

# NUTRI-CRAFT

## Team members

Rajeev R (70)

Nidha Shameer T S (45)

Brighty Jobin (26)

Adeela Farshana (7)



## Guide

Maanasa N A S

# RECAP

## PROBLEM STATEMENT

Generic food recommendations fail to meet individual preferences leading to dissatisfaction for users and missed opportunities for businesses

## SOLUTION

A machine-learning-powered system offering personalized food and diet recommendations based on user preferences, health goals, and dietary restrictions

## TECH STACK

FastAPI, Streamlit, Python, Scikit-learn, Docker, and a dataset of 500,000+ recipes.

## IMPACT

Enhances user satisfaction, supports health-conscious choices, and improves business engagement through tailored suggestions.

## ROADMAP

System design, implementation, and testing completed by March 2025.

# **OBJECTIVE**

The objective of the NutriCraft project is to develop a user-friendly diet recommendation system that utilizes machine learning models like Nearest Neighbors and cosine similarity to generate personalized meal plans. By analyzing user-specific data, including age, gender, weight, height, activity level, dietary preferences, nutritional value and ingredients the system tailors recommendations to meet individual nutritional needs. The platform encourages healthier food choices by suggesting meals that align with user goals while ensuring an intuitive and interactive experience. With a focus on scalability and adaptability NutriCraft can support diverse dietary requirements and larger datasets making it a valuable tool for promoting better nutrition and overall well-being.

TITLE	LITERATURE REVIEW	DESCRIPTION
Fries-R. Gulati and M. Bhagat, "Content and knowledge based Food Recommending Intelligence Enabled System (FRIES)," 2021 IEEE		<ul style="list-style-type: none"> <li>Combines collaborative and content-based filtering for restaurant menus.</li> <li>Focuses on customer preferences; tested on Utsav restaurant data.</li> </ul>
W. Nadee and S. Unankard, "Alternative-Ingredient Recommendation Based on Correlation Weight for Thai Recipes," 2021 IEEE		<ul style="list-style-type: none"> <li>Recommends substitute ingredients using graph-based and correlation techniques for Thai recipes.</li> <li>Assists beginners with machine learning and text mining</li> </ul>
Collaborative-R. Singh and P. Dwivedi, "Food Recommendation Systems Based On Content-based and Collaborative Filtering Techniques," 2023 IEEE		<ul style="list-style-type: none"> <li>Uses KNN and cosine similarity for recommendations.</li> <li>Employs user ratings, food names, cuisine, and diet type.</li> </ul>
M. B. Garcia, J. B. Mangaba and C. C. Tanchoco, "Acceptability, Usability, and Quality of a Personalized Daily Meal Plan Recommender System: The Case of Virtual Dietitian," 2021 IEEE		<ul style="list-style-type: none"> <li>Offers diet plans using Nutrition Care Process Model (NCPM).</li> <li>Combines rule-based reasoning and machine learning for health-conscious users.</li> </ul>
Novel time-M. Rostami, M. Oussalah and V. Farrahi, "A Novel Time-Aware Food Recommender-System Based on Deep Learning and Graph Clustering," 2022 IEEE		<ul style="list-style-type: none"> <li>Uses a hybrid approach combining deep learning and graph clustering.</li> <li>Adapts recommendations over time based on user eating habits and preferences.</li> </ul>

# LEARNING FROM THEM

1

## CONTENT-BASED FILTERING DELIVERS TRUE PERSONALIZATION

Ensures recommendations are personalized based on user preferences, BMI, and dietary goals without relying on community-driven data.

2

## TIME-AWARENESS ENHANCES USER EXPERIENCE

Adapting recommendations based on evolving dietary preferences improves user satisfaction and engagement.

3

## INGREDIENT-BASED RECOMMENDATIONS ENHANCE PERSONALIZATION

Considering food content (e.g., macronutrient values, allergens) leads to healthier and more relevant choices.

4

## COMPUTATIONAL COMPLEXITY VS. PRACTICALITY

Simpler models are easier to implement but may lack adaptability, while advanced models require more computational power but provide deeper personalization.

