Gustavo Moreira
Kazi Omar
Shanghao Li
Farah Kamleh
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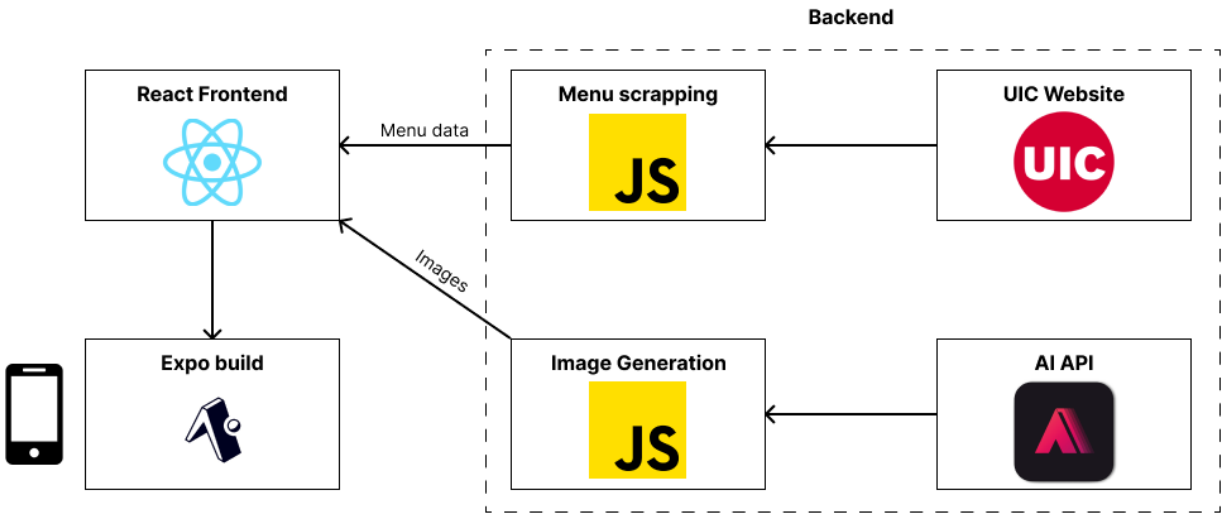
CS 522 - FSP Deliverable #3 - Report

1 - Technical Architecture



The application is built on React Native and has been developed using Expo CLI for an expedited development and testing cycle. React Native serves as the primary framework, enabling cross-platform compatibility for iOS and Android. Expo Go has been utilized as the testing platform, providing a convenient way to preview and test the application on physical devices.

The architectural components of the app encompass various elements: React Components (DishCard.js and PlanCard.js) for diverse screens and reusable UI elements, React Navigation facilitating seamless navigation between screens, and local JSON data (RestrictionQuestion) serving as the source for quiz questions and options. State management relies on React Hooks (useState, useEffect), ensuring efficient handling of component-level state.

Styling is achieved through inline styles, while predefined constants for colors and sizes (in 'constants.js') maintain design consistency. The data flow initiates with Expo CLI's initialization, followed by component rendering, user interaction triggering state changes, and navigation transitions facilitated by React Navigation. This architecture aims for compatibility, modularity, and streamlined development, facilitated by Expo Go for swift testing and deployment.

For scraping the daily menu we make requests to a public API exposed by the UIC United Table website. By specifying the restaurant and the day, the API will return a JSON object representing all the food options categorized by station and dietary labels. We built a parser to extract relevant information to our application and display that information using our React components.

Regarding the images for the dishes, we decided to use a generative AI tool (stable diffusion) to create them. To do that we created scripts that fetch the menu items for the day and use their titles as a prompt for the model. Even though this is a slow process, it just needs to be done once, given that each dish has a unique identifier, so images generated in previous days can be reused as needed.

In the current version of the system, all persistent data is stored locally (e.g. images) and no database is used. All the data concerning dishes are always fetched on demand, given that it changes every day.

2 - Weekly Sprint Plans

<u>Week of Oct 23rd:</u>

User Stories:

1. Users have dietary restrictions and want to incorporate them to find appropriate food.
2. Users want to find a recommended food plan for the day based on their dietary restrictions.

