Wat2Eat Assistive Cooking App
Project Proposal

CS446/ECE452 W2024

jacobgcrocker/Group26-Project (github.com)

Project Collaborators

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1. General Information

The Wat2Eat application solves a problem many people face in their everyday lives - Wat2Eat! The app aims to assist users in choosing meals to prep and cook given the ingredients they have in their pantry. Users can enter a list of their ingredients, and our intelligent app will generate unique recipes on request with instructions, measurements, and cook times included - within the constraints set by the user. This allows users to quickly decide what they can and cannot cook based on their ingredients, or, use the generated recipes to help with shopping lists and meal planning. Users will be able to then leave ratings on their favorite recipes and save them for later on their own individual profiles.

Although user engagement is encouraged for the app, the project is designed so that even without a large user base, any individual will be able to use the app to its full potential to assist in their everyday meal prep and cooking routine.

What makes Wat2Eat an interesting app is its potential impact on the day-to-day lives of users as it addresses a common dilemma we all face; what to eat when time and resources are limited. The easy options people have available to them right now all come with the benefit of convenience. UberEats, Doordash, HelloFresh, fast food chains, and grocery store meals can be expensive, overly processed and unhealthy but they are easy and quick solutions to feeding one's self. In contrast, home cooked meals filled with whole foods are highly nutritious but can be time-consuming and difficult to organize. That's where Wat2Eat comes in to provide users with the best of both worlds. Wat2Eat allows people to maximize their groceries by generating

recipes based on available ingredients and time constraints. This practical approach not only saves time and money but also promotes healthier eating habits.

Wat2Eat can be particularly valuable for students, especially when transitioning to living on their own for the first time. Many find themselves struggling to find the skills, time and energy to cook leading to reliance on unhealthier options. In that way, Wat2Eat provides students with learning opportunities such as how to pair ingredients and manage time effectively in cooking.

The impact of Wat2Eat goes beyond convenience. Research has shown the drastic link between nutrition and our physical and mental wellbeing. In terms of mental wellbeing, it has been shown that a poor diet can actually damage your brain, worsen your oxidative stress, and irregulate your mood and energy levels. As students, improvements in these areas are highly important, as they can aid in improving one's concentration levels and time management. This is incredibly crucial in a university setting where most students are balancing the stress of studies, job searches, and housing searches[1].

Beyond just the individual benefits, Wat2Eat also contributes to broader societal and environmental goals. By cooking recipes with the ingredients users already have, they can minimize food waste and their use of single-use plastics. This in turn allows users to lead more sustainable and economical lives. Additionally, its accessibility and practicality make it a valuable asset to any person seeking a convenient and wallet friendly meal.

This project was selected over alternatives because of its very high usability and convenience factors. On a personal level, each of us in the group feel as though this app fills an important role and abstracts a tedious and difficult part of our everyday lives - in other words, the application is something we all feel we could use every day! As students, we understand the daily struggle of deciding whether we should cook a healthy meal for once or just click "order" on that delivery app. And, as students, we often make the latter decision as a compromise due to the stress that meal planning can bring.

Finally, this project made the most sense on a mobile form factor as that's what makes it convenient and useful for our users. Most people carry their mobile phone with them at all times, making it easy to quickly enter in the ingredients they have. For many people, keeping a laptop or other large electronic device in the kitchen is generally avoided due to counter space and possibility of a spill or mess. Traditional printed paper recipes also suffer from the same dilemma. Additionally, being on a mobile platform lets users meal prep on the go, or even at the grocery store! Users will be able to look up recipes to make for dinner before they arrive home from work, or on the bus home from classes. Meal planning and deciding what to eat becomes easy with Wat2Eat being a mobile app.

2. Project Outline

2.1. Functional Requirements for the Wat2Eat App

The following section lists the primary functional requirements for Wat2Eat.

1. User auth: The app should provide user auth to allow access to individual user profiles.
2. User profiles: Users can create and manage their profiles (input personal details including dietary restrictions, etc,..).
3. Ingredient input: Users can input ingredients available through a user-friendly interface.

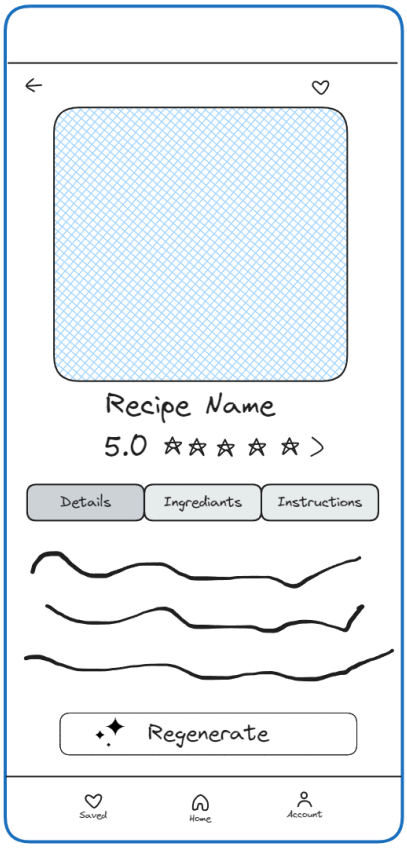
[1] https://www.health.harvard.edu/blog/nutritional-psychiatry-your-brain-on-food-201511168626

