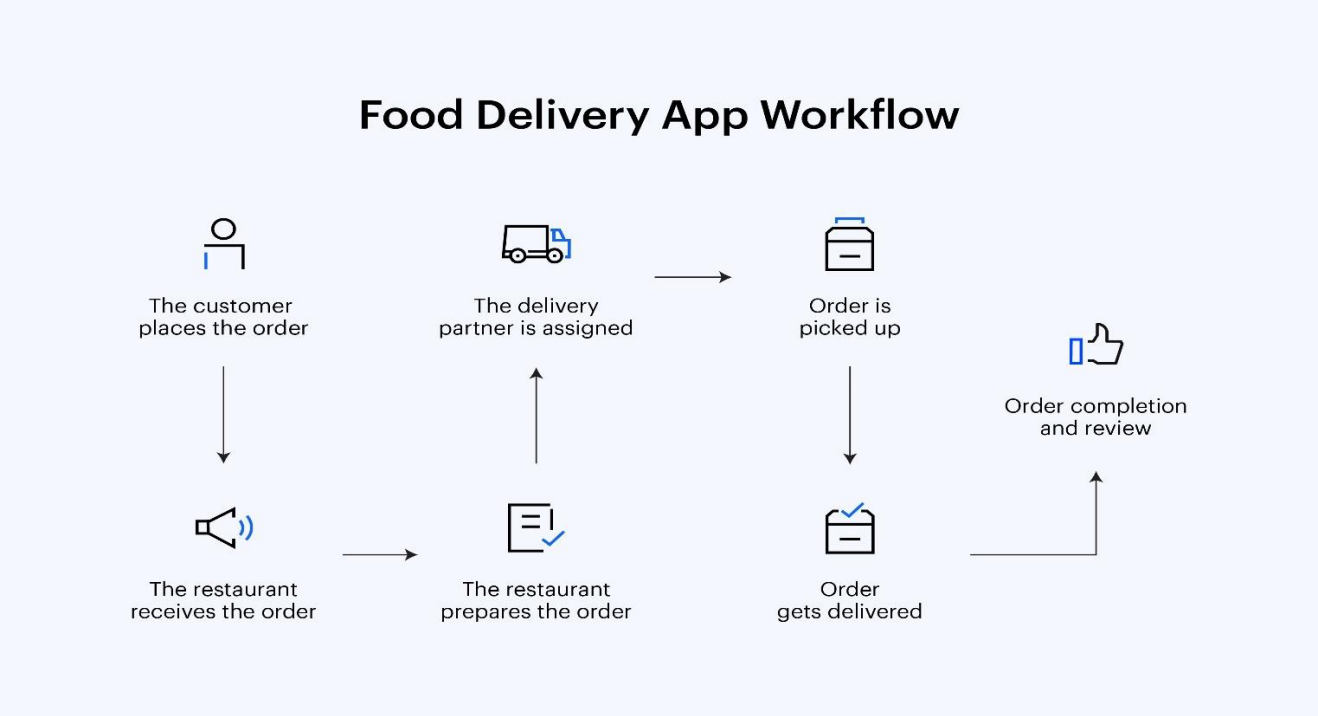

II. LITERATURE REVIEW

This paper presents a web application designed to assist customers in ordering from the nearest branch of the Secret Rasoi Restaurant Chain. The system offers quick and easy online menu management, enabling customers to navigate and place orders with just a few clicks. The proposed system consists of a user interface for customers to view menus and place orders, and an admin interface for restaurants to receive and process these orders.[1]

Netfood is an order management software tailored for food delivery companies. It allows clients to order from multiple restaurants simultaneously and supports both individual and group orders. Customers can place orders through a web interface, while administrators manage data related to restaurants, foods, and orders. Delivery personnel utilize a mobile application, with both client applications served by a central system.[2]

In a wireless meal ordering system was designed and implemented together with consumer feedback for a restaurant. It makes it simple for restaurant operators to change menu presentations and set up the system in a WiFi setting. The configurable wireless meal ordering system has linked a smart phone with real-time customer feedback implementation to enable real-time contact
between patrons of restaurants and business owners.[3]

The goal was investigating the variables that affect internet users' perceptions of online food ordering among university students in Turkey. Davis' Technology Acceptance Model (TAM), which he created in 1986, was used to analyze how the Web environment for ordering food was adopted. Along with TAM, three additional primary factors—Trust, Innovation, and External Influences—are included to the paradigm.[4]

The research project intends to automate the restaurant meal ordering procedure and enhance the patrons' dining experience. The wireless data access to servers is implemented by this system. All the menu information will be available on the user's mobile Android application. Wirelessly, the kitchen and cashier receive the order information from the customer's mobile device. The central database is updated with these order specifics. The proprietor of the restaurant can quickly handle menu changes. [5]

This research examines the initiatives made by restaurant owners to implement ICTs—such as PDAs, wireless LANs, and pricey multi-touch screens—to improve the dining experience. In order to address some of the drawbacks of the traditional paper-based and PDA-based food ordering systems, a low-cost touch screen-based restaurant management system that uses an Android smartphone or tablet is suggested in this study.[6]

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An online food ordering system is software that helps restaurants to accept orders in an online mode. It allows customers to choose and pay for the food from their home or anywhere else using any mobile or computer device. It alerts the kitchen when an order is made [7]

III. PROPOSED METHODOLOGY

The proposed Online Food Ordering System is developed using the MERN stack, which includes MongoDB, Express.js, React.js, and Node.js. The system is structured into two primary modules: the Customer Module and the Admin Module, each tailored to meet the specific needs of users and administrators.

