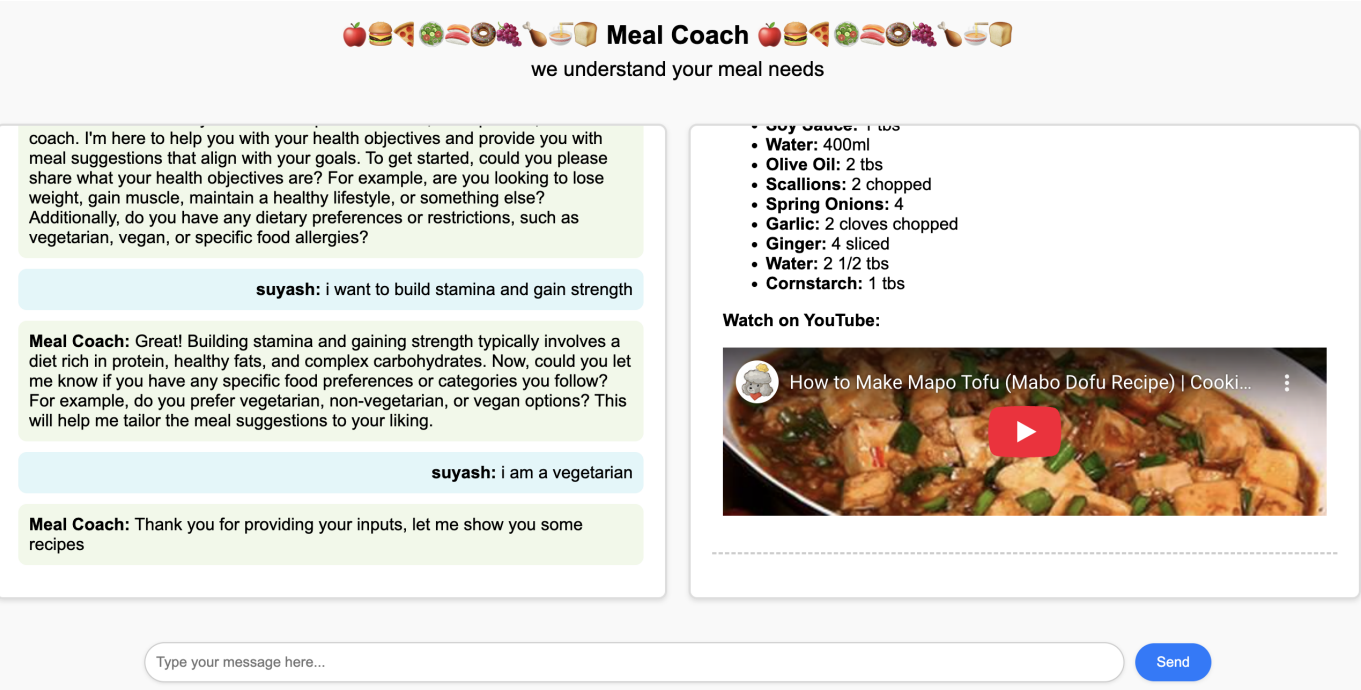


MealCoach



Project Overview

MealCoach is a personalized meal planning application designed to help users create healthy, balanced, and customized meal plans. By leveraging AI and external APIs, MealCoach provides users with tailored meal suggestions based on their dietary preferences, restrictions, and goals.

Features

- **Personalized Meal Plans:** Generate meal plans based on user preferences, including dietary restrictions, and cuisine types.
- **Recipe Suggestions:** Access a wide variety of recipes sourced from [TheMealDB API](#).
- **Interactive User Interface:** A clean and intuitive web interface for users to easily navigate and plan their meals. The User can restart the conversation at any time.
- **AI-Powered Recommendations:** Utilize AI to suggest meals that align with user preferences and nutritional goals. Moderation checks are performed to ensure user input is appropriate.

