AN NAJAH NATIONAL UNIVERSITY

FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY

COMPUTER ENGINEERING DEPARTMENT

FoodHub

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We express heartfelt gratitude to our parents and friends for their unwavering support throughout our academic journey. Your encouragement fueled our determination, and this achievement is a shared success.

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With sincere appreciation,

Abbas Surakji

Diaa Arafat

Disclaimer

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Abstract

FoodHub is a groundbreaking mobile application developed to enhance the food ordering experience. Utilizing advanced technologies like React for the web, React Native for mobile, Node.js for the backend, and SQL for the database, FoodHub provides a seamless and user-friendly platform connecting users with their favorite restaurants. This project aims to go beyond the typical order and delivery model by incorporating a variety of innovative features that boost user engagement and improve restaurant management.

Key features of FoodHub include an interactive feed where restaurants can post photos and videos of their offerings, real-time order tracking, a personalized recommendation system, multi-restaurant orders, secure online payment, and a direct chat with delivery personnel. Additionally, FoodHub offers a comprehensive admin system for restaurant owners to manage orders and gain insights into customer preferences. The app also categorizes restaurants by cuisine, optimizes delivery routes, and includes a loyalty program to reward frequent users. For those who prefer a traditional approach, FoodHub provides a regular menu and ordering system.

In summary, FoodHub revolutionizes the food ordering process by combining advanced technology with user-centric features, enhancing both the customer and restaurant experience.

1. Introduction

The food industry is rapidly evolving with changing consumer preferences and new technologies. In response to these trends, this project introduces "FoodHub," a mobile application designed to enhance the food ordering experience.

FoodHub offers several innovative features. An interactive feed allows restaurants to showcase their dishes with photos and videos, enabling users to react and order directly. Real-time order tracking keeps users informed about their orders' status and location. A personalized recommendation system suggests dishes based on user preferences, and users can place orders from multiple restaurants in a single transaction.

The app includes secure online payment, a delivery chat for real-time updates, and a comprehensive admin system for restaurant owners to manage and track orders. Restaurants are categorized by cuisine to simplify the selection process, and delivery management is optimized with route planning. A loyalty program rewards frequent users, and a traditional menu and ordering system is available for those who prefer it.

In summary, FoodHub enhances the food ordering process with advanced technology and user-focused features, benefiting both customers and restaurants.

2. Problem and Theoretical Background

The food industry has undergone significant changes in recent years, driven by technological advancements and shifting consumer behaviors. Despite the growth of online food delivery services, several critical issues remain that hinder the overall user experience and operational efficiency for restaurants. These issues include:

1. **Limited User Engagement**:

Many existing food delivery applications offer a basic ordering system without engaging the user beyond the transaction. This lack of engagement can lead to reduced user retention and lower customer loyalty. Users are looking for more interactive and personalized experiences, such as social media-like feeds and tailored recommendations.

2. **Inefficient Order Tracking**:

Real-time order tracking is often either unavailable or poorly implemented in many food delivery apps. This results in users being unaware of their order status and delivery times, leading to frustration and dissatisfaction. Efficient real-time tracking is essential for transparency and reliability in the food delivery process.

3. **Lack of Personalized Recommendations**:

Users have diverse tastes and preferences, yet many food delivery platforms fail to offer personalized recommendations. This gap means users often spend more time searching for what they want, reducing the convenience and efficiency that these apps are supposed to provide.

4. **Complex Multi-Restaurant Ordering**:

Consumers often desire to order from multiple restaurants simultaneously, especially when catering to diverse group preferences. However, most food delivery apps do not support multi-restaurant orders in a single transaction, making the process cumbersome and time-consuming for users.

5. **Payment and Security Concerns**:

Secure and hassle-free online payment systems are crucial for user trust and convenience. Many food delivery services struggle with integrating reliable and secure payment gateways, leading to user concerns over data security and transaction issues.

6. **Poor Communication with Delivery Personnel**:

Effective communication between users and delivery personnel is vital for coordinating deliveries and resolving issues. Many apps do not provide a direct communication channel, resulting in delays and misunderstandings.

7. **Administrative Challenges for Restaurants**:

Restaurant owners need efficient tools to manage orders, track performance, and gain insights into customer preferences. Current systems often lack comprehensive dashboards and analytics, making it difficult for restaurants to optimize their operations and improve their service quality.

8. **Categorization and Search Limitations**:

Users benefit from easily finding restaurants and dishes that match their preferences. Many apps do not offer advanced categorization and search functionalities, making it difficult for users to navigate and select their desired options quickly.

9. **Inefficient Delivery Management**:

Delivery personnel need systems that optimize their routes and manage orders efficiently. Poor delivery management can lead to delays, increased costs, and lower customer satisfaction.

3. Methodology

1. Design Phase

Requirement Analysis:

- Gathered requirements through surveys and interviews with potential users and restaurant owners to understand their needs and preferences.
- Identified key features such as interactive feed, real-time order tracking, personalized recommendations, multi-restaurant orders, secure online payment, delivery chat, admin system, categorization, delivery management, loyalty points, and regular menu ordering.

System Architecture:

- Designed the overall architecture of FoodHub, including the front-end, back-end, and database components.
- Created detailed flowcharts and diagrams to map out the interaction between different components and user interfaces.

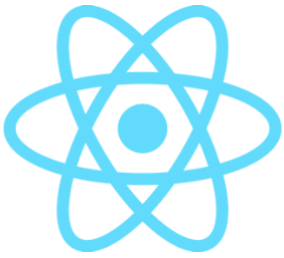
User Interface (UI) Design:

- Ensured a user-friendly and intuitive interface that aligns with user needs and preferences.

2. Development Phase

Front-End Development:

- Utilized React for web development to create a responsive and dynamic user interface.
- Used React Native for building the mobile application, allowing for code reuse across web and mobile platforms.



Back-End Development:

- Implemented the back-end using Node.js and Express.js, leveraging its non-blocking, event-driven architecture for handling real-time data and high concurrency.

- Developed RESTful APIs to facilitate communication between the front-end and back-end.

Database Management:

- Used SQL for database management to store and retrieve data efficiently.
- Designed database schemas to organize and manage user data, order details, restaurant information, and transaction records.

Integration of Third-Party Services:

- Integrated secure online payment systems using services like Stripe or PayPal to handle transactions.
- Implemented a chat system using Firebase for real-time communication between users and delivery personnel.
- Utilized Google Maps API for order tracking and measuring distances, enhancing delivery efficiency and accuracy.

Security Implementation:

- Developed a robust security framework, incorporating encryption for stored passwords in the database.

- Implemented JWT (JSON Web Token) for user authentication, ensuring secure token generation and validation during user interactions.

Authentication and Authorization:

- Integrated JWT for secure token generation during user authentication.
- Established role-based authorization policies to control user access to different features and resources.