For the Customer Module, the application provides features such as profile management, order history, favourite items, real-time order tracking, delivery preferences, and rating or feedback systems. Upon placing an order, all relevant data is stored securely in the MongoDB database, and users receive a confirmation message with an order tracking option for enhanced transparency and convenience.

The Admin Module includes functionalities such as Business Management, Customer Relationship Management (CRM), Analytics and Report Generation, and Order Supervision. This allows administrators to monitor system activity, manage customer interactions, and analyze performance data effectively.

The methodology follows a structured approach:

- Research & Data Collection: Surveys and competitor analysis were conducted to identify user expectations and market needs.
- System Design: The system was planned using wireframes (e.g., in Figma), and a modular backend architecture was designed for scalability.
- Development:
  Frontend: Developed using React.js for a responsive and user-friendly interface.
  Backend: Built with Node.js and Express.js, using RESTful APIs to handle server-side logic.
  Database: MongoDB is used to store user data, order details, and other application information.
- Testing & Deployment: The system underwent rigorous functionality and usability testing, followed by deployment on platforms like AWS or Heroku. Continuous user feedback was integrated for iterative improvements.
- Maintenance: Regular updates are implemented to enhance performance, security, and feature availability.
  This methodology ensures a robust, scalable, and user-centric application that simplifies food ordering while supporting efficient restaurant management.

IV. SYSTEM DESIGN AND IMPLEMENTATION

The system design of the Online Food Ordering System is structured to ensure scalability, performance, and user satisfaction. The methodology adopted for designing the Online Food Ordering System is centered on creating a structured and efficient data flow among the major entities: Admin, Customer, Food, and Order Details. This ensures seamless communication and interaction between users and the system.

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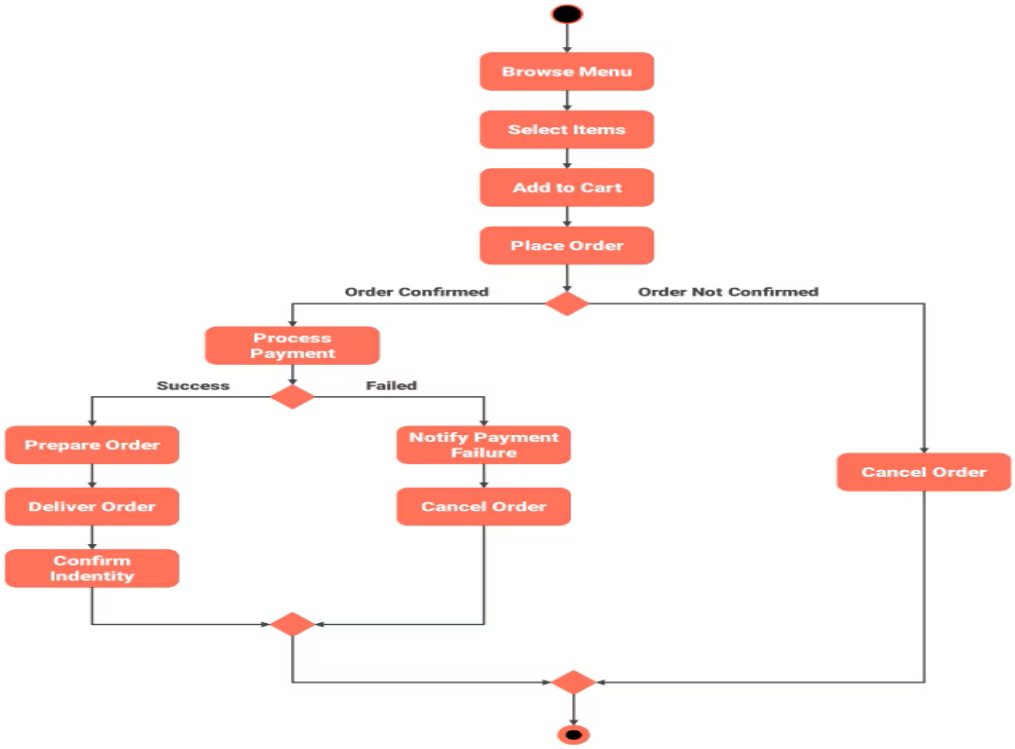

1. Entity Identification and Relationship Mapping

The system is modeled using an Entity-Relationship Diagram (ERD). It highlights the core modules and their interrelationships:

- **Admin** is responsible for managing food data.
- **Customer** interacts with the system for registration, login, and placing orders.
- **Food** contains details about food items added by Admin.
- **Order Details** store information about customer orders, including food, quantity, and pricing.

