

Mixy: Revolutionizing home bartending with AI-enhanced personalization

Final Proposal for ECE495950

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<https://github.com/Azhang1234/MixySpring2024.git>

Abstract — Today, the advent of AI technology has opened new avenues for personalized drink creation. For our ECE 495950 project, our team aims to innovate a mobile application that allows users to provide whatever household ingredients they have available, and expect an extraordinary drink in return. This app stands out by offering a unique, user-friendly platform where the AI suggests a variety of drink recipes tailored to their inventory and taste preferences.

Ultimately, Mixy is a mobile application - tailored to both the experienced mixologist and the new. Users are able to save their suggested recipes, find that the app suggests common household ingredients, and are further informed if an ingredient is missing. These features all contribute to ensuring that the user has the most comfortable experience possible - without harming the purpose of Mixy: to provide the user with a great drink recipe!

Furthermore, users of Mixy are able to engage themselves in challenges that might include making a specific drinking recipe or submitting a recipe of their own!

We will implement Mixy as an iOS Phone application that leverages GPT and the SwiftUI SDK as a proof of concept drink recommender and leisure platform.

Index Terms — Artificial Intelligence, Open Source Software, Data Organization, Mobile Applications, Recommender systems

I. INTRODUCTION

In an era where convenience and personalization reigns supreme, the world of home bartending is undergoing a remarkable transformation. Enter Mixy, a groundbreaking mobile application that is set to redefine the home cocktail experience. At its heart, Mixy is an AI-powered mixologist, a digital companion that turns your kitchen into a sophisticated cocktail lounge.

Developed with both the cocktail aficionado and the curious beginner in mind, Mixy stands out with its intuitive design and intelligent functionality. Utilizing a GPT-based AI wrapper, the app offers a seamless interface where users can input their available ingredients - be it spirits, mixers, or even just fruits and herbs - and receive a curated list of cocktail recipes tailored to their inventory and taste preferences.

However Mixy is more than just a recipe app. Our app learns from our user interactions, evolving to offer more personalized and accurate suggestions over time. Mixy even

offers daily and weekly “quests” for users to complete. Mixy in turn encourages a sense of community among its users, allowing the sharing of custom recipes, experiences, and even photos of their cocktail creations.

Designed to be user-friendly, Mixy boasts a sleek and inviting interface that makes navigating through recipes and tutorials a breeze. Whether you’re hosting a party, looking to unwind with a drink after work, or simply exploring the world of cocktails, Mixy is your perfect companion.

In essence, Mixy is not just an app; it’s a celebration of the joy and creativity of cocktail making. It’s where technology meets tradition, and where every user, regardless of their mixology skill level, can discover the magic of crafting the perfect drink.

II. BACKGROUND & GAP ANALYSIS

This project is based off of a few major concepts:

a) *Personalization Deficit*: Existing resources do not offer personalized drink recommendations based on the user’s current inventory of ingredients. This lack of customization can lead to frustration or disinterest, especially for beginners.

b) *Interactive Learning Gap*: Many existing resources are one-dimensional and do not offer interactive guidance or learning experiences. Users looking to improve their mixology skills seek more than just recipes; they want engaging tutorials, tips, and feedback.

c) *AI Integration Absence*: Despite advancements in AI technology, there is a noticeable absence of its application in the home bartending space. AI can be leveraged for personalized recommendations, flavor profile analysis, and creating unique recipes, enhancing the user experience.

d) *Platform and User-friendly Interface Shortage*: Many existing apps and websites are cluttered and not user friendly, particularly for those who are new to mixology. A simple, intuitive interface on a common mobile platform is needed to lower the entry barrier for beginners

Mixy is designed to bridge these gaps by offering a personalized, interactive, and socially engaging mixology experience, enhanced with AI technology. It addresses the personalization deficit by suggesting recipes based on the user's available ingredients. Its interactive tutorials and tips cater to the learning gap, making mixology accessible and enjoyable for users at all skill or interests levels

Furthermore, Mixy creates a community for cocktail enthusiasts to share and connect, filling the social interaction void. The integration of AI not only aids in personalization but also introduces users to new flavors and combinations they might not have considered, pushing the boundaries of traditional mixology. Lastly, Mixy's clean and intuitive interface ensures a user-friendly experience, inviting more people to explore the world of home bartending.

III. MIXY GOALS

Broadly speaking, this project has the following goals:

- Develop an application that allows users to input available household ingredients (like sugar, vodka, and other alcohols) and receive drink recipes.
- Implement a smart ingredient matching system that can suggest the best drink recipes based on the user's current pantry items.
- Utilize a GPT-based algorithm to analyze user preferences and past selections to offer personalized drink recommendations.
- Introduce gamification elements to encourage users to try new drinks and combinations, rewarding them with badges, points, or achievements.
- Create challenges or missions, like preparing a drink from a specific country or using a new ingredient, to keep the user experience engaging and dynamic.
- Users can upload pictures of the cocktail they made to complete the challenge/mission.
- Provide options to link with external resources for purchasing rare ingredients or finding local suppliers.