5

## ADDRESSING COLD START PROBLEMS IMPROVES PERFORMANCE

content-based filtering does not require prior user interactions (ratings or reviews) to generate recommendations

# PROPOSED SYSTEM

NutriCraft is a personalized food and diet recommendation system that uses content-based filtering approach with a cosine similarity-based nearest neighbor model. It tailors meal suggestions based on nutritional values, ingredients or user-specific data such as age, weight, dietary preferences and activity level

## MAIN MODULES

### Streamlit Frontend

- Captures user input
- Image Retrieval using ImageFinder
- Display for results

### FastAPI Backend

- Receives HTTP requests from the frontend
- Call to model.py logic
- Transforms and returns the model's output as a JSON response

### API gateway

- Constructs API requests
- Sends HTTP requests to backend
- Parses JSON responses

### Model

- Data preprocessing
- Filters data
- k-NN Model
- Recommendation Generation

### Image Finder

- Retrieves images for recipes

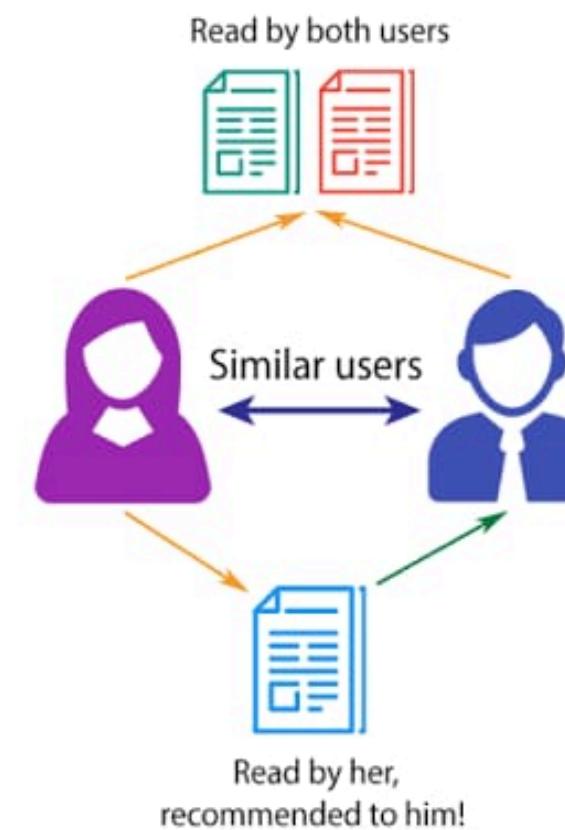
### Streamlit Echarts

- Renders interactive graphs

# Generic Food Recommendation System

- Revenue Driven suggestions and pre defined plans

## COLLABORATIVE FILTERING

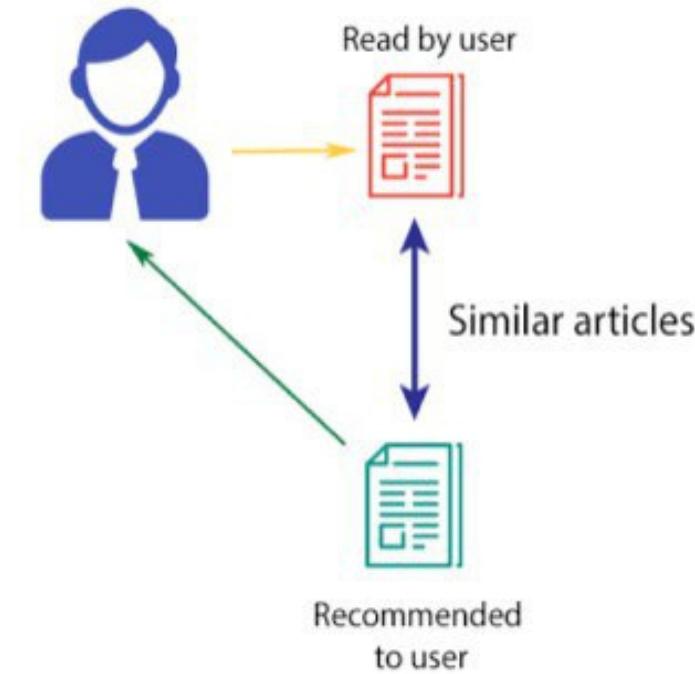


- Suggests items popular among similar users

# Nutri Craft

- Recommendation is data-driven and uniquely customized

## CONTENT-BASED FILTERING



- Tailors suggestions to the user's unique requirements

# FEATURES



## Personalized Diet Recommendations

- Generates meal plans based on age, gender, weight, height, activity level.
- Provides detailed macronutrient and micronutrient breakdown, Real-Time Chart Visualization



## Nutrient-Based Food Recommendations

Users can input available ingredients to receive recipe suggestions



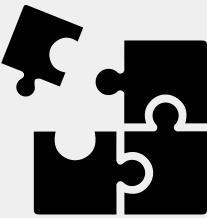
## Ingredient-Based Food Recommendations

Users can input available ingredients to receive recipe suggestions.



## Recipe Database with Extensive Meal Options

Includes diverse meal options covering different cuisines and dietary needs.