How It Works

1. **Input Preferences:** Users provide their dietary preferences, restrictions, and goals.
2. **AI Processing:** The application uses AI to analyze the input and generate meal suggestions.
3. **Recipe Integration:** Recipes are fetched from TheMealDB API and displayed to the user.
4. **Meal Plan Generation:** Users can view and customize their meal plans.

User Experience

Home Page

Welcome to Meal Coach

Your personalized meal coach.

I'll help you prepare a meal based on your health objectives

Get Meal Recommendation

Home Page inappropriate username

Welcome to Meal Coach

Your personalized meal coach.


I'll help you prepare a meal based on your health objectives



Get Meal Recommendation

Username flagged for inappropriate content.

Meal Planner introduction



Meal Coach


we understand your meal needs

Meal Coach: Hello Arjun! I'm glad to meet you. I'm here to help you with your nutrition and meal planning needs. To get started, could you please share your health objectives? Are you looking to lose weight, gain muscle, maintain a healthy lifestyle, or something else? Also, it would be helpful to know your preferences regarding food categories, such as vegetarian, vegan, or any specific dietary restrictions you may have.

Type your message here...

Send

Meal Planner recommendations



Meal Coach

we understand your meal needs


Meal Coach: Hello Arjun! I'm glad to meet you. I'm here to help you with your nutrition and meal planning needs. To get started, could you please share your health objectives? Are you looking to lose weight, gain muscle, maintain a healthy lifestyle, or something else? Also, it would be helpful to know your preferences regarding food categories, such as vegetarian, vegan, or any specific dietary restrictions you may have.

Arjun: I want to live a healthy lifestyle

Meal Coach: That's a great goal, Arjun! Living a healthy lifestyle involves a balanced diet, regular physical activity, and overall wellness. To tailor meal suggestions for you, could you let me know your preferences regarding food categories? For example, do you prefer vegetarian, vegan, or do you include meat in your diet? Additionally, are there any specific foods you love or dislike?

Arjun: any food category is ok

Meal Coach: Thank you for providing your inputs, let me show you some recipes



Honey Balsamic Chicken with Crispy Broccoli & Potatoes


Category: Chicken
Cuisine: American

Instructions: 2 Servings 1. Preheat oven to 425 degrees. Wash and dry all produce. Cut potatoes into 1/2-inch-thick wedges. Toss on one side of a baking sheet with a drizzle of oil, salt, and pepper. (For 4 servings, spread potatoes out across entire sheet.) Roast on top rack for 5 minutes (we'll add the broccoli then). 2. Meanwhile, cut broccoli florets into bite-size pieces, if necessary. Peel and finely chop garlic. In a small microwave-safe bowl, combine 1 TBSP olive oil (2 TBSP for 4 servings) and half the garlic. Microwave until garlic sizzles, 30 seconds. 3. Once potatoes have roasted 5 minutes, remove sheet from oven and add broccoli to empty side; carefully toss with garlic oil, salt, and pepper.

Type your message here...

Send

Start over the conversation



Meal Coach

we understand your meal needs

Meal Coach: That's a great goal, Arjun! Living a healthy lifestyle involves a balanced diet, regular physical activity, and overall wellness. To tailor meal suggestions for you, could you let me know your preferences regarding food categories? For example, do you prefer vegetarian, vegan, or do you include meat in your diet? Additionally, are there any specific foods you love or dislike?

Arjun: any food category is ok


Meal Coach: Thank you for providing your inputs, let me show you some recipes

Arjun: can we start over

Meal Coach: Of course, Arjun! Let's start fresh. Hello, I'm here to assist you with your nutrition and meal planning. To begin, could you please share your health objectives? Are you looking to lose weight, gain muscle, maintain a healthy lifestyle, or something else? Additionally, it would be helpful to know your preferences regarding food categories, such as vegetarian, vegan, or any specific dietary restrictions you may have.

Send

Inappropriate conversation



Meal Coach


we understand your meal needs

Meal Coach: Hello Arjun! I'm excited to help you with your health objectives and meal planning. To get started, could you please share what your specific health goals are? For example, are you looking to lose weight, gain muscle, maintain a healthy diet, or something else? Also, it would be helpful to know your preferences regarding food categories, such as vegetarian, vegan, or any specific dietary restrictions you might have.

