

CMSC436 Project Final Report: DineIn

Project Team 1

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Overview

DineIn is a mobile application designed to make booking restaurant reservations easier by providing a user-friendly and efficient platform. The app lets users quickly search for, find, and book tables at their favorite restaurants. It uses real-time data to show accurate table availability, helping users avoid the delays often found in traditional reservation systems.

The app also includes detailed restaurant profiles with information on cuisine types, pricing, user reviews, and photos, helping users choose where to eat based on their preferences.

For restaurant owners, DineIn provides tools to manage bookings and communicate with customers effectively. It allows restaurateurs to update their availability instantly and manage their reservations more efficiently. The platform also features communication tools that enable direct interaction with diners, improving customer service and satisfaction.

DineIn targets diners who value convenience and efficiency in their dining experiences. It addresses common problems such as uncertain wait times and fully booked notices, which are frequent with older reservation methods. Features like customizable search filters, location-based services, and interactive maps meet the specific needs of each user, ensuring a smooth reservation process.

Features Overview

DineIn features an array of functionalities aimed at user experience and the happiness of diners and restaurants. This all-inclusive platform really simplifies the process of making and managing reservations, increases immense restaurant discovery, and really simplifies user and restaurant profile management. All the features exist for a reason, so the interaction of every user with the application is efficient, pleasant, and effective.

Features for Restaurant Customers

1. User Authentication

- **Functionality:** Supports login and signup via Google authentication as well as traditional app-managed authentication.
- **Benefit:** Offers a secure and flexible way to access the app, accommodating user preferences for quick and easy authentication.

2. Restaurant Search

- **Functionality:** Allows users to search for restaurants by name.
- **Benefit:** Enables quick discovery of favorite or new restaurants, simplifying the search process.

3. Restaurant Information

- **Functionality:** Displays details such as descriptions, locations, operating hours, ratings, menus, and reviews.
- **Benefit:** Offers all the necessary information to help users make informed dining choices.

4. Reviews

- **Functionality:** Users can post reviews and rate restaurants on a five-star scale.
- **Benefit:** Fosters a community-driven resource that assists users in choosing restaurants based on reliable peer feedback.

5. Restaurant Reservations

- **Functionality:** Allows users to book tables based on the party size and date and time.

- **Benefit:** Provides an easy and flexible dining plan, allowing users to secure reservations at their convenience.

6. Reservations Management

- **Functionality:** Manages both upcoming and past bookings with options to cancel or modify reservations.
- **Benefit:** Provides greater flexibility and control over dining plans.

7. Favorites

- **Functionality:** Allows users to add restaurants to a favorites list for quicker future access.
- **Benefit:** Improve user experience by making it easy to rebook and revisit preferred restaurants.

8. Profile Management

- **Functionality:** Users can edit personal information such as name, profile picture, email, phone number, and password.
- **Benefit:** Empowers users to manage their personal and account information securely and conveniently.

9. Become Owner

- **Functionality:** Allows customers to transition their account status from customer to restaurant owner.
- **Benefit:** Simplifies the process for users to list and manage their restaurants on the platform.

10. Log Out

- **Functionality:** Provides a way for the users to log out of the app.
- **Benefit:** Ensure user security and privacy by ending sessions when no longer needed.

Features for Restaurant Owners

1. Restaurant Management

- **Functionality:** Owners can add and update critical information about their restaurant, including name, location, service options, food categories, menu items, images, and more.

- **Benefit:** Helps owners maintain a compelling and accurate online presence, crucial for attracting and maintaining customer interest.

App-Wide Features

1. Dark Mode

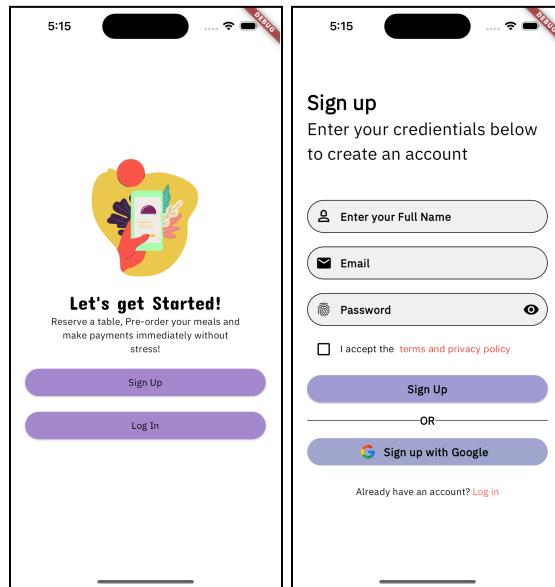
- **Functionality:** Includes a dark theme option for the app's interface.
- **Benefit:** Provide the option for users to choose between the dark and light themes.