2. Modules Description

- **Admin Module**:
  - Contains Admin id, Admin name, and Admin password.
  - Admins can add or update food items.
- **Customer Module**:
  - Contains Cus-id, Name, Email, and Password.
  - Customers can register, log in, and place orders.

- **Food Module**:
  - Includes Food id, F Name (Food Name), Price, Description, and Admin id.
  - Food is linked to the Admin who added it.
- **Order Details Module**:
  - Includes Order no, Cus-id, F Name, Price, and Quantity.
  - Captures complete transaction details when a customer places an order.

3. Data Flow and Relationships

- A **Customer (Cus-id)** places an **Order**, which is recorded in the Order details table.
- The ordered food item (F Name) is referenced from the Food table using the Food id.

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- The Food data is managed by an **Admin**, linking the Admin id between the Food and Admin tables.

4. System Workflow

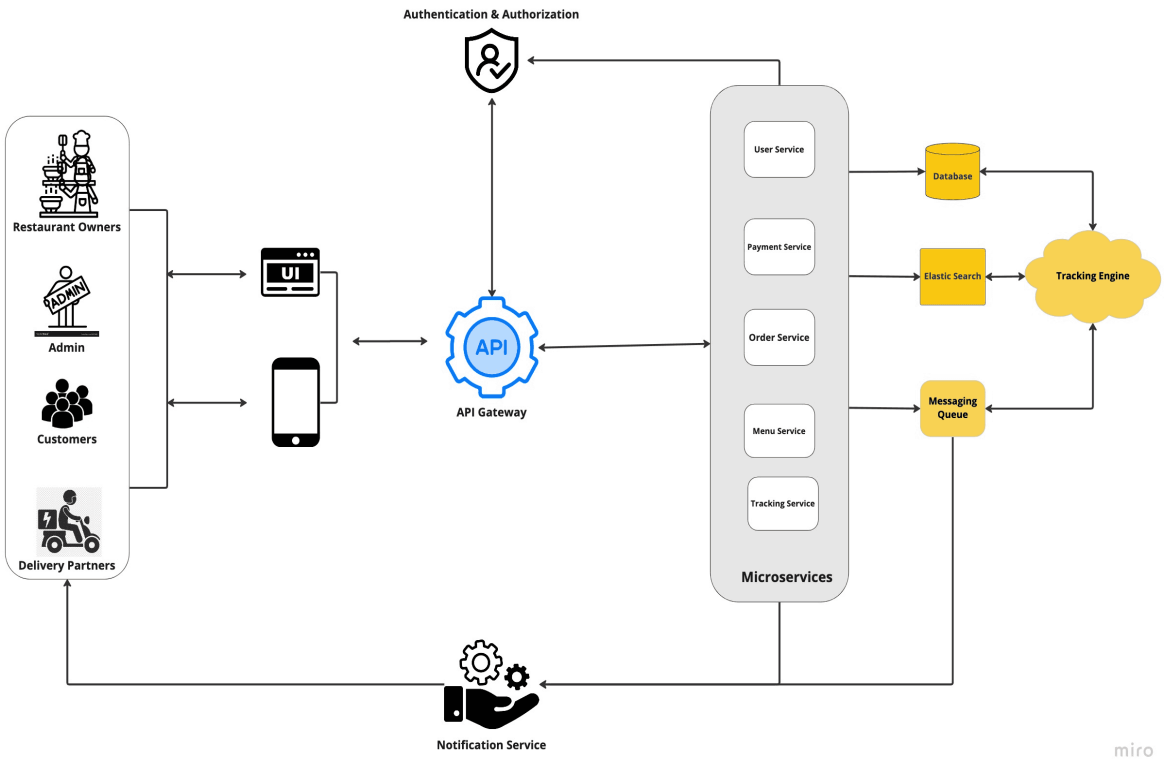
- Admin logs in to manage food items.
- Customer signs up and browses the food menu.
- Orders are placed and stored with food and customer references.
- The system calculates total amounts based on price and quantity.

5. Implementation Considerations

This structure supports modularity and scalability, which is essential for implementing the system using the MERN stack:

- **MongoDB** stores entity data.
- **Express.js** and **Node.js** manage server-side logic and routes.
- **React.js** is used for creating interactive front-end components.

6. Architecture Diagram



- User Registration & Login
  - Customers and restaurants register or log in securely using JWT authentication.
  - Passwords are hashed and stored securely, and sessions are maintained for authorized access.
- Restaurant & Menu Management
  - Restaurants can create and manage menus by uploading food items along with their details such as price, description, category, and images.
  - Items can be edited, deleted, or updated as needed.
- Browsing & Searching
  - Customers can browse food items.
  - Advanced search and filter options are provided based on cuisine, ratings, price, and more.
- Add to Cart

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- Users can add selected food items to the cart.
- They can view the cart, update quantities, or remove items before proceeding.

- Order Placement & Payment
- Users confirm their order and choose a payment method: either online (via Razorpay/Stripe, UPI, Cards) or Cash on Delivery (COD).
- Upon successful payment, the order is placed in the system.