Arjun: i want to lift weights

Meal Coach: Great to hear that you're focused on lifting weights! To support your weightlifting goals, it's important to have a diet rich in protein, healthy fats, and complex carbohydrates. Now, could you let me know your preferences regarding food categories? For example, do you prefer vegetarian, non-vegetarian, or any specific dietary restrictions? This will help me tailor the meal suggestions to your needs.

Send



Meal Coach

we understand your meal needs

Meal Coach: Your message was flagged for inappropriate content.

Meal Coach: Let's start over

Meal Coach: Hello Arjun! I'm here to help you with your nutrition and meal planning needs. To get started, could you please share your health objectives? Are you looking to lose weight, gain muscle, maintain a healthy lifestyle, or something else? Also, it would be great to know your preferences regarding food categories. For example, do you prefer vegetarian, vegan, or any specific types of meat?

Send

Challenges Faced

One of the key challenges faced during the development of MealCoach was integrating recipe suggestions from both OpenAI's language model (LLM) and TheMealDB API. While the LLM provides diverse and personalized recipe recommendations, TheMealDB API offers detailed cooking instructions and YouTube video links, which are essential for an enhanced user experience.

To address this, we decided to use only the "main ingredient" from the LLM's recommendations and fetch corresponding recipes from TheMealDB API. This approach ensures that users receive recipes with complete instructions and multimedia support, while still leveraging the personalization capabilities of the LLM.

Future Scope

In the future, we aim to improve the matching process between the LLM's recipe responses and the recipes available in TheMealDB API. This could involve advanced natural language processing techniques to better align the LLM's suggestions with the API's database, ensuring even more accurate and tailored meal recommendations.

Technical Details

Getting Started

1. Clone the repository and add your own OPENAI_API_KEY.txt in the mealcoach-app directory.:

```
git clone https://github.com/yourusername/mealcoach.git
cd mealcoach/mealcoach-app
pip install -r requirements.txt
python app.py
```

Folder Structure

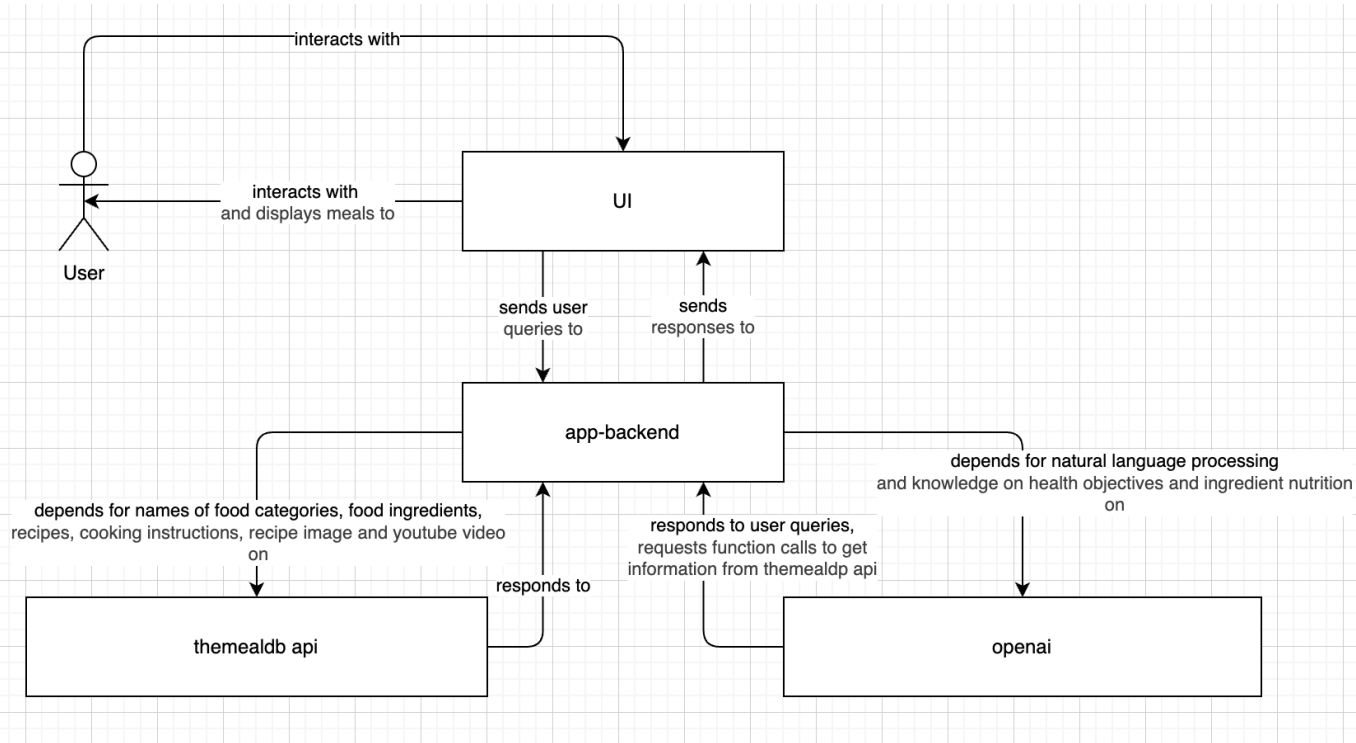
- **mealcoach-app/**: Contains the main application code.
 - **app.py**: The Flask application entry point.
 - **mealcoachai.py**: AI logic for meal recommendations.
 - **themealdbapi.py**: Handles integration with TheMealDB API.
 - **templates/**: HTML templates for the web interface.
 - **index.html**: Homepage of the application.
 - **meal-planner.html**: Meal planning interface.
 - **requirements.txt**: Lists all dependencies required to run the application.