Sub-Tasks:

1. Initial Application Setup:
- Estimated Time: 1-2 days
- Actual Delivery Time: 2 days
- Owner: Kazi

2. Page for Adding Food Preferences/Dietary Restrictions:
- Estimated Time: 1-2 days
- Actual Delivery Time: Design completed within two days; Implementation deferred for future sprints
- Owner: Shanghao

3. Page for Recommended Food List (without styling):
- Estimated Time: 2 days
- Actual Delivery Time: 2 days
- Owner: Gustavo

<u>Week of Oct 30th:</u>

User Stories:

1. Users want to find a recommended food plan for the day based on their dietary restrictions.
2. Users want to create a meal plan for the day with their recommended food plan.
3. Users want to navigate the dining hall seamlessly.

Sub-Tasks:

1. Modifying Questions in Set Dietary Restrictions Page
- Estimated Time: 1 days
- Actual Delivery Time: 2 days
- Owner: Shanghao

2. Functionalities for Adding/Removing Food Items and My Plan Page:
- Estimated Time: 2 days
- Actual Delivery Time: 3 days
- Owner: Gustavo

3. Styling for Recommended Food List Page:
- Estimated Time: 1 day
- Actual Delivery Time: 1 day
- Owner: Farah

4. Initial UIC Dining Hall Map Screen (without functionalities):
- Estimated Time: 1 day
- Actual Delivery Time: 1 day
- Owner: Kazi

Week of Nov 6:

User Stories:

1. User has dietary restrictions and wants to incorporate them to find appropriate food.
2. User wants to create a meal plan for the day with their recommended food plan.
3. User wants to check the ingredients and nutrition of a food item.
4. User wants to navigate the dining hall seamlessly.

Sub-Tasks:

1. Styling for Adding Food Preferences/Dietary Restrictions Page and Backend Integration:
- Estimated Time: 1 day
- Actual Delivery Time: 1 day
- Owner: Shanghao

2. Backend for Food Nutrition Page, Integration with My Plan and Recommended Food Plan Page:
- Estimated Time: 1 day
- Actual Delivery Time: 1 day
- Owner: Gustavo

3. Styling for Recommended Food List and Food Item Nutritions Page:
- Estimated Time: 1 day
- Actual Delivery Time: 1 day
- Owner: Farah

4. Adding Functionality of Navigating the Map with Tooltips and Numbers:
- Estimated Time: 1 day
- Actual Delivery Time: 1 day
- Owner: Kazi

5. Algorithm for Navigating the Map Efficiently and Integration with Map Page:
- Estimated Time: 2 days
- Actual Delivery Time: 1 day
- Owner: Gustavo

3 - Progress

One of the most important user needs pointed out by our target users is being able to identify foods on the dining hall menu that fall under the user's dietary restrictions. Included on the Home page of our application is a green button "Set Dietary Restrictions". When selected, the user navigates to a five-part quiz that asks them to identify food restrictions, preferences, allergies, and intolerances. At the moment, the food restrictions listed are vegan, vegetarian, gluten-free, dairy-free, and nut-free. These are labels that are already present in the dataset. A major future implementation is to include other restrictions, especially religious ones such as halal and kosher. After identifying the user's dietary restrictions, the list of menu items scraped from the online menu should be filtered to only include what the user can eat. After filtering, the list of menu items uses iconography to label which foods are vegan, vegetarian, gluten-free, dairy-free, and nut-free, so the user can double-check their restrictions or make more educated choices.

Another vital user need is to locate foods of interest within the dining hall space. The first step is to identify foods of interest which is performed using the "Set Up New Plan" page. The application successfully scrapes the online menu for the foods offered on that day and organizes them based on which station they are located. The stations included in the plan page are Grill, Nook, Bakery-Dessert, Asian Kitchen, Latin Kitchen, Mezze, Global Tour, and Fresh Market. To select foods of interest, the user can click on the plus button located at the top right corner of each food that is listed. If they are curious about the contents of the dish, they can press the Details button which navigates them to the "Dish Details" page that includes the name of the dish, a description, a list of ingredients, and additional nutritional information. To see the foods that have been selected and saved, the user can navigate to the "My Plan Page". To locate the foods of interest within the space, the user can either directly navigate to the "Map" page by selecting "Check Navigation Route" or return to the Home page and select the green Map button.