Admin Dashboard Implementation:

- Developed a comprehensive admin dashboard allowing efficient order management, real-time communication with users, and product editing capabilities.

4. Challenges and Constraints

- **Integration of Multiple Technologies**:
  Combining various technologies such as React, React Native, Node.js, Express.js, and SQL posed a significant challenge. Ensuring seamless communication and data consistency across these platforms required meticulous planning and robust implementation.

- **Real-Time Data Handling**:
  Implementing real-time features like order tracking and live chat demanded efficient data handling and synchronization. Achieving low latency and high performance was critical, especially during peak usage times.

- **Security Implementation**:
  Developing a secure authentication system using JWT and encrypting sensitive data like passwords required a deep understanding of security best practices. Protecting user data and transactions from potential threats was paramount.

- **Scalability**:
  Designing the system to handle a growing number of users, orders, and interactions posed a scalability challenge. Ensuring the backend infrastructure could support high traffic and large volumes of data was essential for maintaining performance and user satisfaction.

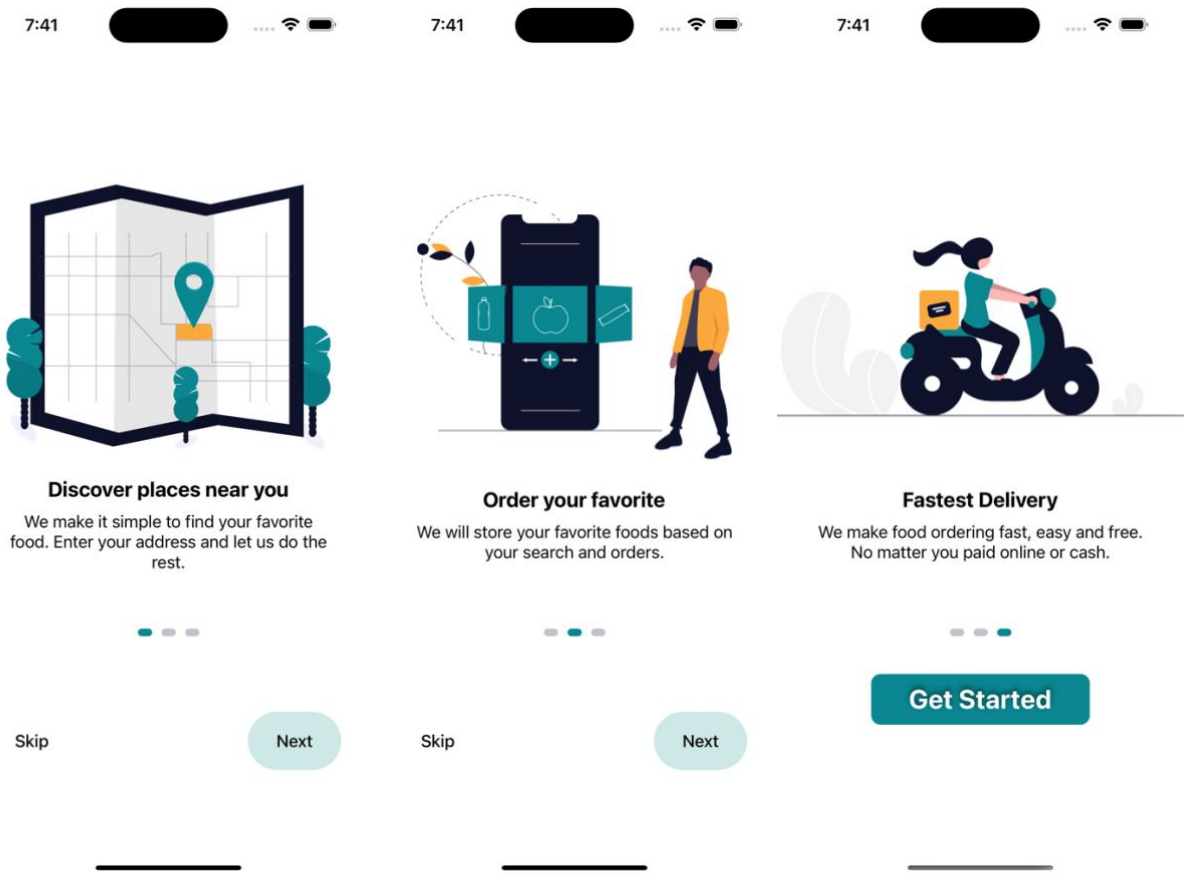
5. Results and Discussion

The development of FoodHub involved several stages, each contributing to the final product. Below is a detailed discussion of the results, highlighting the key features and functionalities of the three distinct applications developed as part of FoodHub: one for regular users, one for restaurants, and one for delivery personnel.

Screens for Regular User App

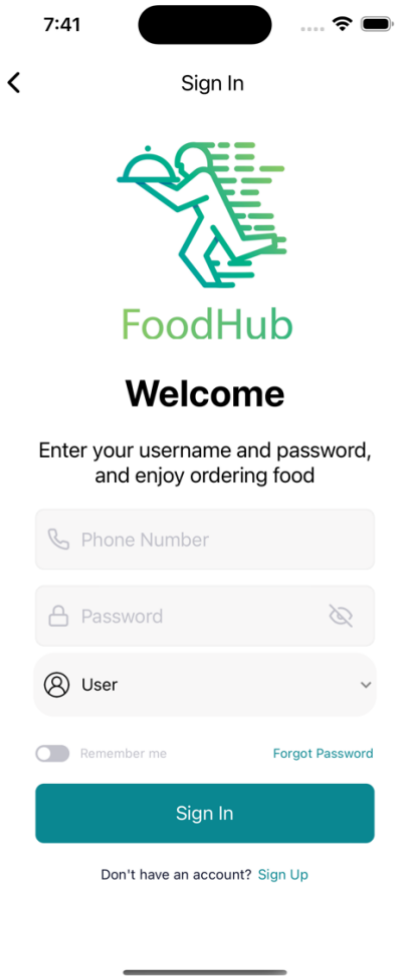
1. Welcome Screens

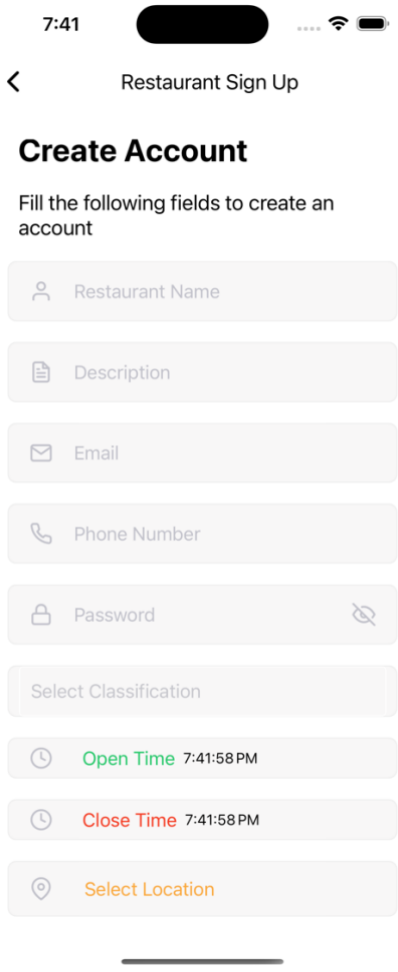
Introduces the app to new users with a brief overview and navigation options.