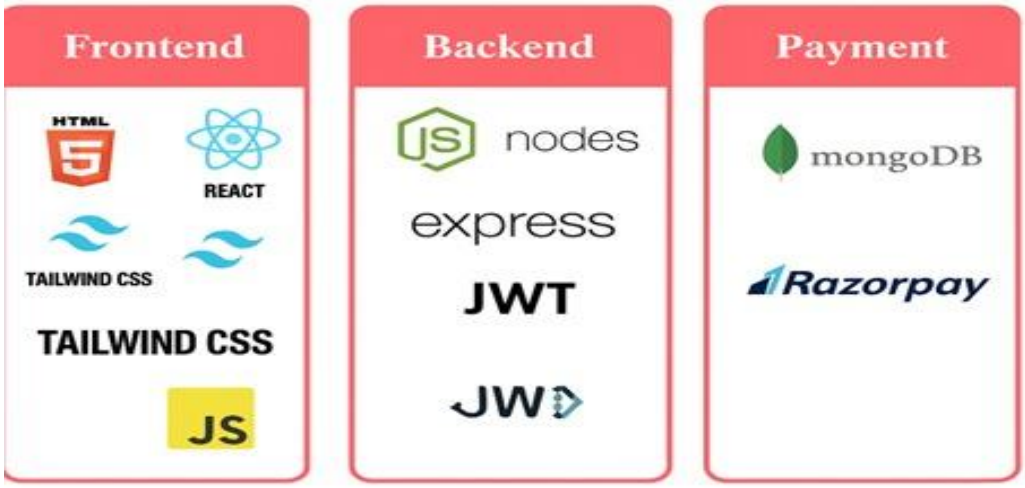
- Order Processing
- Restaurants receive real-time order notifications.
- They prepare the food and update the status (e.g., Preparing, Ready, Dispatched).

- Delivery Management
- If delivery is supported, a delivery partner is assigned.
- The partner receives the delivery address and order details for efficient dispatch.

- Order Completion & Review
- After receiving the order, customers can mark it as completed.
- They can leave ratings and reviews for the food and delivery service.

- Admin Panel Management
- Managing users and restaurants
- Monitoring order statuses
- Viewing analytics and reports
- Handling disputes and ensuring quality control

V. TECHNOLOGY USED



1. Frontend Technologies
- React.js – Used for building a dynamic and interactive user interface, ensuring a seamless browsing and ordering experience.
- CSS – Provides a responsive and modern design for an enhanced UI/UX.

2. Backend Technologies
- Node.js – Handles server-side logic and API requests, ensuring high performance and scalability.
- Express.js – A lightweight backend framework that enables fast and efficient API development. MongoDB – A NoSQL database used for storing users, orders, restaurants, and menu details

3. Payment and Security
tripe/Razorpay Payment Gateway – Integrates secure and encrypted online payment processing.

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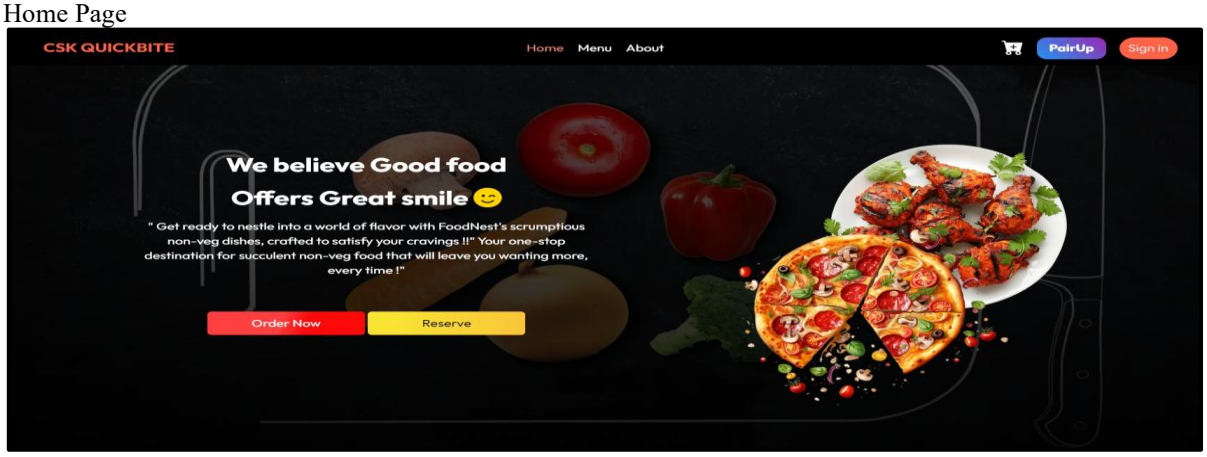
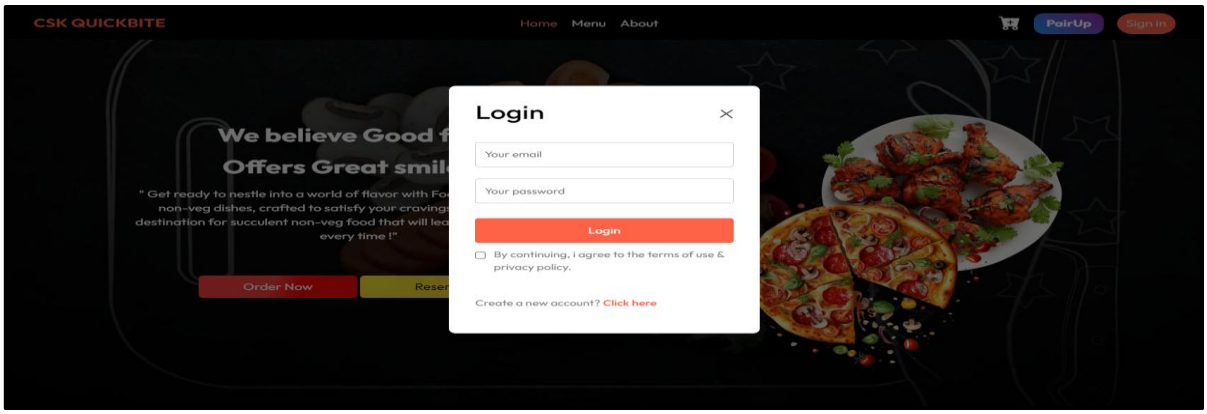
VI. RESULTS