System Design

The MealCoach application is designed with a modular architecture to ensure seamless interaction between the user, backend, and external APIs. Below is an overview of the system's architecture:

- **User Interface (UI):** The user interacts with the application through a clean and intuitive web interface. The UI sends user queries to the backend and displays meal suggestions and plans based on the responses.
- **App Backend:** Acts as the core of the application, processing user queries, managing data flow, and coordinating with external APIs. It handles:
 - Communication with **TheMealDB API** to fetch recipe data, including food categories, ingredients, cooking instructions, images, and YouTube videos.
 - Integration with **OpenAI** for natural language processing, health objectives, and ingredient nutrition analysis.
- **TheMealDB API:** Provides a rich database of recipes and related information, which the backend uses to generate meal plans.
- **OpenAI:** Powers the AI-driven recommendations by analyzing user preferences and generating personalized meal suggestions.

This architecture ensures a smooth and efficient user experience by leveraging external APIs and AI capabilities.



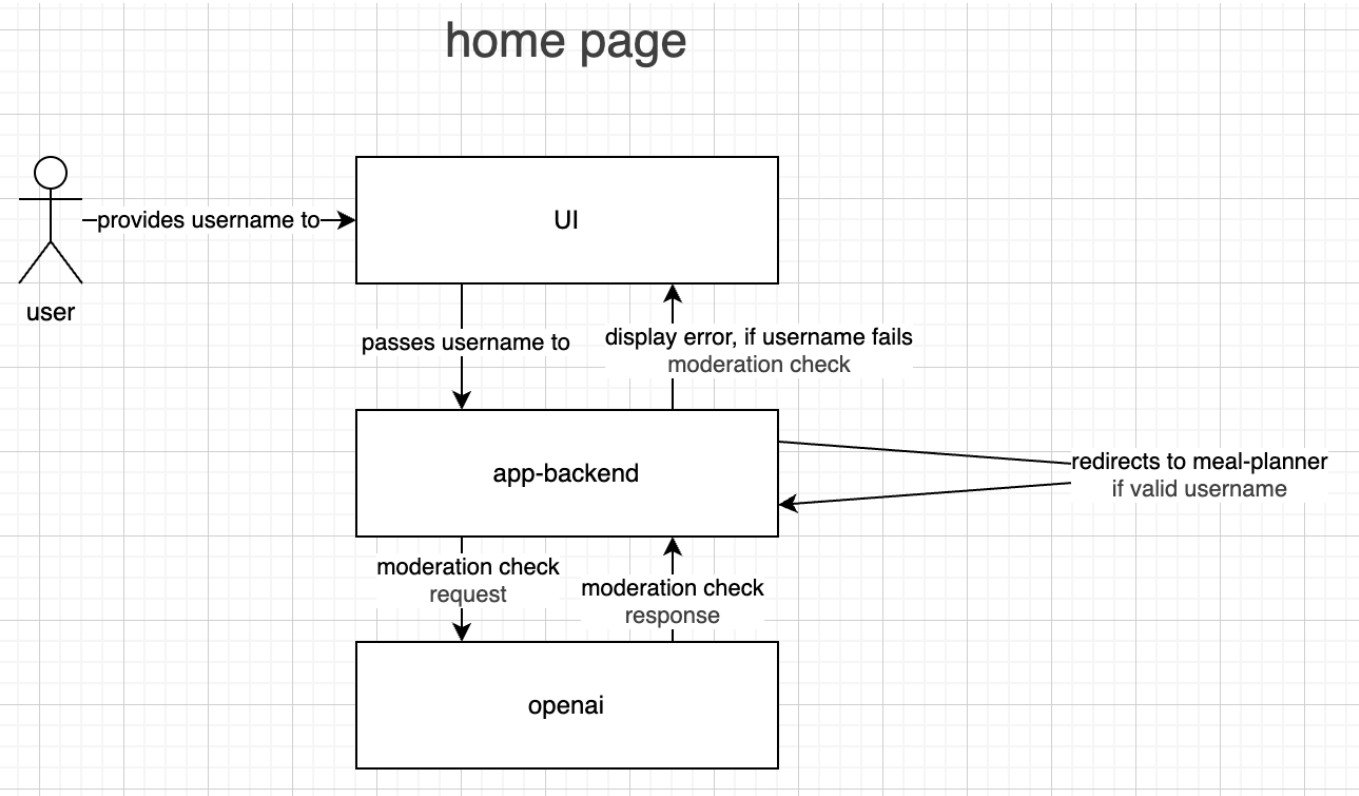
Technical Implementation

User Interaction: Home Page

This diagram illustrates the user interaction flow on the home page of the MealCoach application:

- 1. **User Input:** The user provides a username through the UI.
- 2. **Validation:** The UI sends the username to the app backend for validation.
- 3. **Moderation Check:** The backend forwards the username to OpenAI for a moderation check to ensure it meets acceptable standards.
- 4. **Response Handling:**
 - If the username fails the moderation check, an error message is displayed on the UI.
 - If the username passes the moderation check, the backend redirects the user to the meal planner page.

This process ensures a safe and user-friendly experience by validating usernames before proceeding further.