2. SignIn Screen and SignUp Screen

Allow users to sign in or sign up for an account, with validation and error handling.



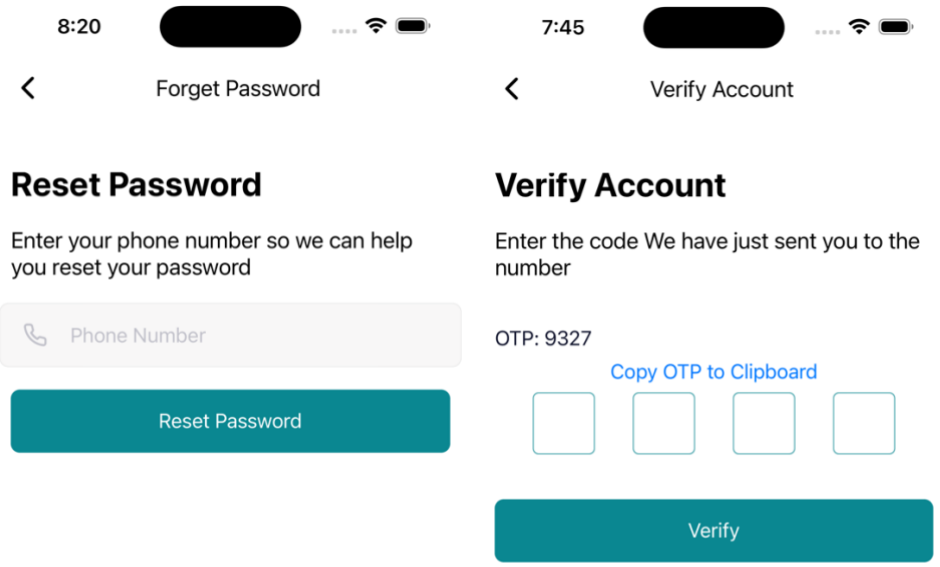


3. Location screen selection

This screen is to enable the user or Restaurant to select their location on map, so the app will store the city, street, longitude and latitude for distance measurement.

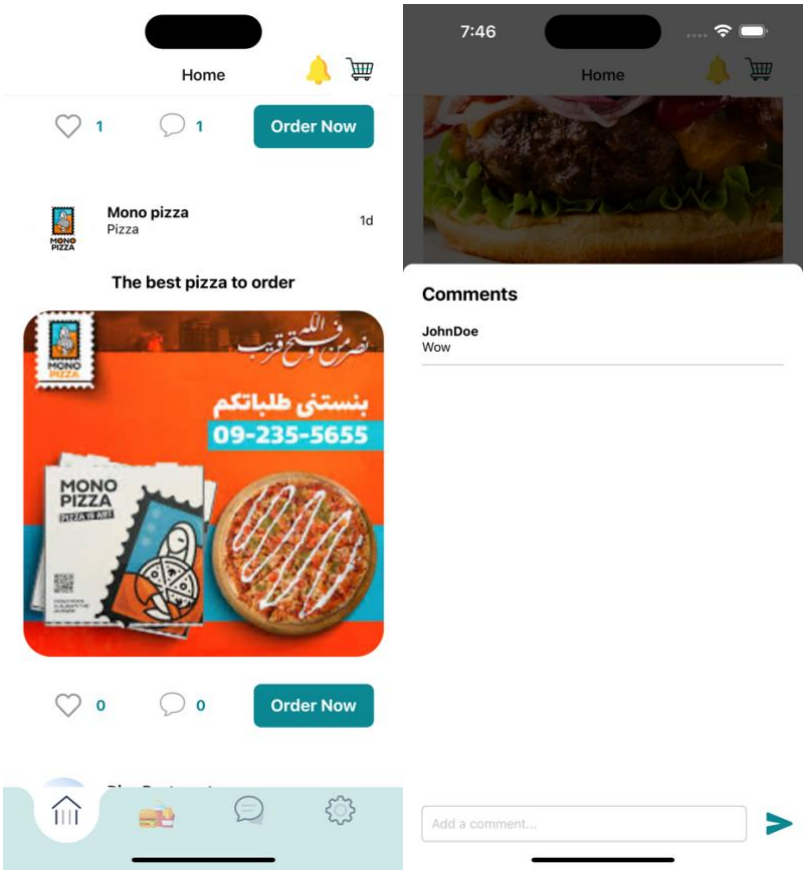
4. Forget Password and OTPScreen

OTP verification is used for verification after sign up or if the user forgot the password



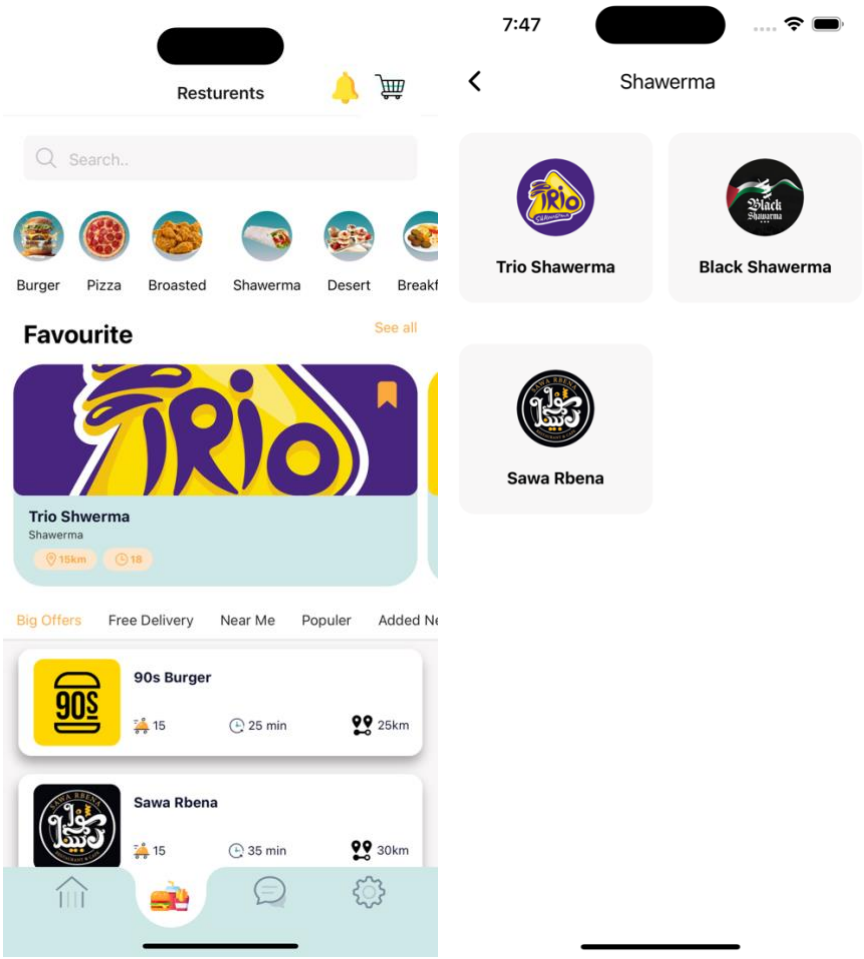
5. Home Feed screen

Home feed to show the new posts by the restaurants and the users can add likes and comments to the posts