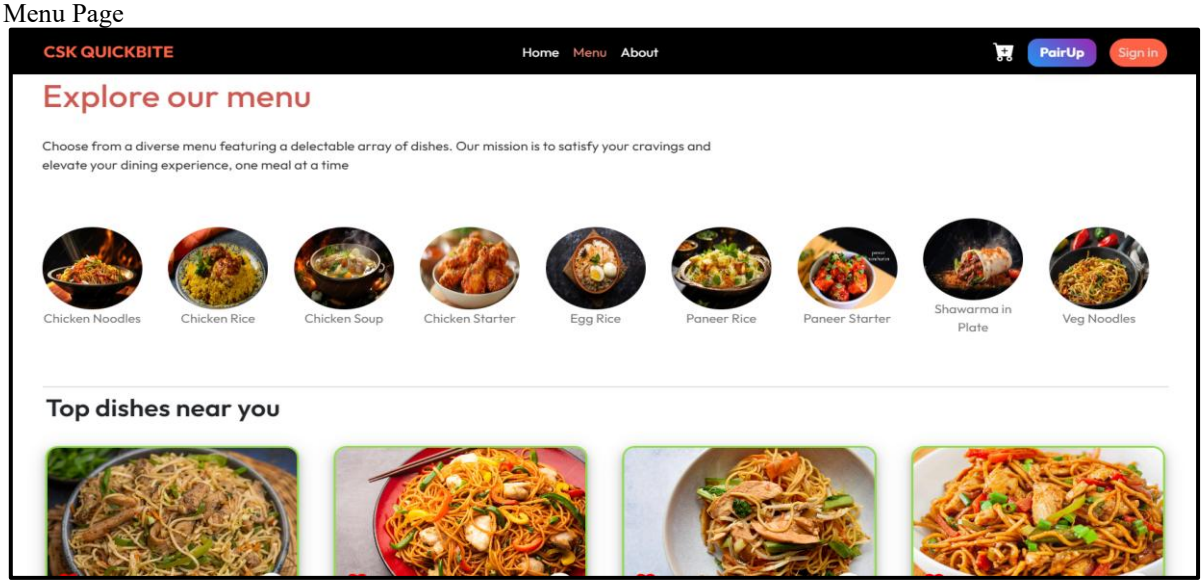
1) Home Page



2) Sign up / Sign in Page



3) Menu Page



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