

BiteMatch - No more “What should I eat?” debates

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Project Summary

Deciding what to eat can be a time-consuming and frustrating experience, especially with the overwhelming number of recipes available online. Our preference-based dish decision-making app simplifies this process by offering a personalized and efficient way for users to discover meals that align with their dietary preferences, calorie goals, and ingredient availability. Unlike traditional cookbook and recipe management apps, our platform minimizes decision fatigue by streamlining the selection process.

At its core, the app functions like a “dating app for recipes,” where users can quickly browse and express interest in meals by swiping to save, mark as a “maybe,” or skip. Over time, the app refines recommendations based on user preferences, creating a highly personalized experience. In this way, our application allows users to explore a diverse range of dishes in a short amount of time, making meal planning effortless and enjoyable.

Problem Statement and Application Description

Background

Finding the right recipe that fits a user’s dietary preferences, calorie needs, and available ingredients can be challenging. Many existing platforms lack personalization, making it difficult for users to discover relevant recipes, track calories, and organize their meal plans efficiently. Our recipe website aims to simplify this process by providing recipe recommendations, meal planning integration, calorie tracking, and grocery list management—all in one seamless experience.

Problem Identification

- **Decision Fatigue:** Users struggle to find suitable recipes that match their preferences, dietary restrictions, or available ingredients.
- **Health & Calorie Tracking:** Users lack an easy way to track the calories in meals.
- **Meal Planning & Organization:** Users find it difficult to plan meals and organize grocery shopping.
- **Content Discovery:** Users want to explore recipe videos but need a seamless experience integrating external platforms.

Proposed Solution

- **Meal Planning & Calendar Integration**
 - Allows users to save their favorite recipes and plan meals for the week.
 - Syncs with Calendar to help users schedule meals.
- **Calorie & Nutritional Tracking**
 - Automatically calculates the calorie content per recipe, helping users make informed dietary choices.
- **Engaging Recipe Content & Video Integration**
 - Enhances the cooking experience by linking to step-by-step video tutorials from platforms like YouTube, TikTok, and Pinterest.
 - Provides a user-friendly recipe detail page with clear instructions and ingredient breakdowns.
- **User Accounts & Recipe Saving**

- Users can create personal accounts to save recipes, track dietary preferences, and revisit favorite meals.

Target Users

- **Home cooks:** People who enjoy cooking, but need inspiration or help with meal planning.
- **Health-conscious users:** Users tracking calorie intake and nutritional values.
- **Busy professionals/students:** People looking for quick and easy meal solutions.
- **Beginner cooks:** Those who need step-by-step instructions and video guides.

Creative Components

We are going to build a **preference-based** (calories, ingredients) dish decision-making app that reduces the time users spend deciding 'what to eat'. Currently, these types of apps fall into two main categories: cookbook apps like NYT Cooking, which serve as recipe databases where users can share their own recipes, and recipe management apps like Crouton, which help users organize recipes collected from cookbooks and third-party platforms (TikTok, YouTube, Pinterest).

Based on the interest of the user in a recipe (save, maybe, or skip), the user can like and dislike the recipe, making it a dating app experience, allowing the user to go through a good amount of recipes in a short time.

Usefulness & Uniqueness

Analysis of Competitive Products

NYT Cooking

NYT Cooking is a digital culinary platform developed by The New York Times, offering a vast collection of over 22,000 recipes curated by professional editors and chefs. Launched as a standalone app and website, it provides users with a comprehensive cooking experience, featuring recipe search, personalized recommendations, and organizational tools. NYT Cooking stands out for its high-quality content, user-friendly interface, and unique 'notes' feature that encourage a collaborative community of home cooks.

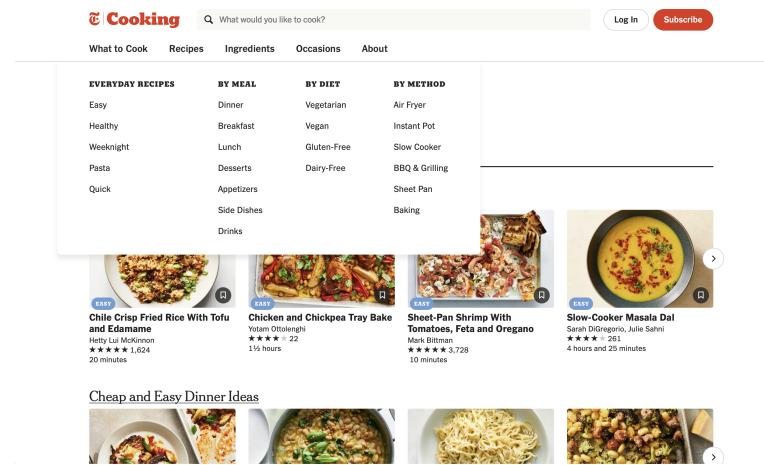


Figure 1: NYT Cooking Website

Crouton

Crouton is a recipe management and meal planning app designed for Apple platforms that enables users to collect recipes from various platforms. Its core feature is importing recipes from anywhere using AI technology—including websites, cookbooks, and even handwritten notes. The app also offers a range of functionalities to enhance the cooking experience, such as step-by-step guided cooking, automatic meal planning, integrated timers, and the ability to create shopping lists directly from recipes.