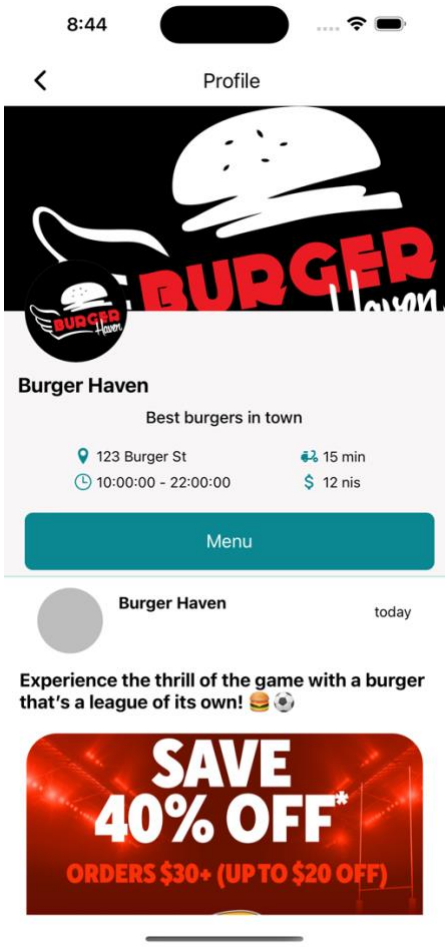
6. Restaurants screen

Display a list of available restaurants and categorized using multiple filters types, also a favorite section.



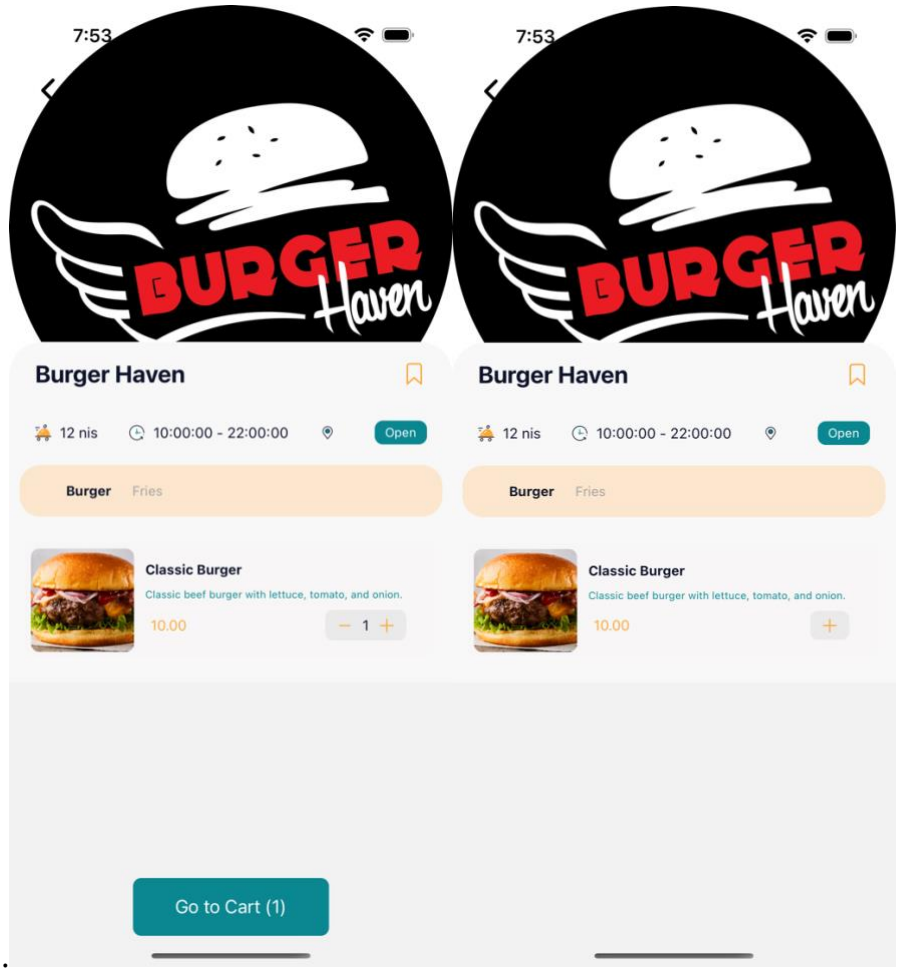
7. Restaurant Profile screen

Detailed profiles for each restaurant, including menu button, location and working times.