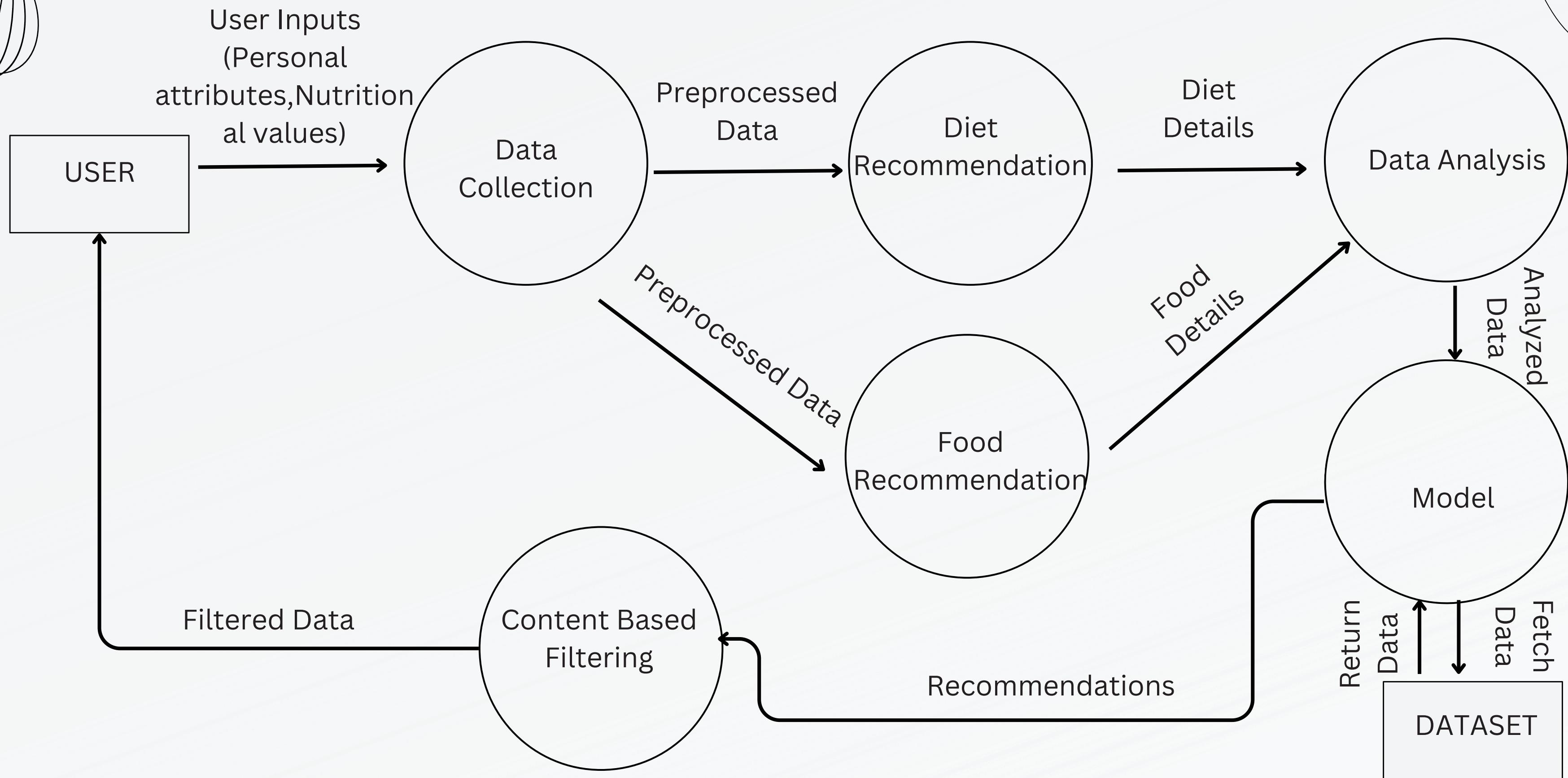
## Image-Based Recipe Enhancement

Enhances user engagement by providing visual insights into meals.