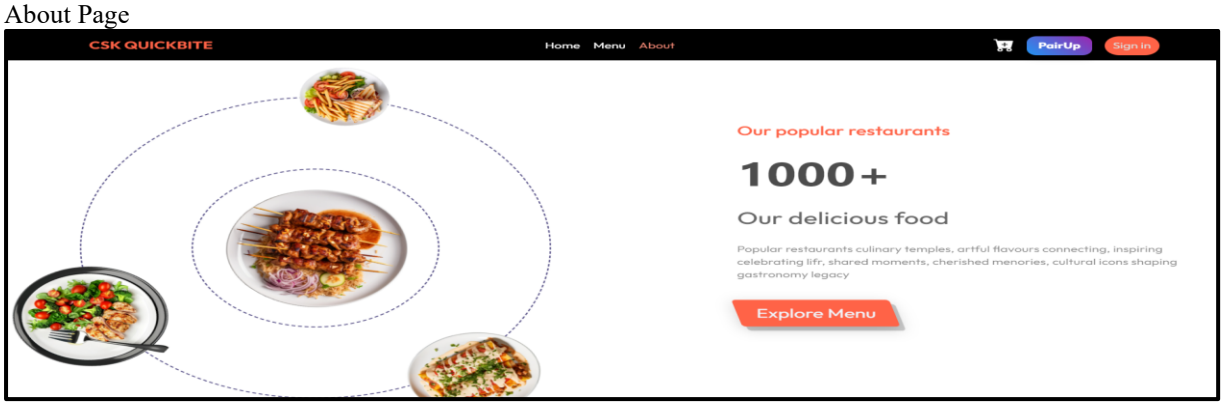
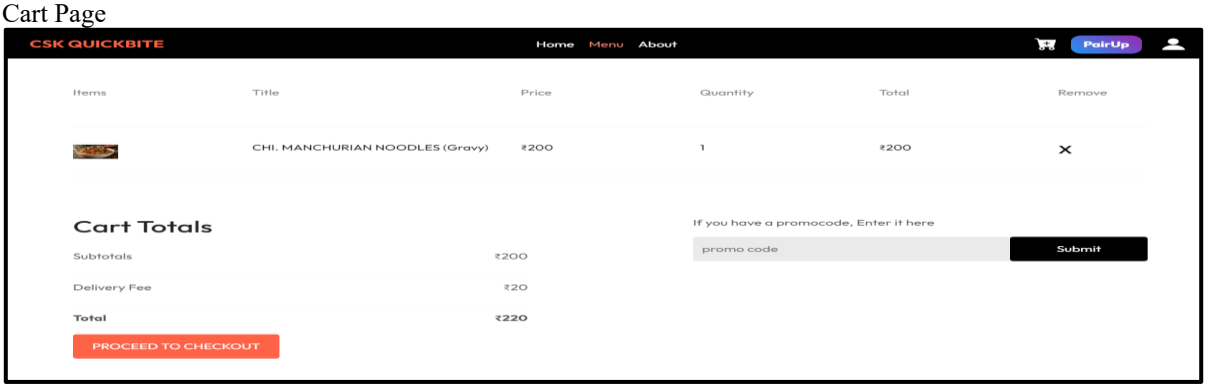
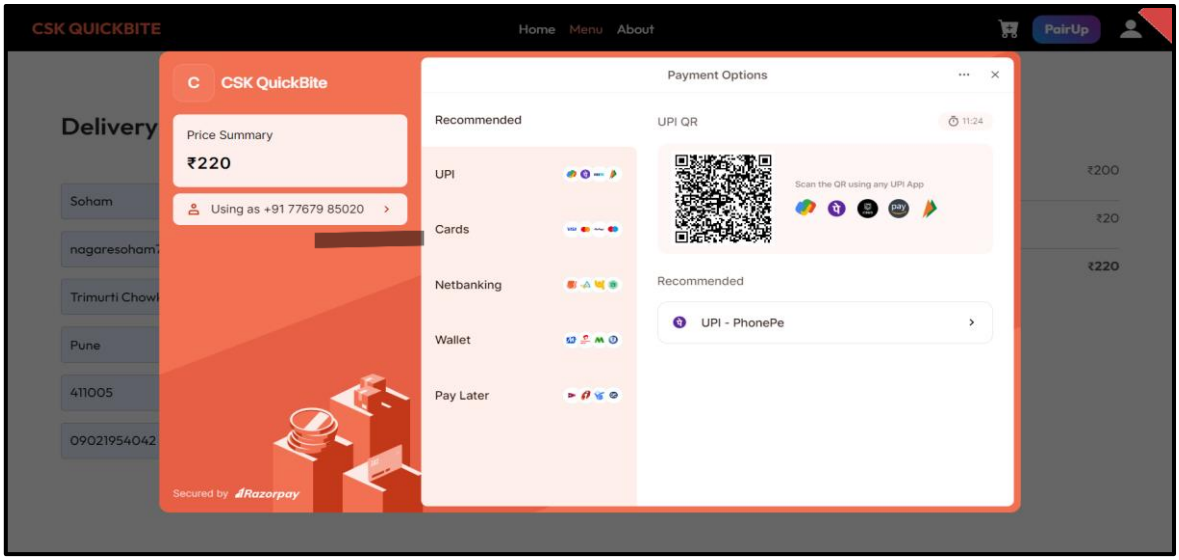
4) About Page