The Map page includes a layout of the dining hall space with the entrance as the point of reference. The user, regardless of their visiting frequency, will be able to understand where each station is located due to the simple layout. Included on the map are numbers that intend to guide the users to the stations that host their foods of interest. By clicking on the numbers, the tooltip informs them of which food is stationed where. The map feature not only assists in navigating the space but also informs the user where to find their foods of interest so they spend less time searching and making choices and more time dining.

Similarly, to better locate foods of interest within the dining hall space, users emphasized a need for accompanying images to be included with each food listed on the menu. Currently, the online menu only includes names of foods which has proven unhelpful, as students with dietary restrictions cannot locate them within the space by sight. Therefore, the inclusion of images will not only provide them with a good sense of what they intend to eat but also reduce the amount of time it takes to locate the items within the space. The current method is to wait in long, crowded lines until the student reaches the station to ask the staff which is time-consuming and inconvenient. The ideal solution would be to obtain real photographs from the dining hall, but that is beyond the scope of this project. Our temporary solution involves using a generative image AI (like stable diffusion) and generating images based on the title of the dishes.

While not a critical feature for students with dietary restrictions, unless health-related, included in the Details page is the portion size, number of calories, and nutritional information such as the amount of protein, carbohydrates, sugar, fat, fiber, vitamins, cholesterol, sodium, potassium, calcium, and iron found in each dish. Expanding on this non-critical feature is a question in the dietary quiz of the “Set Dietary Restrictions” page that asks, “Which nutritional aspects are you interested in tracking or focusing on?” with a range of answers from protein intake to vitamin and mineral tracking. Another non-critical feature included in the page’s dietary quiz is a question that asks, “What is your primary reason for following these food restrictions?”. This question takes into account the user’s reason for a restrictive diet whether it be health-related, allergy-related, ethically-related, or environmentally-related, but it does not affect their experience using the application to locate safe foods on the menu or within the space. Similarly, the application is interested in noting the behaviors of the user when it comes to the problem at hand, asking, “How do you typically handle social situations involving food?”, with anticipated answers such as “communicate dietary needs in advance”, “bring my own food”, “choose restaurants with diverse menu options”, and “adapt to available options”.

While all central features of the project were successfully implemented, some challenges arose for auxiliary features. In our low-fidelity prototype, we presented a favorite screen to recommend dishes recurrently consumed by the user. This was not an identified user need but can be seen as a “quality of life” feature, and it was not implemented given the need for a database to store history data between sessions.

As of now, users can fetch and interact with data for the lunch menu. Supporting breakfast and dinner does not require any changes in our backend infrastructure, but it is a matter of affording the interactions on the interface.

Concerning the dietary restrictions quiz, not all questions are used to filter the dishes displayed on the interface. Doing so requires the implementation of additional food labels beyond the ones available on the original dataset since the ones available do not cover complex/custom restrictions.

For the map interface, all the isles for the main space are available, however, both on the left and right sides, there are secondary rooms with one extra aisle each and those still need to be added to the current layout.

In general terms, it is safe to say that our project is 85% complete, given that all central features are supported and secondary features are either partially implemented or there is an initial setup in place for them.

Collaboration Record

Student Name: _Gustavo Moreira
Contribution: For the application, setting up backend functionalities like web scraping and image generation, help styling, creating “set up plan” and “my plan” pages, and building the routing algorithm. For report writing features not implemented, helping with the technical architecture and creating the diagram.

Student Name: _Kazi Omar____
Contribution: Setting up the project, creating and styling the home screen and navigation to all other screens from home, creating and styling the map screen for dining hall navigation, and adding tooltips with numbers and lists of items in the map screen. For the report, wrote the weekly sprint plan.

Student Name: _Shanghao Li___
Contribution: finishing Set Dietary Restriction page and technical architecture

Student Name: _Farah Kamleh__
Contribution: For the application, stylizing the Set Up New Plan and the Dish Details pages. For the report, completion of the first five paragraphs in the Progress section.