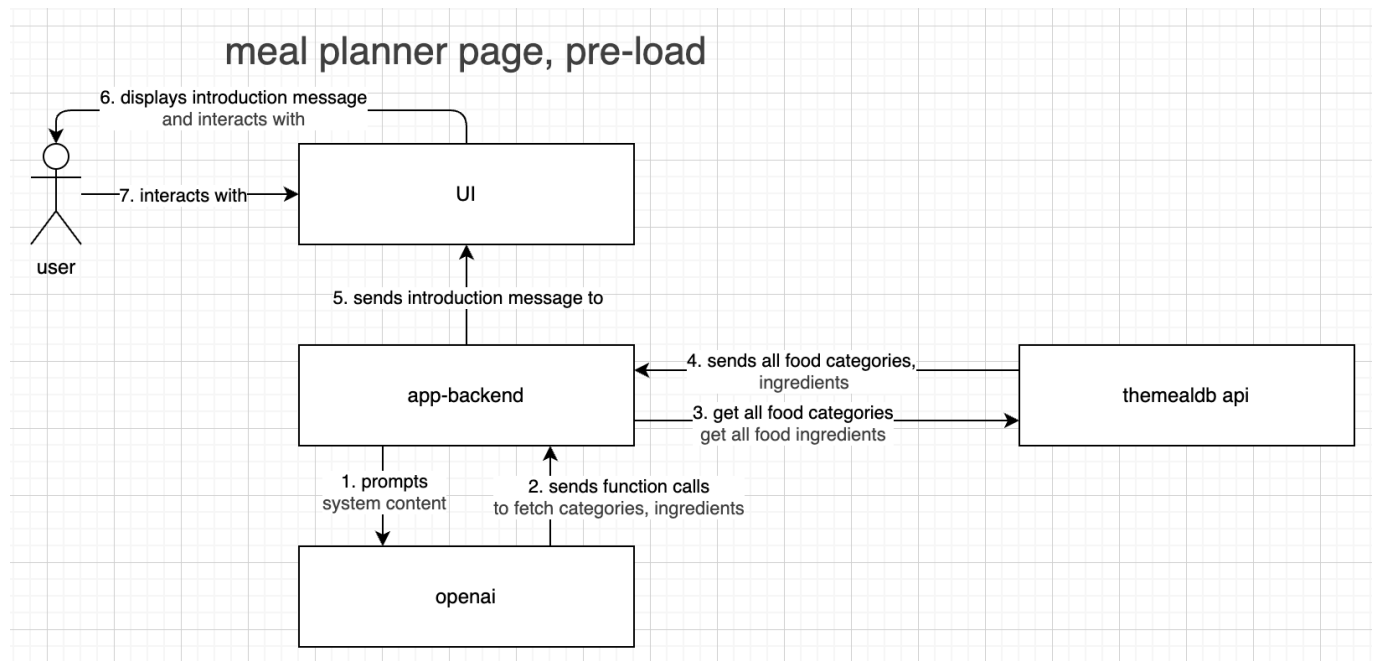


User Interaction: Meal Planner Page (Pre-Load)

This diagram illustrates the interaction flow when the Meal Planner page is pre-loaded in the MealCoach application:

1. **System Prompt:** The backend prompts OpenAI with system content to initialize the meal planning process.
2. **Function Calls:** OpenAI sends function calls to fetch food categories and ingredients.
3. **Data Retrieval:** The backend requests all food categories and ingredients from TheMealDB API.
4. **API Response:** TheMealDB API responds with the requested data (categories and ingredients).
5. **Introduction Message:** The backend sends an introduction message, along with the retrieved data, to the UI.
6. **UI Display:** The UI displays the introduction message to the user.
7. **User Interaction:** The user interacts with the Meal Planner page to begin customizing their meal plan.

This process ensures that the Meal Planner page is pre-loaded with all necessary data, providing a seamless and interactive user experience.