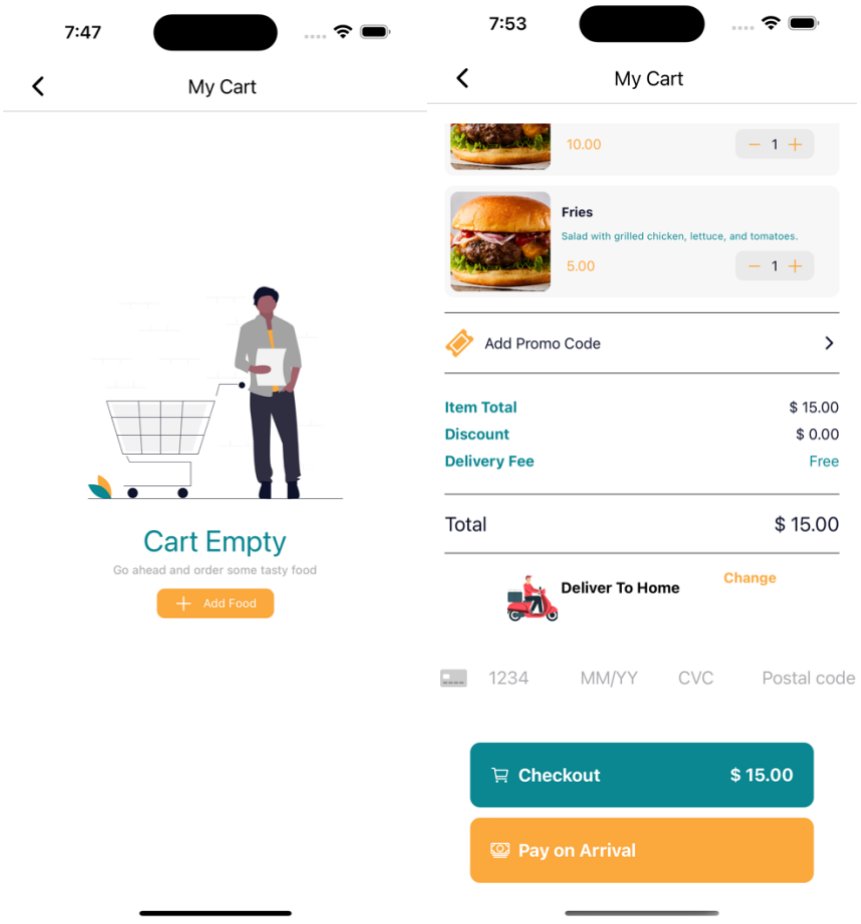
8. MenuScreen and FoodCards

Show the restaurant’s menu, allowing users to browse using categories and select meals



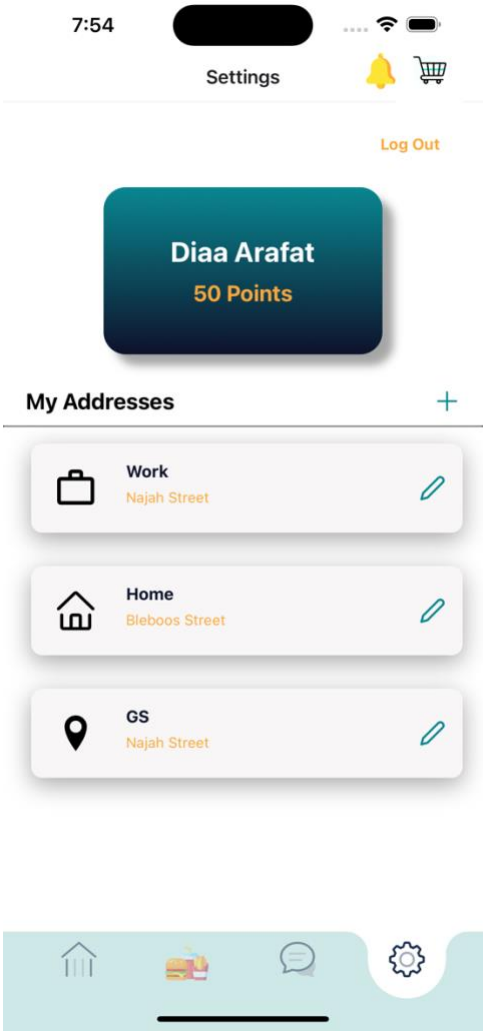
9. CartScreen

Provides an overview of selected items, enabling users to modify their order before checkout and select to pay online or on arrival.



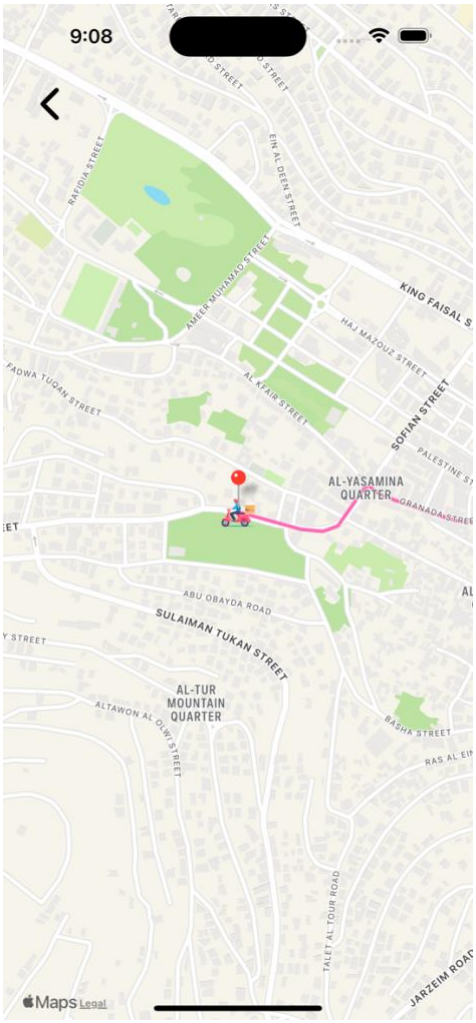
10. User Profile

Allows users to view their points and edit their locations.



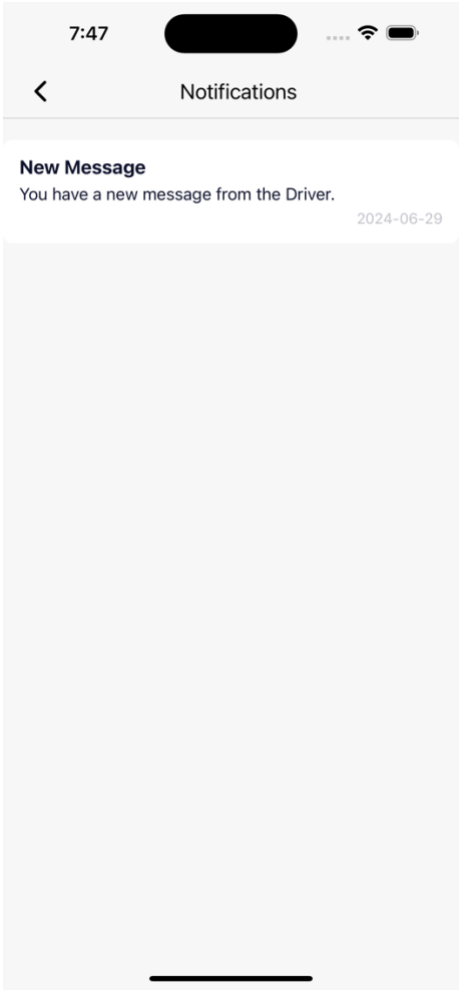
11. Order Tracking Screen

Offers real-time tracking of orders using Google Maps API, providing users with live updates about order location.