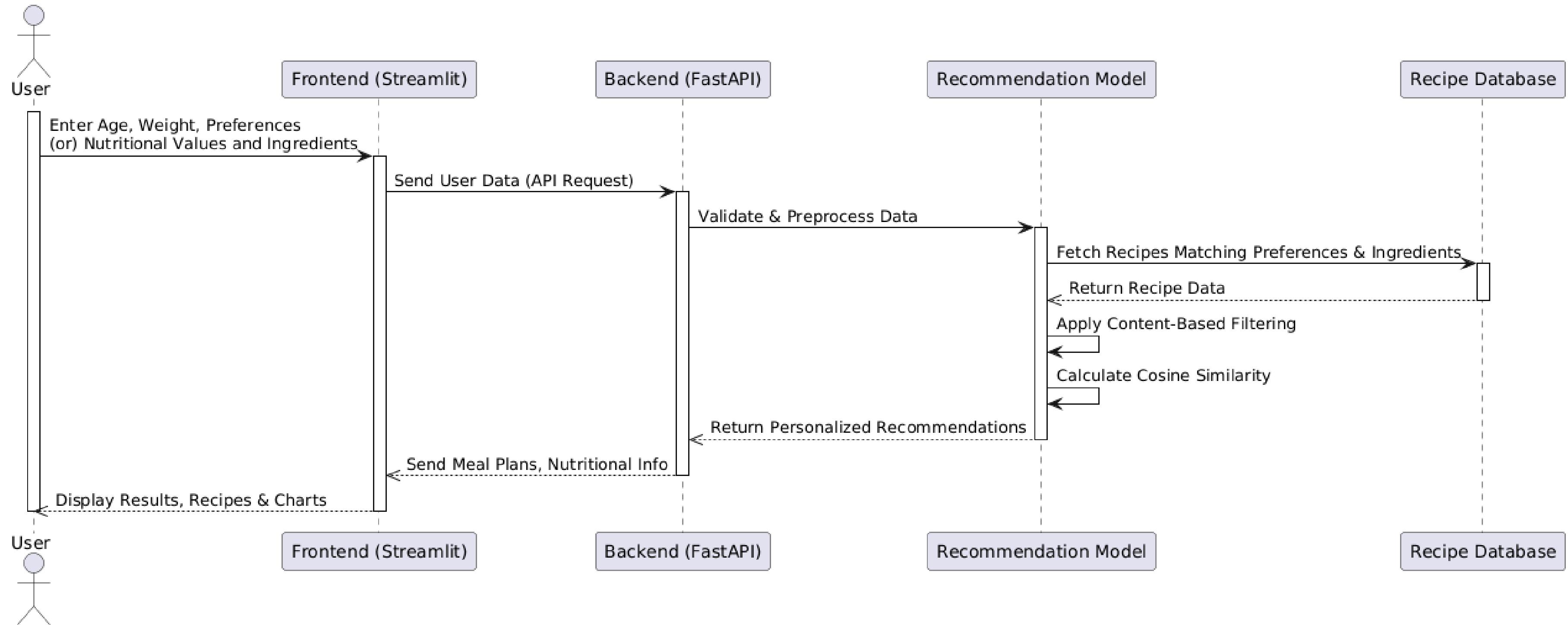
# DFD LEVEL - 0



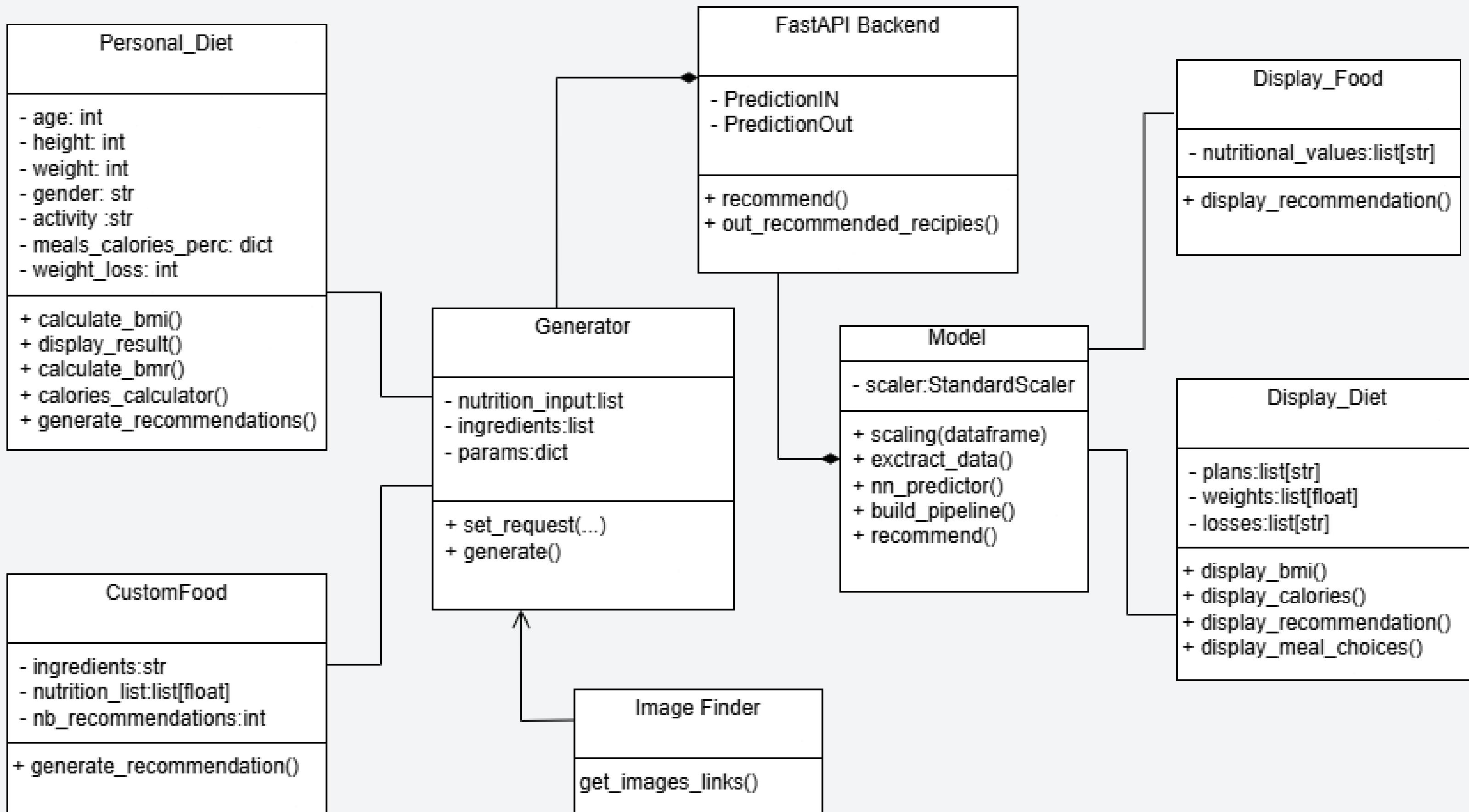