5) Cart Page



6) Payment Page



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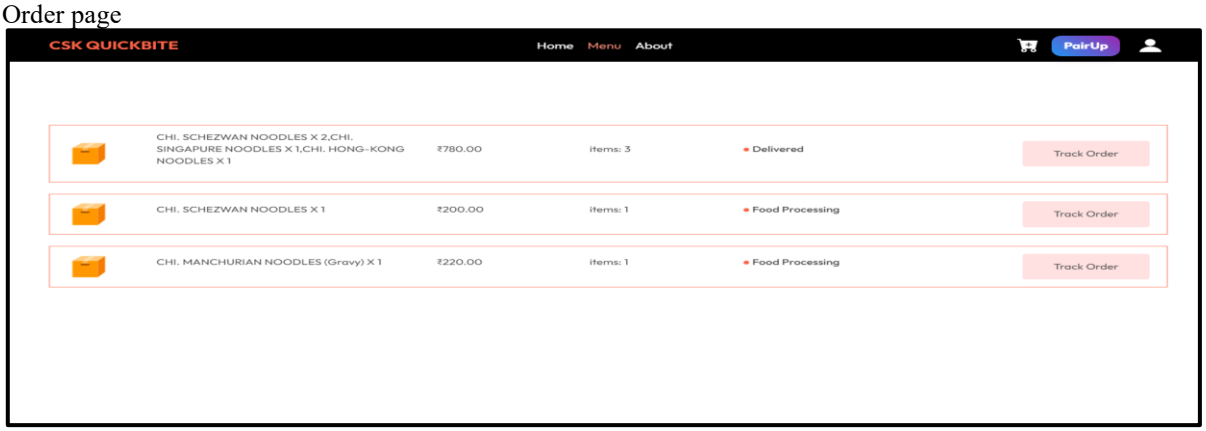
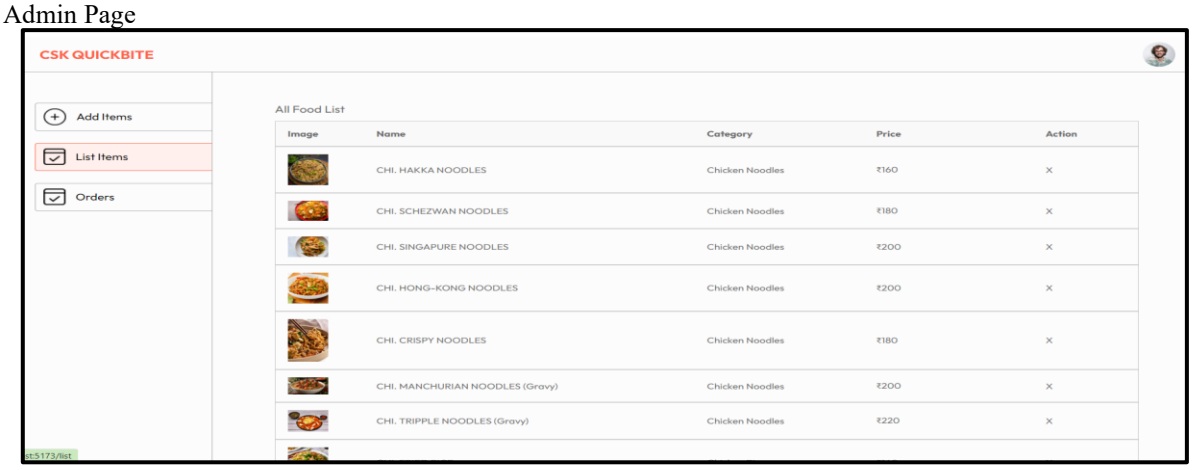
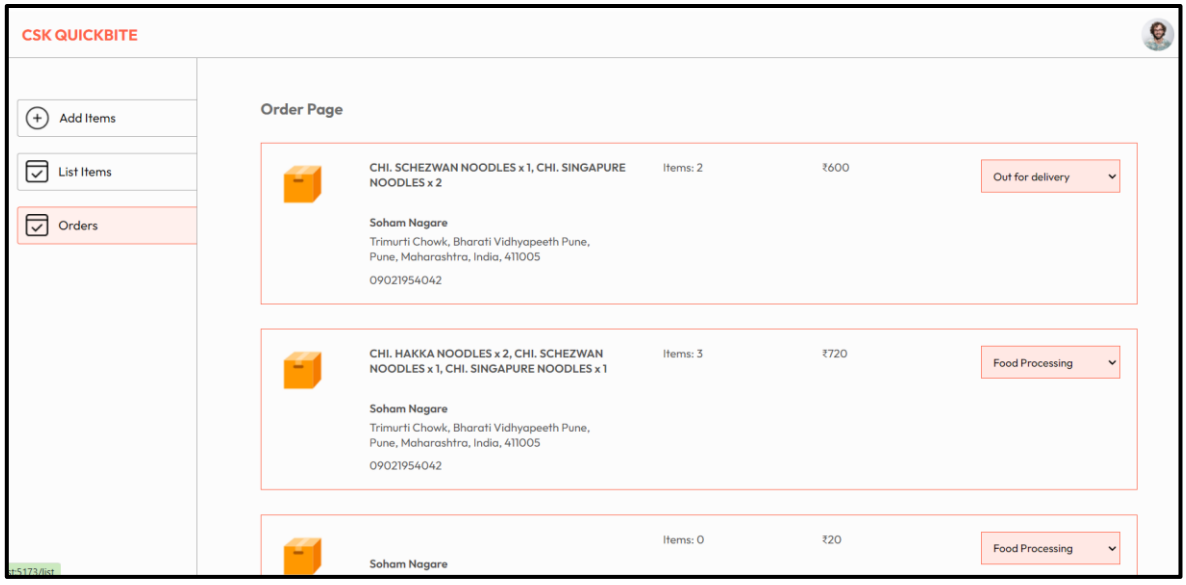
7) Order page