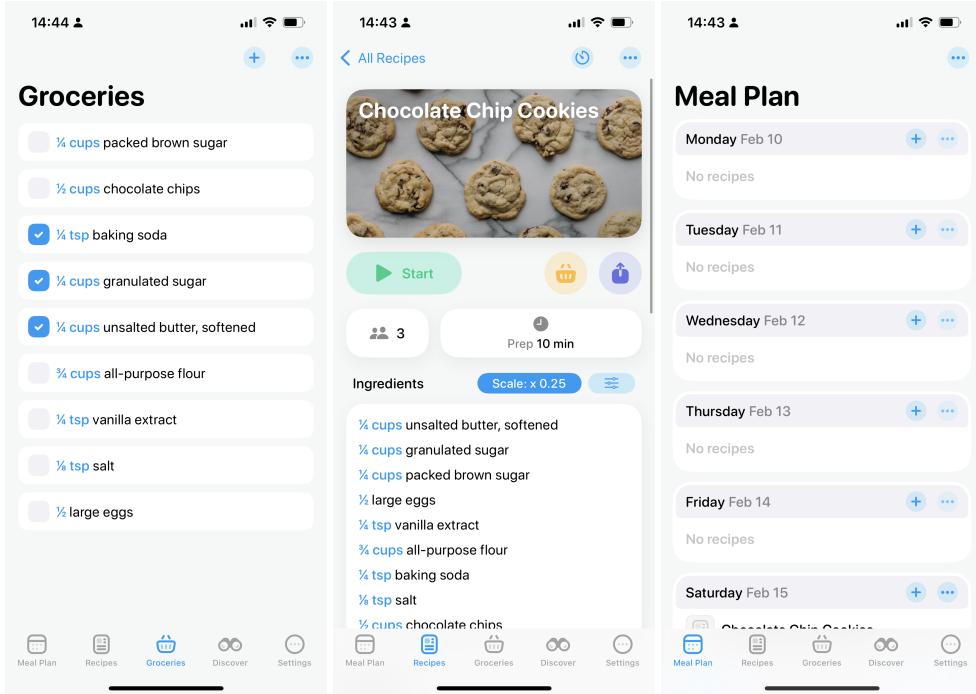


Figure 2: Crouton Recipe App

Uniqueness

NYT Cooking stands out as a premier recipe content provider, offering a rich collection of culinary ideas. In contrast, Crouton serves as an efficient tool for gathering recipes from various platforms and managing meal plans. BiteMatch takes a unique approach, boasting an extensive recipe database that delivers personalized recommendations based on users' ingredients or preferences. This user-centric model eliminates the need for manual recipe collection. Instead, users simply specify their available ingredients or dietary requirements, and BiteMatch presents tailored recipe suggestions.

Features

Core features

- Create user account
- Recommend recipes to users
- Push recipes based on user's preference, including calories and ingredients
- View recipes and users can decide if they want to make it or not
- User can save recipes for later use
- Calculate calorie for one recipe
- Detail page of recipe (Direction, ingredient and their calories, external link to external cookbook)

Additional Feature

Features	Description
Meal Plan	For the user's favorite recipe, you can add it to Meal Plan and consider adding it to the user's Google Calendar.
Grocery	Maintain a missing grocery list according to user needs.
View making process video	Jump to an external cookbook (TikTok, YouTube, Pinterest) to watch the making process video.

Expected Impact

Saves Time & Reduces Decision Fatigue

- Meal planning helps users streamline their cooking process.

Promotes Healthier Eating Habits

- Built-in calorie and nutritional tracking empowers users to make informed dietary choices.
- It also helps users stick to specific diets, whether it's low-carb, high-protein, vegan, or other preferences.

Encourages Engagement & Recipe Discovery

- Users can save and revisit favorite recipes, creating a personalized recipe collection.

Provides a User-Centric Experience

- A single platform that integrates recipe discovery, meal planning, nutrition tracking, and grocery management.

Data Sources & Realness

Dataset 1: RecipeNLG

The RecipeNLG dataset is a large-scale collection of recipes containing 2.2 million recipes. It provides structured information for various applications, including recipe recommendation, ingredient analysis, and automated recipe generation. The dataset captures multiple aspects of recipes, including:

1. **Title** - The name of the recipe.
2. **Ingredients** - A list of ingredients used in the recipe along with their quantities (e.g., "teaspoons grated lemon rind", "4 cups chicken stock").
3. **Directions** - Step-by-step cooking instructions.
4. **Link** - The original URL of the recipe source URL.
5. **Source** - The platform from which the recipe was collected.
6. **NER (Named Entity Recognition)** - Identified key ingredients extracted from the recipe.

Source: RecipeNLG

Format: Data Format: csv

Data Size:

	Cardinality	Degree
RecipeNLG	6	2231141

Dataset 2: Food Nutrition Dataset

The dataset captures comprehensive nutritional information of various food items, including macronutrients (calories, fats, proteins, carbohydrates) and micronutrients (vitamins, minerals). It also includes additional details such as sodium content, dietary fiber, cholesterol levels, and water composition.