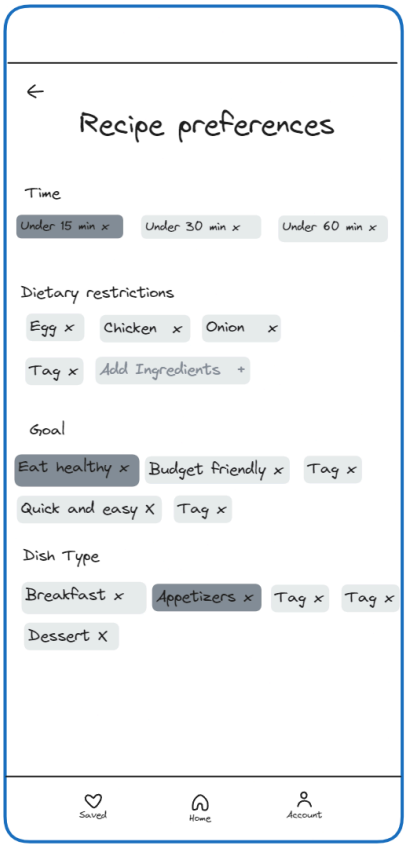
4.1 Recipe search: The app shall include a search functionality allowing users to search for recipes based on inputted ingredients.
4.2 Recipe presentation: For each recipe returned, the user should be able to click/view a recipe and see detailed instructions/required ingredients
4.3.1 Recipe feedback: Users should be able to leave star ratings for each recipe they try

2.2. Functional Nice-to-Haves

The following section lists several functions that would enhance the app's usability and enrich features, but aren't necessary for core functionality. A number of these functions would greatly leverage the mobile device's native functionality as well.

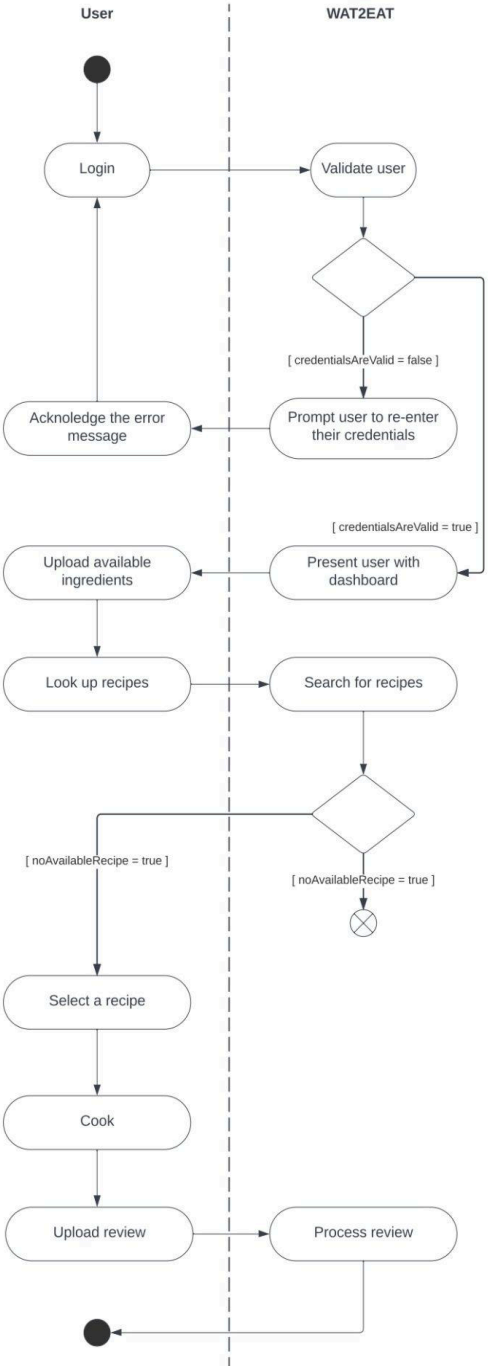
4.3.2 Recipe feedback: Users should be able to add comments + photos for recipes they try.
4.4 Recipe generation: The app will analyze user input and generate a list of dishes/recipes that match the provided ingredients and dietary restrictions (using LLM).
5. Favourite recipes + page: Users should be able to favourite/save recipes, access/view them easily (on a separate screen), and search/filter through saved recipes.
6. Recipe recommendation: The app should recommend users popular recipes in their area.
7. Timer: Users can time themselves on how long it takes to cook the recipe.
8. Grocery List: Users can export missing ingredients as a grocery list.