8) Admin Page





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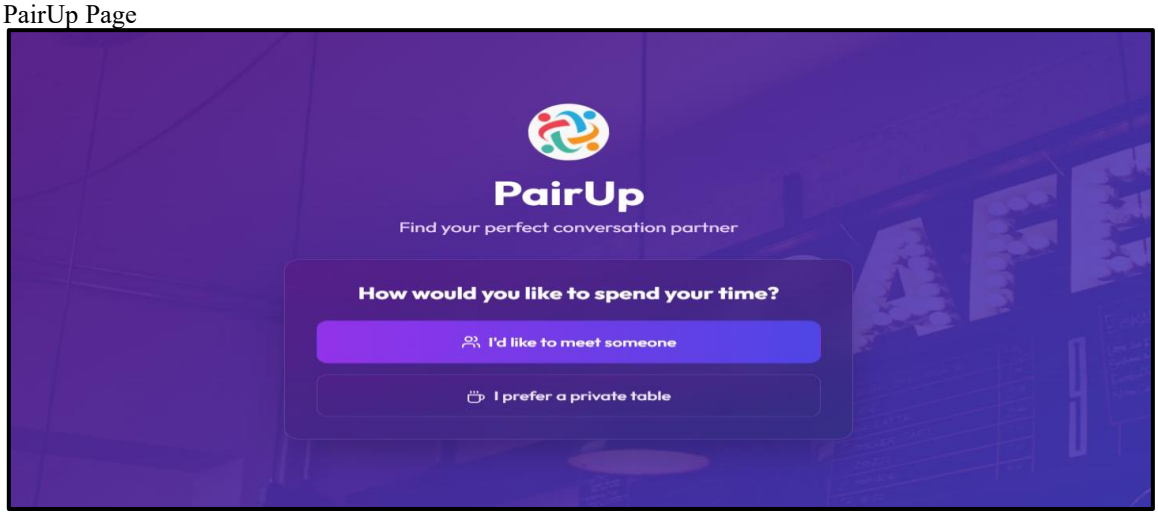
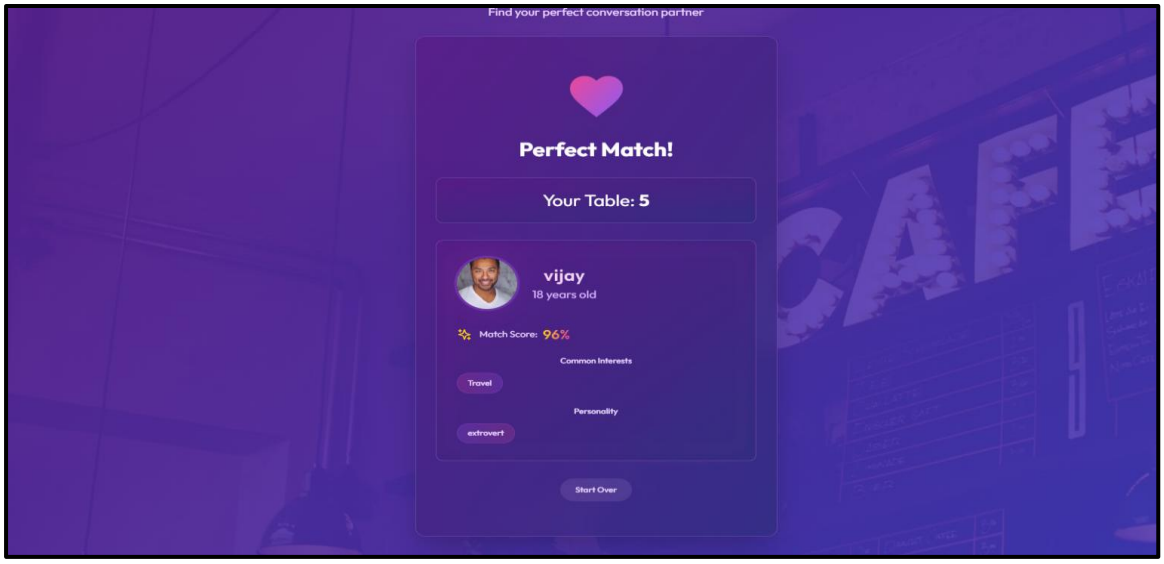
9) PairUp Page





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VII. CONCLUSION

The development of an Online Food Ordering System using the MERN stack (MongoDB, Express.js, React.js, and Node.js) presents a modern and efficient solution to meet the growing demand for digital food delivery services. This system offers a user-friendly interface for customers, seamless restaurant management tools, real-time order tracking, and secure payment options. By leveraging the full capabilities of the MERN stack, the application ensures high performance, scalability, and maintainability.

This project not only enhances user convenience and restaurant efficiency but also addresses key challenges such as timely delivery, order accuracy, and user data security. The implementation demonstrates how web technologies can transform the traditional food service sector into a more dynamic and accessible platform.

In conclusion, this research highlights the potential of full-stack development in creating scalable, real-time, and user-centric applications. Future enhancements such as AI-driven recommendations, delivery route optimization, and advanced analytics can further improve system performance and customer satisfaction, making it a powerful tool in the evolving food-tech landscape.

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