IV. USE CASES

There are four major components as part of Mixy:

Ingredient Cabinet: This is a virtual representation of the user's available ingredients. Users can add or remove ingredients (like sugar, vodka, etc.) to their cabinet. This helps the app suggest drinks based on what the user currently has.

Fig. 1. The Ingredient Cabinet

Mixing Station: A feature where users can experiment by combining different ingredients. The app suggests possible

drink recipes based on the combination and provides step-by-step mixing instructions.

Taste Profile: Users can rate drinks they've made or are interested in. This data is used to refine future drink suggestions, tailoring them to the user's taste preferences.

Community Cocktails: A social feature where users can share their own drink creations, view recipes shared by others, and interact with the Mixy drink-making community.

To begin, a user adds ingredients to their virtual Ingredient Cabinet. This is done by manually entering ingredients or by scanning barcodes of bottles and packages using the phone's camera. The app then populates the cabinet with these ingredients, which become the basis for drink suggestions.

With the Mixing Station, users select ingredients from their Cabinet to experiment. The app suggests drinks that can be made with the selected ingredients. Users can follow the recipe or tweak it to their liking, creating a new variation of the drink.

As users try different drinks, they rate and review them in the Taste Profile. This feedback is used by the app to learn the user's preferences and suggest drinks that align with their taste in the future.

In the Community Cocktails section, users can share their unique drink creations, complete with recipes and photos. They can also browse and try recipes shared by others, leave comments, and engage in discussions about mixology.

Based on the user's activity in the app, including their Taste Profile, Diary entries, and interaction in the Community section, the app uses a GPT-based algorithm to suggest new drinks to try, ingredients to explore, and even create personalized recipes.

V. REQUIREMENTS

With these use cases in mind, we identify the following requirements:

Requirement 1: User Input

Users should be able to input the ingredients they have at home for the recommender to suggest a drink to be made. These user queries will also be a part of the app's history for the user to go back to when they would like. This requirement helps foster a more convenient environment for the user.

Requirement 2: Daily and Weekly Challenges

Users of Mixy have the opportunity to partake in both daily and weekly challenges. These could include making a specific drink, submitting their own drink recipe, or more! The Mixy challenges will help to build a game-like and social aspect to the application.

Requirement 3: Drink Recommender

Once users have input required ingredients, a recommended drink should be shown to the user through a GPT wrapper.

Requirement 4: Graphical User Interface

The graphical user interface would mostly be composed of an input mechanism where users can input the ingredients that they have. This is likely to be an “autocomplete” or “typeahead” search functionality. This feature enhances user experience by making data entry faster, reducing errors, and aiding in discovery of available options. Our GUI would also harbor a output display, and this section of the user interface would display the suggested cocktail recipes to the user.

Requirement 5: Robust Database

Because the application requires a large storage to reference previous queries the user might, a system with a robust database with meaningful schemas to reflect such data entry would be important. Data retention is necessary for historical analysis and other specified functionality in Mixy.

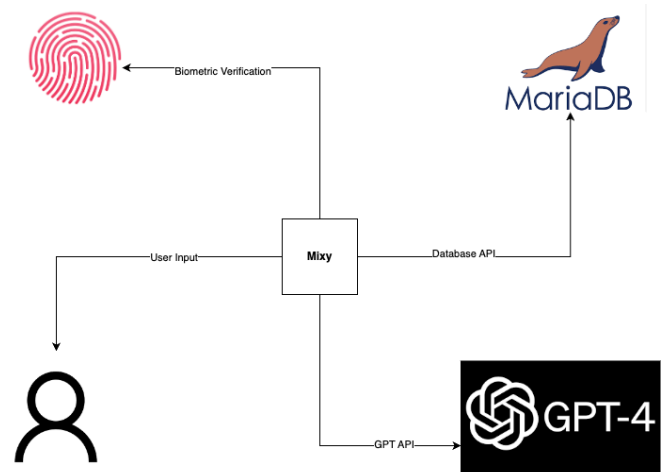
VI. SOFTWARE ARCHITECTURE

A. Context Diagram

The context diagram describes the interactions between Mixy and 4 different parties.

First, the user goes through biometric verification, ensuring secure user authentication through fingerprints or facial recognition. “User Input” represents the mechanism through which users provide the parameters or enter the ingredients for the cocktail recommendation system. The user is able to have an autocomplete system find the ingredients they type in, or access their search history for ingredients they’ve entered in before. The “Recommendations” component is the core of the system, processing user inputs and generating suggestions using an AI approach. Lastly, the “Database” is a crucial backend element that stores and manages data, such as user profiles, biometric information, and the other details necessary for generating recommendations.