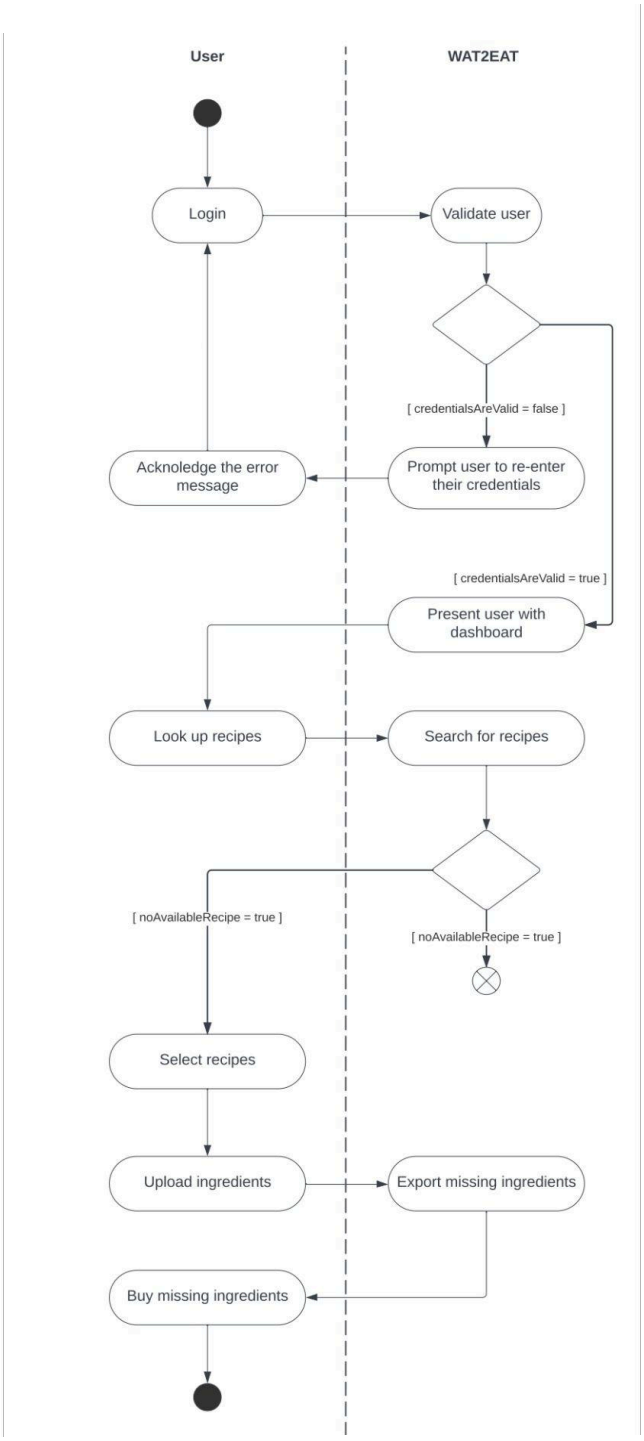


2.3. User Scenarios

User Scenario 1 Diagram



User Scenario 2 Diagram



2.3.1. User Scenario 1: Quick Dinner Ideas

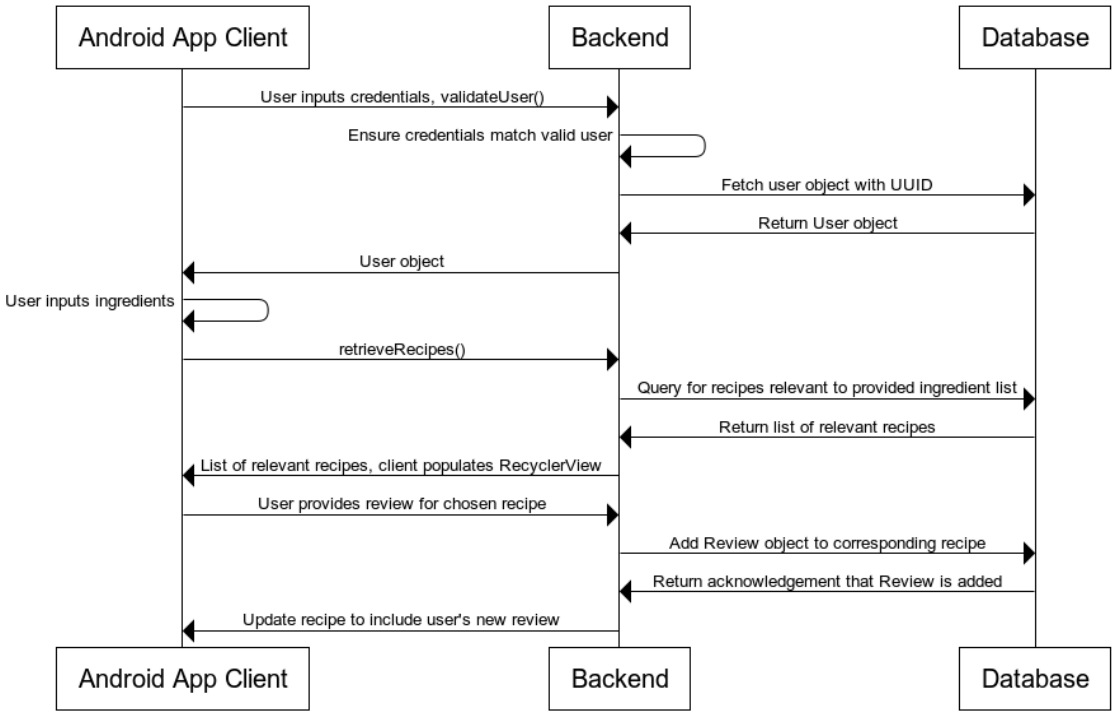
User opens the WAT2EAT app, logs in (Functional Requirement 1), and inputs the ingredients available in their kitchen using the user-friendly interface (Functional Requirement