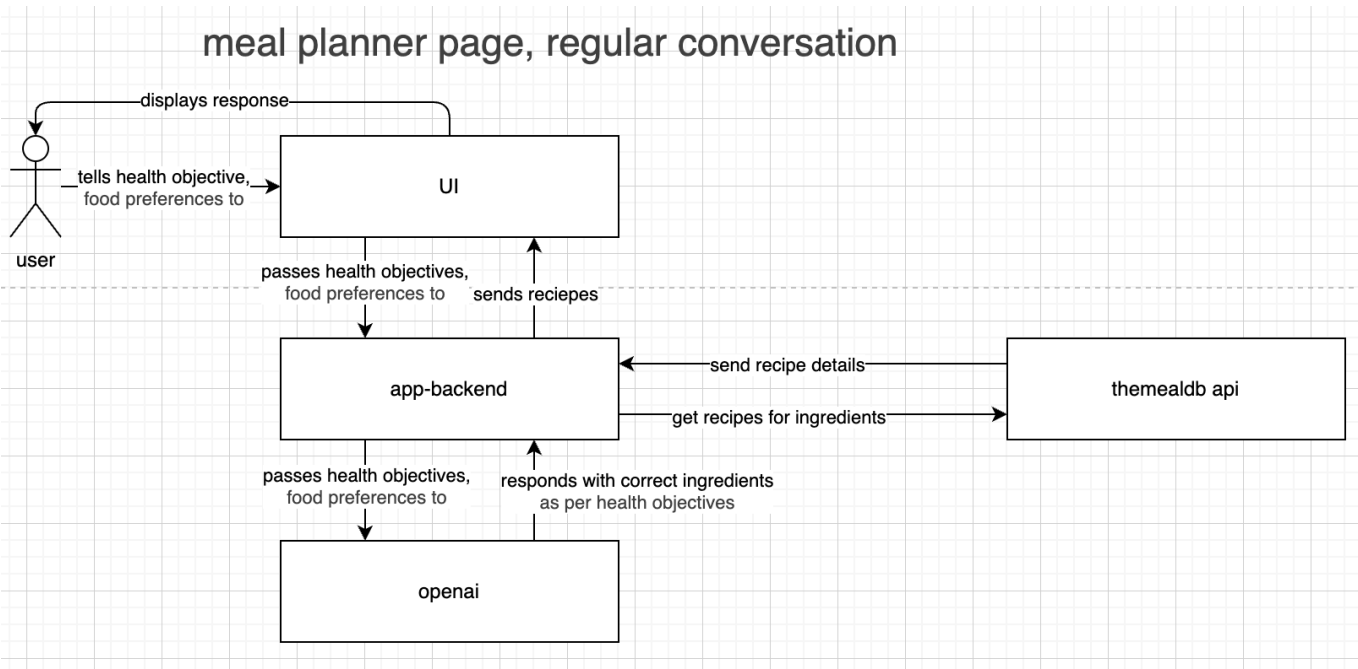


User Interaction: Meal Planner Page (Regular Conversation)

This diagram illustrates the interaction flow during regular user interactions on the Meal Planner page of the MealCoach application:

- 1. **User Input:** The user provides health objectives and food preferences through the UI.
- 2. **Backend Processing:** The UI sends the user's input to the app backend.
- 3. **AI Analysis:** The backend forwards the health objectives and food preferences to OpenAI, which processes the input and responds with appropriate ingredients based on the user's health objectives.
- 4. **Recipe Retrieval:** The backend uses the processed ingredients to request recipes from TheMealDB API.
- 5. **API Response:** TheMealDB API responds with detailed recipe information.
- 6. **UI Display:** The backend sends the recipes to the UI, which displays them to the user.
- 7. **User Interaction:** The user interacts with the displayed recipes to further customize their meal plan.

This process ensures that the user receives personalized meal suggestions tailored to their health goals and preferences.



App Backend Details

The app backend serves as the central hub of the MealCoach application, orchestrating communication between the user interface, OpenAI, and TheMealDB API. Below is a detailed breakdown of its responsibilities:

1. User Input Handling:

- Receives user inputs such as dietary preferences, restrictions, and health objectives from the UI.
- Validates and processes the inputs to ensure they are suitable for further analysis.

2. AI Integration:

- Sends user inputs to OpenAI for natural language processing and personalized meal recommendations.
- Handles AI responses, extracting key information such as suggested ingredients and meal ideas.

3. API Communication:

- Interfaces with TheMealDB API to fetch detailed recipe data, including cooking instructions, images, and video links.
- Ensures that the recipes align with the AI-generated suggestions for a cohesive user experience.

4. Moderation and Validation:

- Performs moderation checks on user inputs (e.g., usernames) using OpenAI to maintain a safe and respectful environment.
- Validates API responses to ensure data integrity and relevance.

5. Data Coordination:

- Combines AI-generated suggestions with TheMealDB API data to create comprehensive meal plans.
- Manages data flow between different components to ensure seamless operation.

6. Error Handling:

- Implements robust error-handling mechanisms to address issues such as API failures or invalid user inputs.
- Provides meaningful feedback to the user in case of errors.

By efficiently managing these responsibilities, the app backend ensures a smooth and reliable experience for MealCoach users.