The OpenAI GPT API will be used as a key component in our drink recommender. MariaDB is what will be used for our database component. The current iOS biometric verification options are through FaceID and fingerprint.



B. Component Diagram

The component diagram elaborates the major parts of the Mixy application. For the sake of clarity, a description of these are as follows:

- The “User Verification Handle” makes use of the iOS biometric verifications to verify the user
- The “User Input Handle” will prompt user for manual search for drink or to utilize our platforms AI recommender
- The “Search Engine” interacts with community suggested drinks
- The “History Handling” either fetches or writes to the database mechanism in place to overall improve the quality-of-life experience for the user
- “Favorites” will provide recipes based on favorites listed by the user.
- “Mixing algorithm” will feed into the GPT wrapper
- “GPT Recommendation” is the OpenAI API which interacts with Chat GPT service

VII. LIBRARY ANALYSIS

Using the context from the component diagram, we researched the following libraries to carry out our project.

VIII. CONCLUSIONS

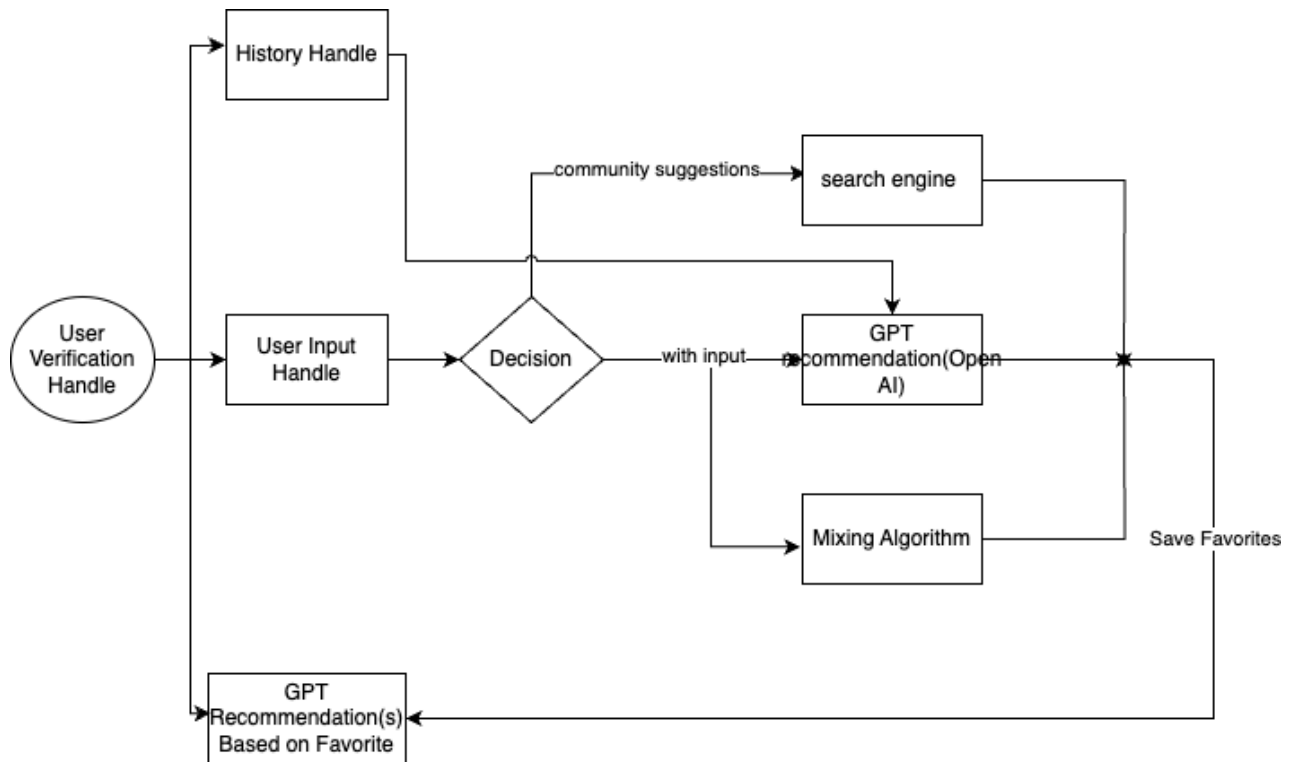
This document presented the final proposed design of the Mixy application.

Fig. 6. Mixy’s Context Diagram

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Fig. 6. Mixy's Component Diagram



Library	Component	Description
OpenAI GPT SDK	OpenAI API	The OpenAI GPT SDK provides the necessary tools to integrate GPT models into our application
Swift UI	Layout/Platform	Standard and modern framework for building iOS app interfaces
Rest API	External Data/Services	Recipe database access and GPT model integration
MariaDB	Database	Provides analytics and real-time database solutions; commonly used for mobile app development

TABLE I

LIST OF LIBRARIES USED