2. Contact Us

- **Functionality:** Enables direct communication with the app's support team.
- **Benefit:** Provides a reliable way for users and owners to report issues or seek help, ensuring a smooth app experience.

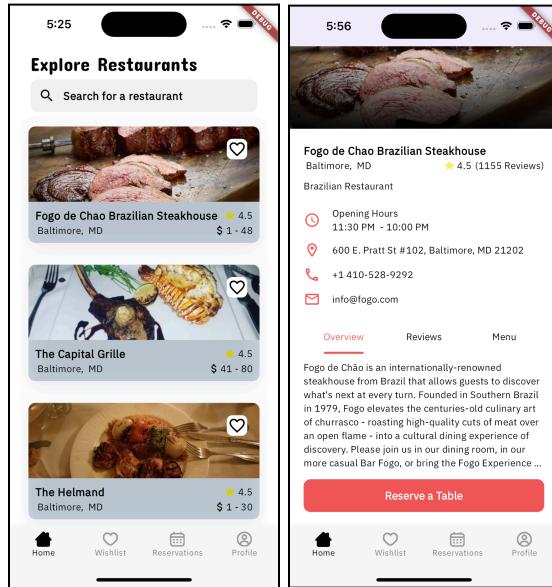
Walk-through of User Interactions

1. Starting the App:



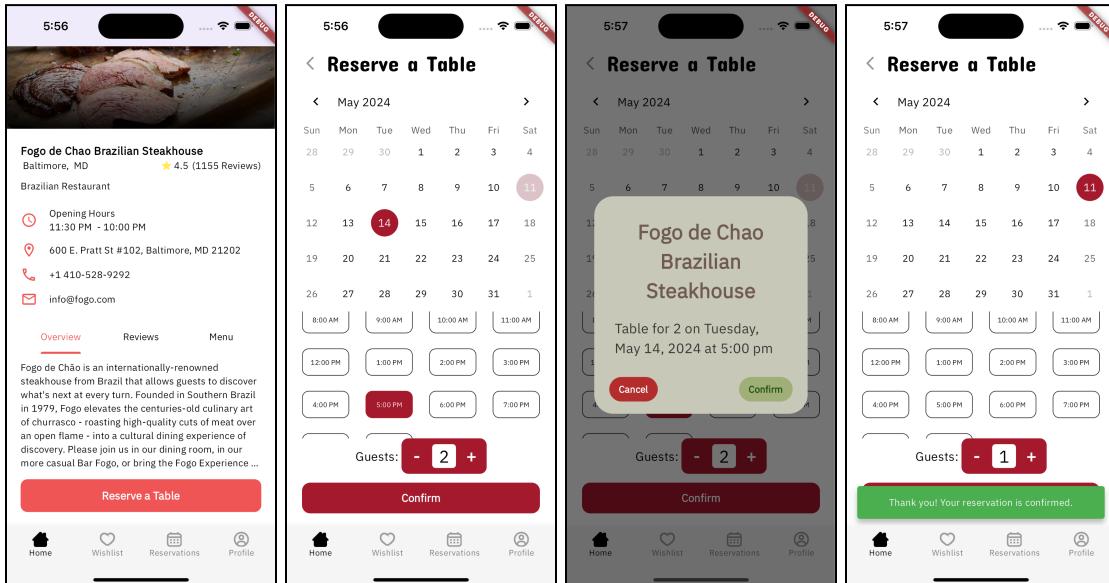
Upon launching DineIn, users are greeted with a login tap where they can either create an account or log in to theirs. Also, they can choose to use Google authentication or use traditional login with credentials.