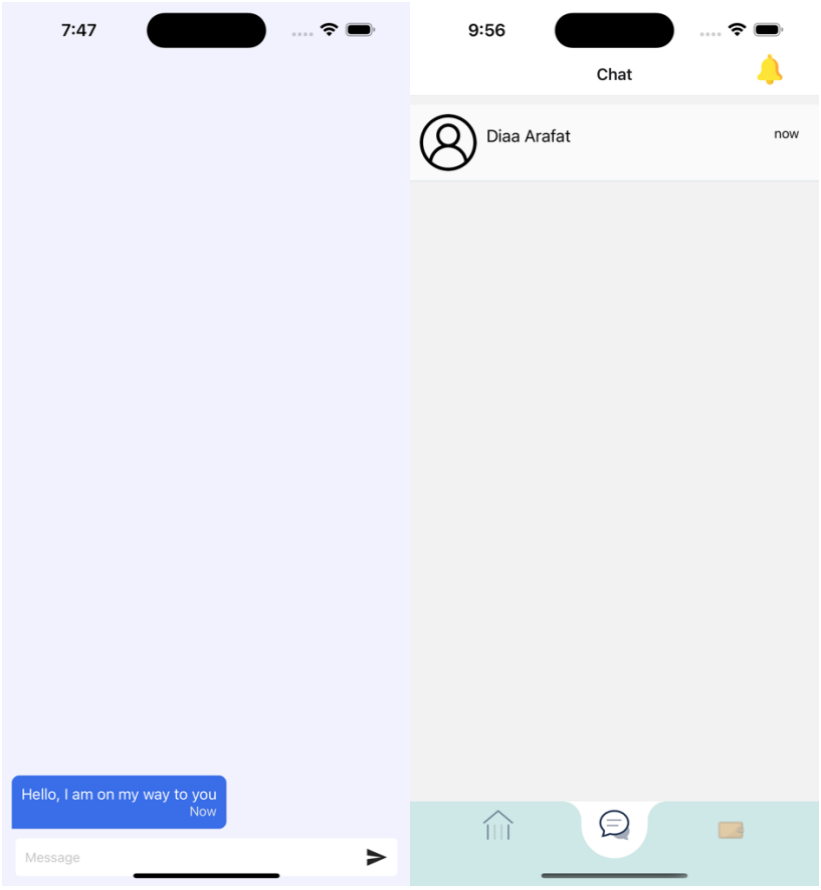


12. Notification Screen

Displays notifications related to orders, promotions, updates and messages.



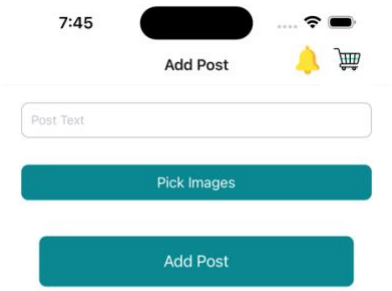
13. Chat Screen and Chats List Screen



Screens for Restaurant App

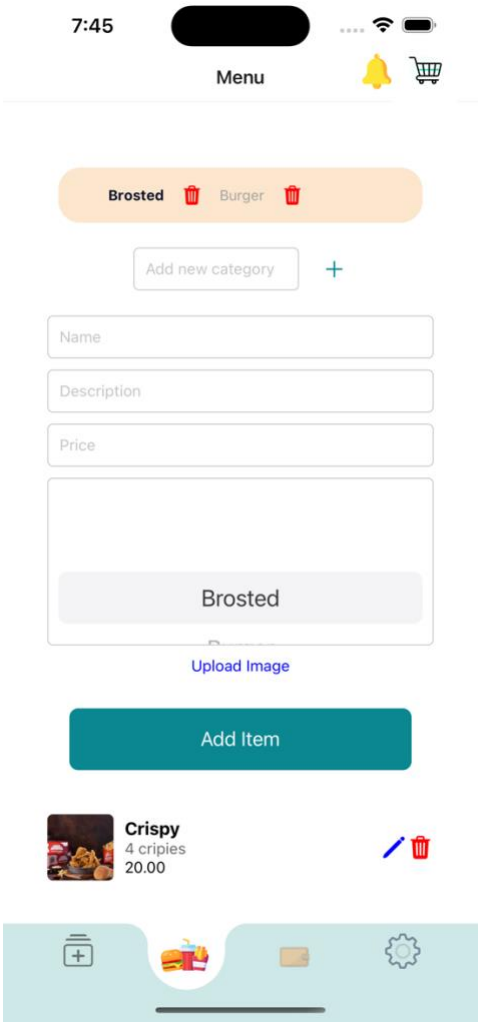
1. Add Post Screen

Allows restaurant owners to create and share posts on the interactive feed to engage users.



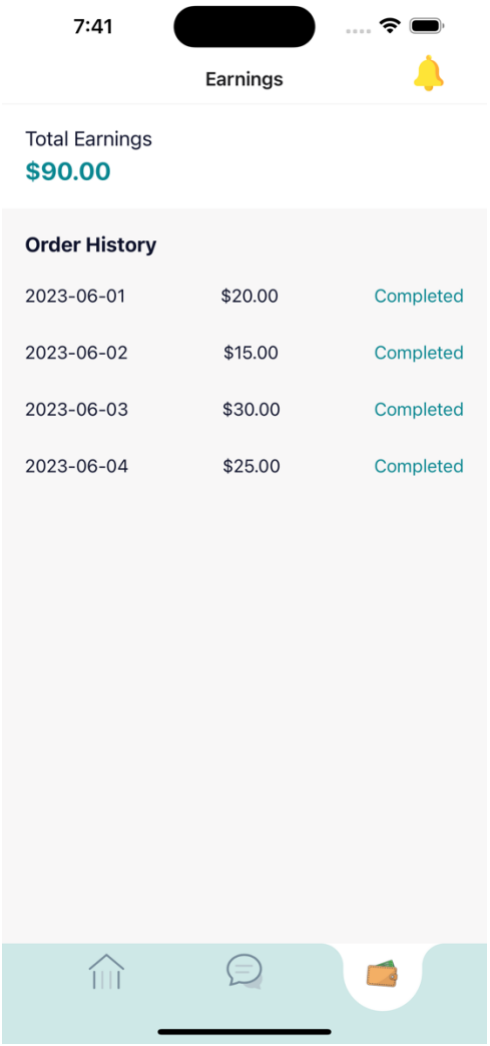
2. Restaurant Menu Screen

Enables restaurant owners to manage their menu items, including adding, editing, and deleting meals and categories.



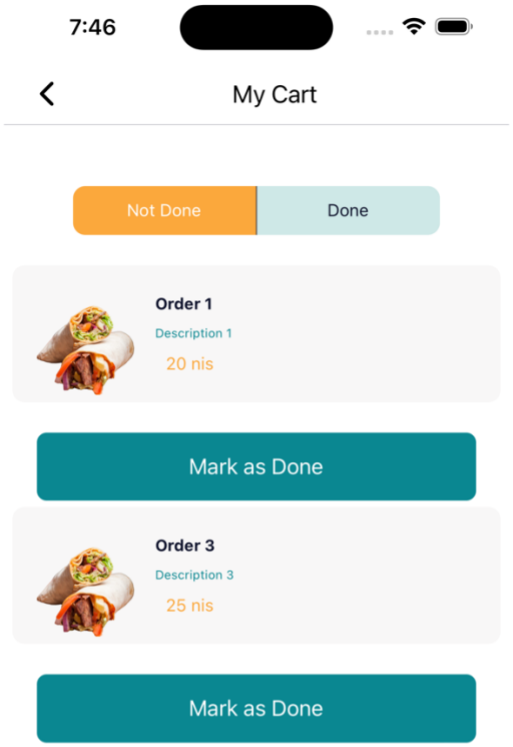
3. Earnings Screen

Provides restaurant owners with a detailed view of their earnings, including order history and revenue analysis.