# DFD LEVEL-1



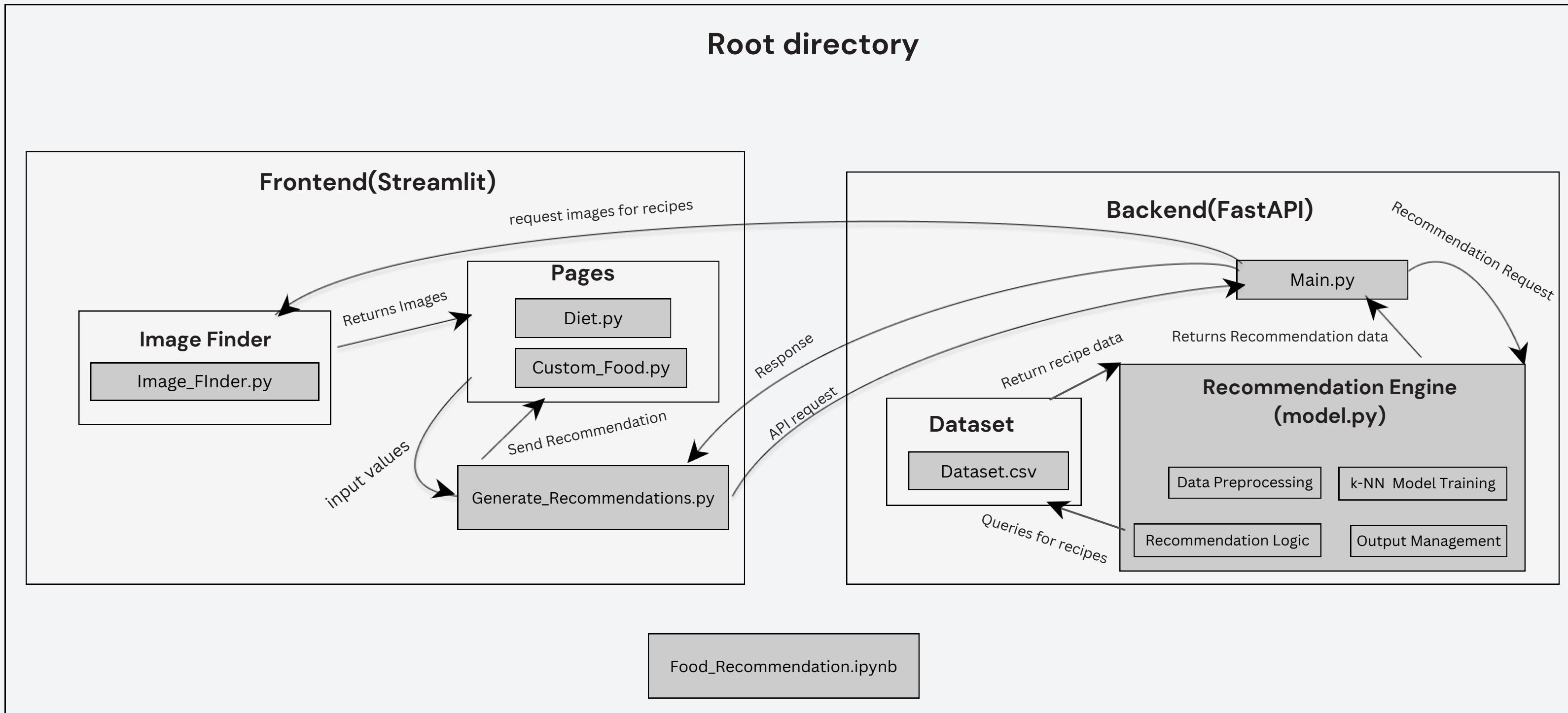
# SEQUENCE DIAGRAMS FOR KEY INTERACTIONS



# CLASS DIAGRAM



# COMPONENT DIAGRAM



# PROJECT ROADMAP