2. Home Screen:



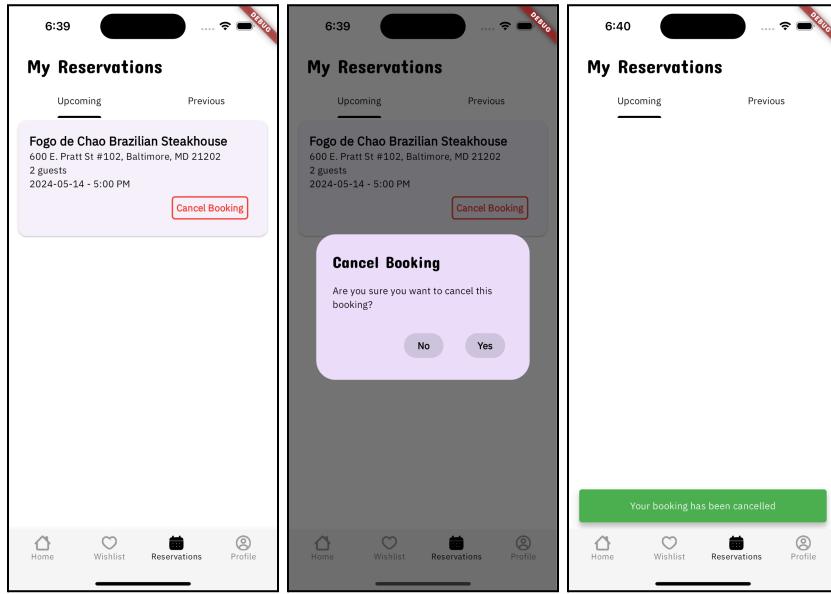
The home screen shows a list of restaurants available, which users can scroll down to find a restaurant they like. Once they find one, they can press on it to receive more information and details about it.

3. Making a Reservation:



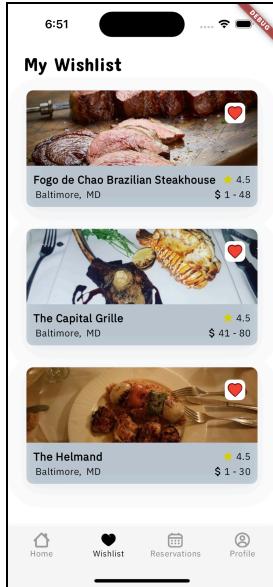
After selecting a restaurant from the search results, the option to choose a suitable date and time from an interactive calendar appears, followed by a confirmation of their reservation. Each step is accompanied by visual cues and confirmation dialogs to ensure clarity.

4. Managing Reservations



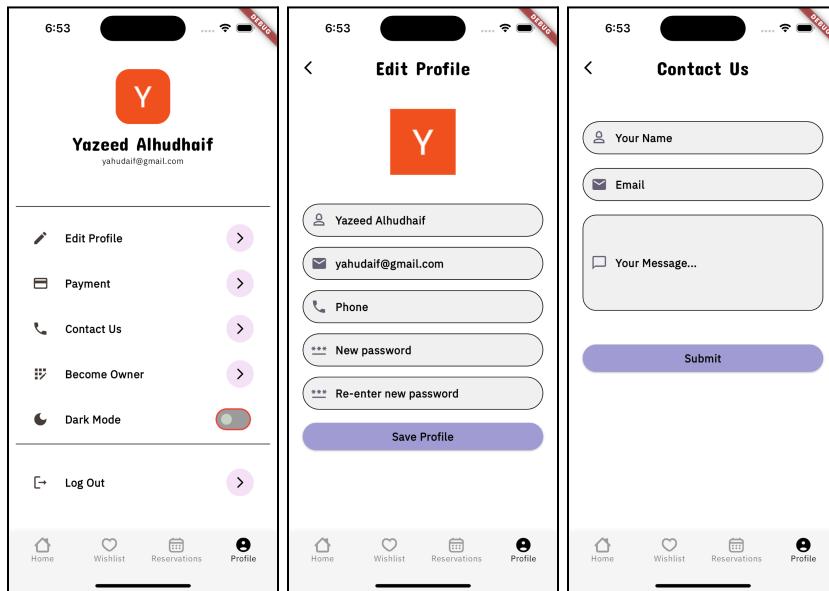
The reservations tab allows users to view their upcoming and past bookings, where they can modify details or cancel reservations if needed.