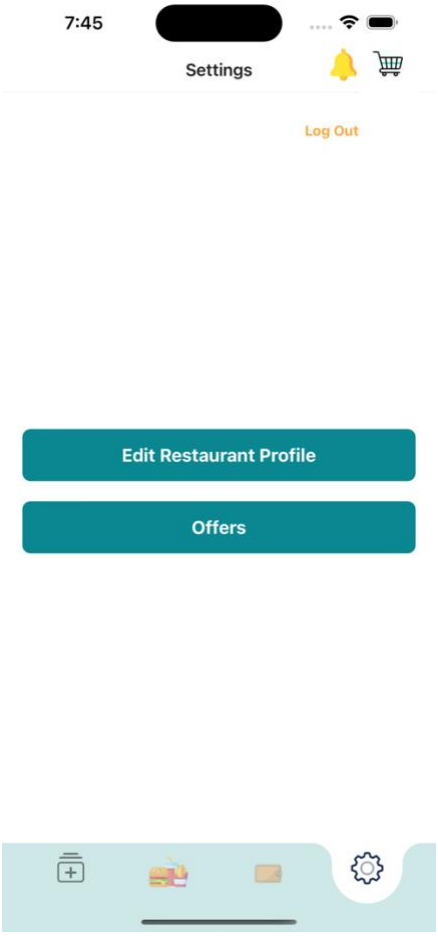
4. Orders Screen

Shows detailed information about each order, helping restaurant owners manage and fulfill orders efficiently.



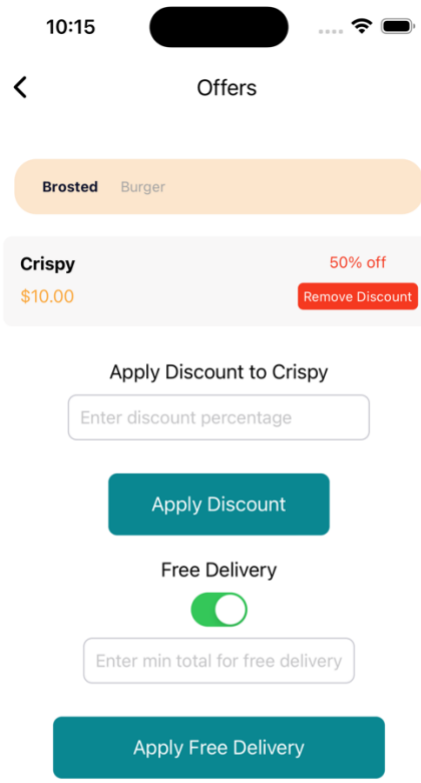
5. Restaurant Settings Screen

Provides settings for managing various aspects of the restaurant's profile and operations.



6. Offers Screen

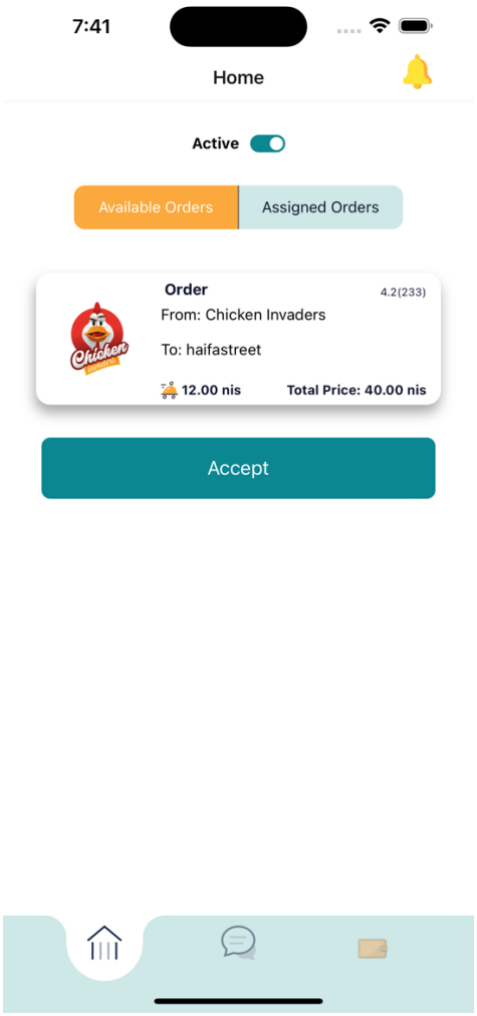
Enables the restaurant to add offer for a specific meal or add a free delivery on orders



Screens for Delivery App

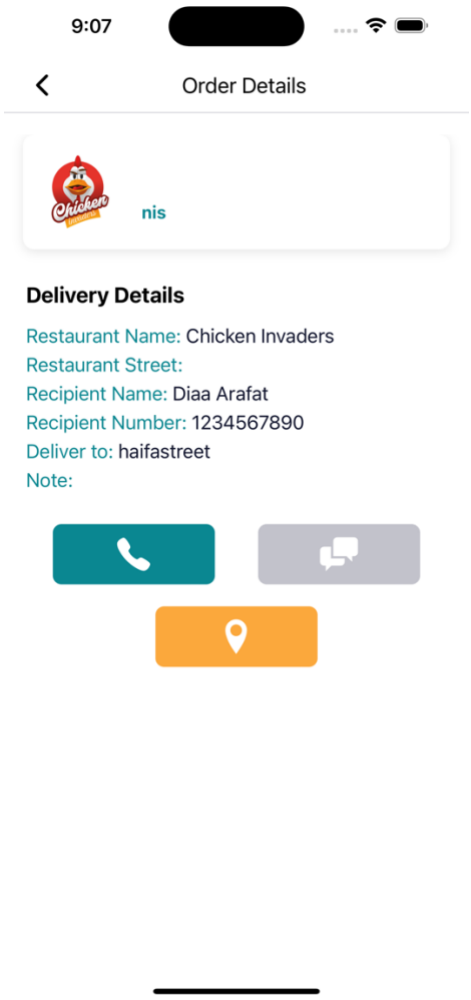
1. Delivery Home Screen

The main screen for delivery man, displaying available orders and details.