Source: Kaggle

Format:

- Data Format: csv
- Number of Files: 5 csv files
- File Sizes:
 - FOOD-DATA-GROUP1.csv 97KB
 - FOOD-DATA-GROUP2.csv 52KB

- FOOD-DATA-GROUP3.csv 98KB
- FOOD-DATA-GROUP4.csv 39KB
- FOOD-DATA-GROUP5.csv 121KB

Data Size:

	Cardinality	Degree
GROUP1	35	551
GROUP2	35	319
GROUP3	35	571
GROUP4	35	232
GROUP5	35	722

Explain how these datasets will be combined or used in the project

The RecipeNLG dataset provides detailed information about various recipes, including title, ingredients, instructions, and so on. However, this dataset lacks nutritional information such as calories, fats, and protein content.

On the other hand, the food nutrition dataset contains detailed nutritional information for different food items. However, it does not contain recipes or cooking contents.

To enhance the usability of both datasets, we will combine them based on ingredient names. Specifically, the NER field in the RecipeNLG dataset will be cross-referenced with the food column in the nutrition dataset. This will help us enhance the recipe data by adding nutritional values, allowing users to assess the health effects of a given recipe.

Parse the NER Array

- Extract all ingredient names from the NER field (e.g., “garlic,” “water”).
- Since NER is stored as an Array(String), it needs to be divided into individual food names.

Joint Strategy

- Use fuzzy matching or direct name matching to link processed NER in RecipeNLG with food in the nutrition dataset.
- If multiple ingredients match a food item, aggregate the nutritional values accordingly.

Output result

- Each recipe will now include details such as caloric values, macronutrient composition, and other health-related information.

By combining these elements, we can build a recipe recommendation system that considers nutritional factors, helping users find meals that fit their dietary preferences and health goals.

Application Functionality

User Actions: What can a user do? (CRUD operations: Create, Read, Update, Delete)

- **Create:** Users can create new accounts and add recipes to their collections.
- **Read:** Users can search recipes based on what food they have at home.
- **Update:** Users can modify their collected recipes.
- **Delete:** Users can delete recipes from their collected recipes.

Key Features:

- **Search and filtering options**
 - Search and filtering are based on the user’s desired ingredients and the calorie value of a dish. The user should also be able to search a recipe based on the name of the dish and rating of the recipe.
- **Data visualization elements**

- Recipes will be displayed in a list format including the image of the dish if it exists, name, preparation time, and calorie values.
- **User authentication (if applicable)**
 - Users should be able to create an account to keep all their saved recipes.
- **Customization options**

User Flow: Describe the step-by-step user interaction with the application.

- In the application, the user inputs the ingredients they have and/or the calorie value they want for this meal. The system then displays a list of results ordered by relevancy. The user can then select one of the recipes and read the instructions.
- Once the user saves a recipe or decides to make one, they can choose which ingredient to add to the grocery list.

UI Mockup

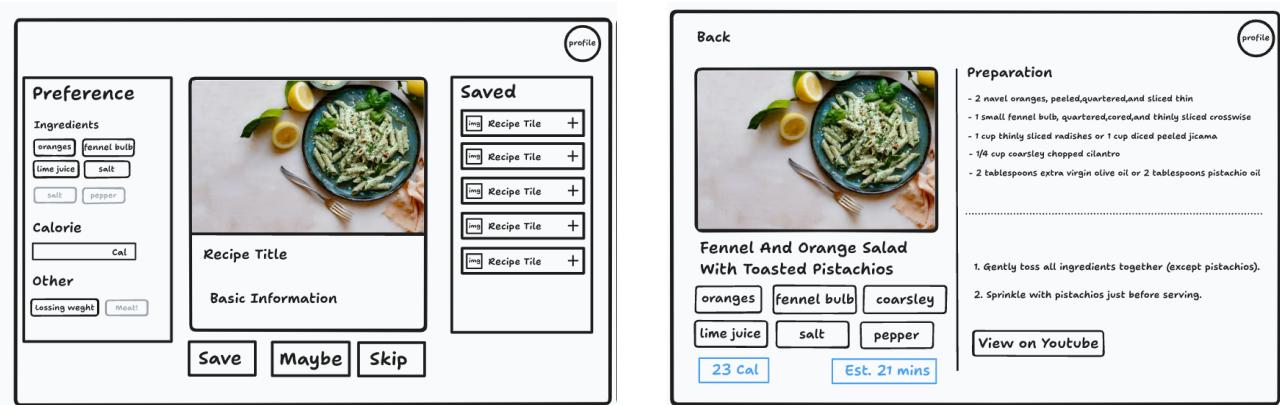


Figure 3: User Interface Mockups for BiteMatch

Work Distribution

Responsibilities	Team
Frontend responsibilities (UI design, client-side logic)	Yiwen(Yvonne) Zhang
Database Management	Yiting Wang
API development	Jiajun Huo, Zhihao Cheng
Tools	GitHub, Figma, GCP, MySQL, Notion