5. Wishlist



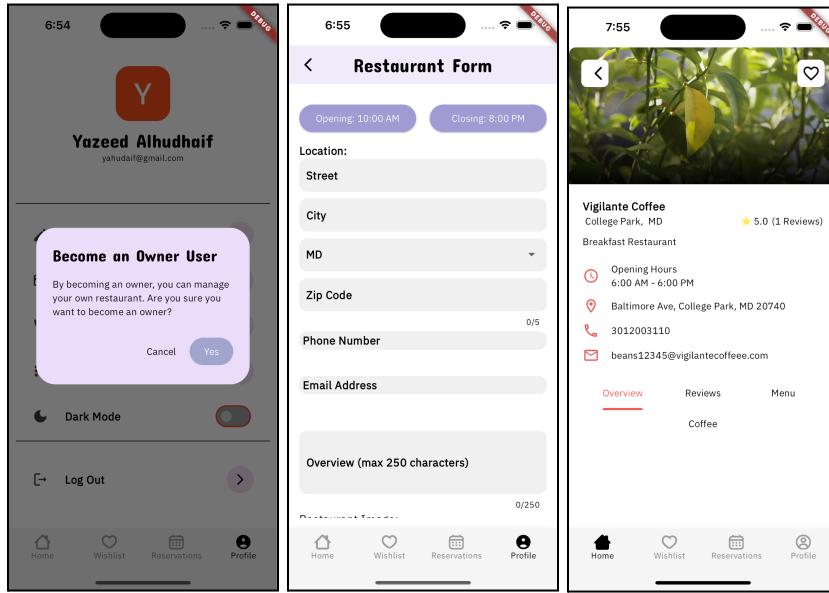
The wishlist where favorite restaurants can be saved to be able to find them faster.

6. User Profile:



In the profile section, users can manage their personal information, preferences, and settings. Additionally, they are able to contact support for questions or concerns within the app.

7. Owner page:



The Owner page could be reached from the profile, where the user can add a restaurant to the app. They do that by filling all the required information on the app and after that restaurant will be able to take reservations.

Discussion of the Development Process

The DineIn app was developed for three months with a high level of structuration, including detailing, planning, constant iterations, and implementation in a strategic way. It was structured in such a manner that it ensured the presence of an intuitive, robust, and visually aesthetic restaurant reservation platform.

Preliminary Planning and Team Organization: It began with the extensive planning stage, during which the roles of the members and their responsibilities were well defined. The team was organized into specialized units, including front-end development, back-end infrastructure, and UX/UI design. With that division, it was possible to use the powers of individuals in the best way and ensure expertise in every facet of the app's development.

Technology Stack and Implementation Rationale: The technology stack and the development process of our system had to be based on what best meets the app's complex requirements. We decided on Google Sign-In and JWT for our login. These two login strategies gave our users more flexibility as well as to enhance the security of user

sessions and transactions. Finally, we settled on using Supabase as the PostgreSQL database, since we felt that for better-enhanced querying, it was better than other non-relational databases. Firebase Firestore was not offering any compelling feature for our goal; therefore, this was an important decision for supporting the execution of complex queries under the relativity of our data. This will involve the user profile, restaurant details, and reservations.

UX/UI Design and Iteration: Led by Yazeed Alhudhaif, the UX/UI design process was essential to ensuring a balanced user interface with functionality and aesthetics at the core. From the first designs, the team has always kept refining the app's interface through iterative development processes. Through the different testing phases, we are able to make real-time adjustments by seeing how users interact with the app. This can make sure that with each update, the intuitiveness and visual engagement of the interface stay up, keeping high standards of usability and design quality high throughout the project.

Backend Development and Data Management: Our backend developer, Jose Valdivia, headed the effort of putting up the back-end infrastructure, following which he managed data in the desired manner. He configured the Supabase database to ensure strong data integrity and efficient server-side logic with high security levels. Development at the back-end was then according to needs of the frontend, making sure that all the data could be easily integrated and synchronized in real time, which is most important for the "live update" features inside the app.

Front-end Development and Integration: Nam Tran and Quan developed the front-end app by implementing user interfaces from the UX/UI design. They developed the experience and interaction that has been implemented into the application for customers. In this, the dynamic functionalities are implemented in the reservation system, search functionality, and management of user profiles for easy integration into the backend system.