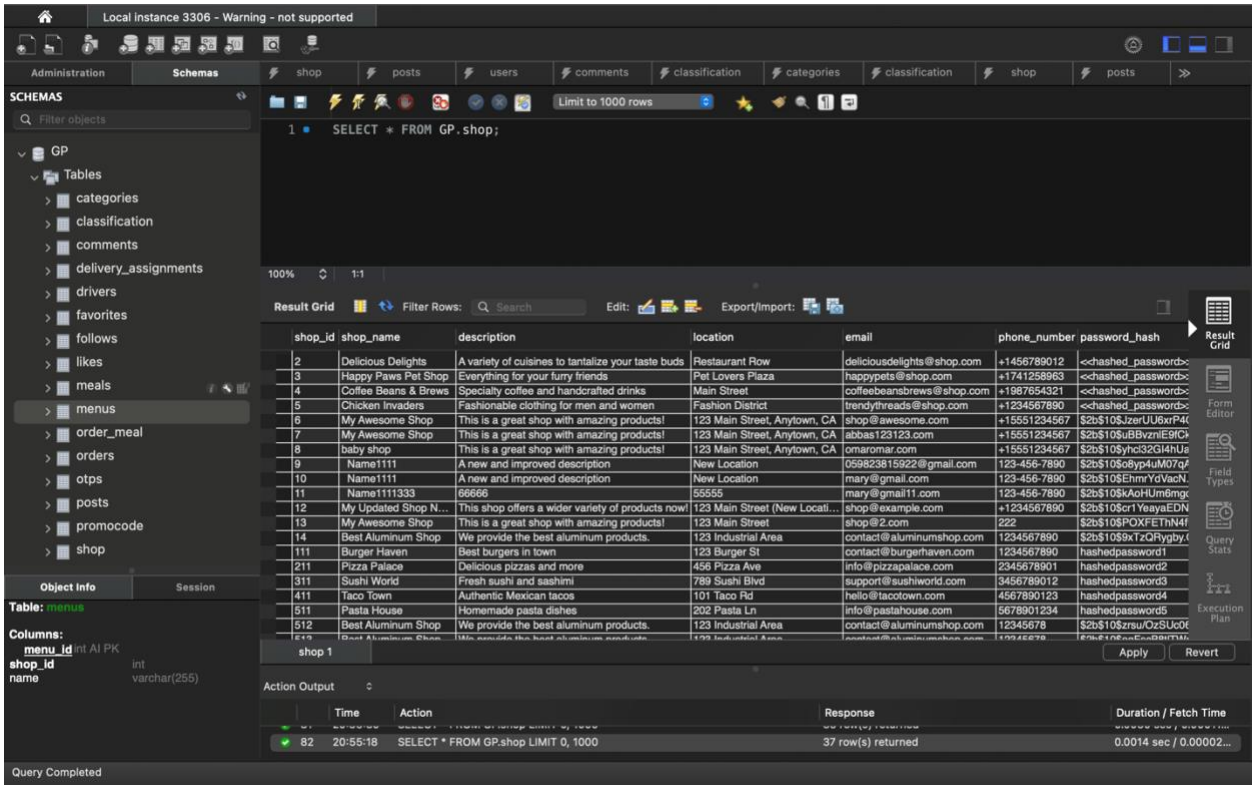
2. Order Details Screen

Provides detailed information about each assigned order, including pickup and delivery instructions, with ability to make call , send message and navigate location for shortest path.



Database

The database schema is designed to handle various aspects of the application, including user data, restaurant details, orders, and transactions. The use of MySQL ensures reliable data storage and retrieval, supporting the application's scalability and performance.



Discussion

FoodHub successfully addresses the key problems identified in the food ordering and delivery industry by dividing the application into three specialized apps for regular users, restaurant owners, and delivery personnel. This separation ensures that each user type has access to features tailored to their specific needs, enhancing overall efficiency and user experience.

The interactive feed for regular users enhances engagement, while real-time order tracking and personalized recommendations improve satisfaction. The restaurant app empowers owners with tools to manage their business effectively, from menu management to earnings tracking. The delivery app optimizes the delivery process with real-time tracking and communication features, ensuring timely and accurate deliveries.

By leveraging modern technologies like React, React Native, Node.js, MySQL, and Google Maps API, FoodHub delivers a scalable and maintainable solution that meets the diverse needs of its users. The robust security measures and efficient backend architecture further contribute to the application's reliability and user trust.

Overall, FoodHub represents a significant advancement in food ordering and delivery applications, offering a comprehensive and user-friendly solution that benefits both consumers and restaurant owners alike.

6. Conclusion and Future Work

Conclusion

The development of FoodHub has successfully addressed several key challenges in the food ordering and delivery industry. By leveraging modern technologies such as React, React Native, Node.js, Express.js, and SQL, FoodHub offers a seamless, user-friendly experience for consumers, restaurant owners, and delivery personnel. The application integrates essential features like real-time order tracking, personalized recommendations, secure online payments, and a comprehensive admin dashboard, significantly enhancing the overall efficiency and user satisfaction.

FoodHub's interactive feed, multi-restaurant ordering, and loyalty program foster user engagement and retention, while the secure authentication and robust security framework ensure user data protection. The use of Google Maps API for order tracking and distance measurement has improved delivery accuracy and efficiency.
Despite facing technical, development, and operational challenges, the structured methodology and iterative development process enabled the team to deliver a high-quality product. FoodHub is well-positioned to make a significant impact in the food delivery market, providing a comprehensive solution that meets the needs of both consumers and restaurant owners.

Future Work

While FoodHub has achieved its initial objectives, there are several areas for future enhancement and expansion:

1. **Enhanced User Personalization**:
    - Implement advanced machine learning algorithms to further improve the personalized recommendation system, offering users more accurate and tailored dining suggestions.
2. **Expanded Delivery Options**:
    - Introduce additional delivery options, such as scheduled deliveries and pickup points, to provide users with greater flexibility and convenience.
3. **Expanded Payment Options**:
    - Integrate additional payment gateways and support for digital wallets and cryptocurrency to cater to a broader user base.
4. **Enhanced Analytics for Restaurants**:
    - Develop more advanced analytics and reporting tools within the admin dashboard to help restaurant owners gain deeper insights into customer behavior and optimize their operations.
5. **Multilingual Support**:
    - Implement multilingual support to make FoodHub accessible to a wider audience, particularly in regions with diverse language preferences.

6. **AI-Powered Customer Support**:
    - Integrate AI-powered chatbots for customer support to provide instant assistance and improve response times for user inquiries and issues.
7. **Sustainability Features**:
    - Introduce features that promote sustainable practices, such as highlighting eco-friendly restaurants and offering users the option to opt for minimal packaging.
8. **Partnerships and Collaborations**:
    - Expand partnerships with more restaurants and delivery services to increase the variety of options available to users and improve service coverage.
9. **Performance Optimization**:
    - Continuously monitor and optimize the application's performance to ensure it can handle increased traffic and data volume as the user base grows.

By focusing on these areas, FoodHub can continue to evolve and adapt to the changing needs of the food delivery market, ensuring sustained growth and user satisfaction. The commitment to innovation and user-centric design will enable FoodHub to remain a leading solution in the industry.