3). The app then returns a list of recipes based on the entered ingredients and dietary restrictions (Functional Requirement 4.1). The user selects a recipe and follows the detailed instructions provided (Functional Requirement 4.2). After enjoying the meal, the user leaves a rating on the recipe's taste and simplicity (Functional Requirement 4.3.1 and 4.3.2).
Benefits: The user can easily discover a recipe that suits their available ingredients and dietary preferences.

2.3.2. User Scenario 2: Weekly Meal Planning

User plans their meals for the week on WAT2EAT. They browse their saved recipes (Functional Requirement 5), filter recipes based on preferences using the search functionality (Functional Requirement 4.1), and choose a variety of recipes with different complexities and preparation times (Functional Requirement 4.1). The user then exports the missing ingredients to their grocery list (Functional Requirement 8) and heads to the store.
Benefits: The user efficiently plans meals and saves money by buying only what's needed.

Seuquence Diagram for User Scenario #1



2.4. Non-Functional Properties

- **Performance**: Page loads must take less than 2 seconds. Recipe searching results should be displayed in less than 4 seconds under normal use.
  - Users would appreciate a fast and snappy application, especially when hungry and looking for cooking ideas. Well-built mobile frontend and efficient backend searching queries will enhance user satisfaction and retention.
- **Usability**: Users should be able to easily find the search and generate recipes right from the home page. The application should aim to use universal/highly recognizable icons

such as those from Google's Material Design. Users can zoom in/out and change the text size easily in the settings menu, which is reachable within 3 taps from any page.
    - ➢ The user interface needs to be intuitive and easy to navigate to cater to users of all ages and varying levels of tech-savviness. If the application is confusing and inconvenient, users will encounter an unnecessary learning curve. We aim to help new users understand our core features and reach their goals quickly. Users should also enjoy the design and user experience provided by the application.
- ❖ **Scalability**: The system should be able to support 100 concurrent users while maintaining good performance. The system should be able to scale up to handle a 30% increase in concurrent users within the next 6 months.
    - ➢ The application can be expected to have a small user base in its early stages. Scalability ensures the application can accommodate growth in user base without compromising performance. This should also accommodate the fluctuation of concurrent users during the day.

2.5. Human Values

- ❖ **Health and Well-being**: The application should carefully consider dietary restrictions and recommend reasonable recipes based on users' nutritional needs, time constraints, and stated budget. This value reflects a commitment to promoting healthier eating habits and accommodating users to health-related restrictions.
- ❖ **Community**: The application fosters community engagement by allowing users to leave ratings and comments on recipes. This feature turns the platform into a low-effort cooking-based "social media" by encouraging social interactions and sharing of experiences among users. This helps to enhance the value of community and make the cooking/meal-prepping experience more enjoyable.

3. Project Involvement

3.1. Project Stakeholders

A stakeholder of the system are the users of the app. This includes any user who simply downloaded our app and created an account, to users who interact with our app through providing a list of ingredients and providing feedback for suggested recipes. They will want to ensure that their information is stored safely and securely.

Another stakeholder of the system are the developers, they will have an interest in the architecture of the system. Developers would want to ensure that the app is developed in a highly decoupled way to ensure easy debugging when issues arise.

3.2. Project User Base

Our target population of users will be people who want to explore new recipes. They might have random ingredients lying around their kitchen and want to find a recipe to utilize all ingredients. Another population of users are people who are short on time and simply want a quick meal without needing to go grocery shopping. University students and young people are the primary component of this population of users.