Collaborative tools and version control: During the development, we have been using Git as the version control system, along with GitLab, which is used as the source code management tool. This ensured that each developer used a designated branch, which would be easy to control the development process without disturbances in the main code. This allowed a smooth workflow to update regularly and integrate new features promptly. But the most important part is the merging of those features into the master branch, and it has to be exhaustively tested in both functionality and the absence of bugs.

In other words, the DineIn app was developed dynamically and collaboratively with hard work and ardor within a span of only three months. Our strategic approach to the selection of technology, rigorous collaboration among team members, and continuous feedback integration culminated in a very high-quality application that met all the objectives that were initially laid out. It would ensure not just a fully functional and user-friendly product, but also give important insights for very effective project management and application development in a real-world setting.

Potential Future Directions

Moving forward, we are developing the DineIn app, which will contain important strategic upgrades to improve user experience and overall functionality for diners and restaurant owners. We want to introduce next-generation features that would add to our platform's success and be user-driven, making the dining reservation experience very engaging and personalized.

Real-time Chat: Another major addition is the real-time chat feature between the customers and the owners. The customers are able to ask any inquiries about the menu items or even place special orders, and they will receive immediate answers. It will increase the quality of service and the level of engagement. For restaurants, it is a direct tool that would help owners enhance customer service, problem-solving, and relating better with customers.

Enhanced Photo Displays: We will provide an option for restaurant owners to upload more than one image of their restaurant, which will be displayed as a slider on the homepage. This will bring considerable visual appeal to the restaurants, making them able to portray the ambiance, special dishes, and any promotional events going on at that time to the diners for a rich visual context of their choice.

Map View for Restaurant Search: Another upgrade we are experimenting with is the map view to search for restaurants. A user can navigate dining experiences using the most relevant location feature: this can help with the exact location of a restaurant,

based on the user's current location or in a specified area. This spatial context can be particularly useful for users looking to dine in unfamiliar places or those who prefer proximity-based dining options.

Location-Based Sorting: We are trying to extend the app features further by trying to implement sorting of restaurants based on a user's location. This feature can be attuned to the restaurant listing based on proximity, offering convenient, personal options to users on the go and making it easier for them to find dining spots near them.

Advanced Filtering Options: The home page will provide advanced filtering options to filter the search results based on food category, distance, price range, and geographical location. This would help the user customize each and every detail of the restaurant they would like to go to.

Loyalty and Rewards Program: We will install a loyalty and rewards program within the app to further increase user retention and reward frequent diners. Such a program will provide points or discounts based on user activities—such as making reservations through the app or leaving reviews. That would encourage continuous app use, increasing customer loyalty and further engagement.

These are all features that could make the DineIn app much more than just a reservation-booking app: a discovery tool and a customer engagement platform. We will keep on innovating, with the sole objective of increasing value for the diners and restaurant owners, so DineIn will be ahead in all facets of the digital dining experience.

Conclusion

This class project of developing the DineIn app over the last three months has been a learning journey for our team. Such an experience gives us first-hand participation in

the software development life cycle, from planning and design through controlled implementation, all within the academic setup.

Having said that, throughout this project, we kept building core functionalities: user authentication, database management, and basic user interface components—things that should go into any DineIn app that prioritizes convenience and quality for its users. These, besides offering a basic framework for the realization of a real-world application, were implemented for illustrative purposes as part of the core concepts of software development.

The teamwork in this project outlined what collaboration, communication, and iterative feedback mean in software development. Each of the team members had unique skills to contribute to this project; it turned out to be a very diverse and enriching learning experience for all of us. It navigated through the problems most likely faced in real-world software development: tight schedules and technical constraints, which would raise our problem-solving skills and prepare us for future professional projects.

The skills and knowledge we gained through the development process are of paramount value and importance to our careers and skill sets. The project really highlighted the importance of real hands-on projects to let students materialize their theoretical knowledge into practice and prepare us for the intricacies of the tech industry.

Overall, the project was a successful learning experience in the sense that it opened an intricate domain in application development and teamwork collaboration. The experience really provided the tools and confidence needed to cope effectively with future software development challenges.