Recipe Finder

CCSW 223

Lab Project Report

[IT]

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Table of Contents

1 Introduction

Cooking can be a daily challenge for many, whether due to a lack of skills or missing ingredients. Recipe Finder is designed to simplify this process by helping users create delicious dishes based on the ingredients they already have. This not only reduces food waste but also enables users to make the most of their available resources, turning everyday cooking into an enjoyable and resourceful experience.

2 Problem Definition

Many people face challenges with their cooking routine. Some of them lack cooking skills, and some do not have the required ingredients to make a dish. Recipe Finder aims to help users create recipes based on the ingredients they have available. This addresses the common challenge of food waste and users' desire to cook with available resources.

3 Information Gathering

3.1 Interview Description

Aim: We aim to find out whether people approve of our program's idea and gather suggestions for any changes to improve its quality.

Questions:

1- How would you describe your level of cooking?
2- What applications do you use to search for recipes? What are some things that you do not like about that application?
3- After we explained our application to you, what feature do you want to suggest adding to the application?
4- How often do you think you will use the application?
5- What challenges do you face in managing food waste? and how can our app help you address these issues and reduce food waste?

3.2 Interview Analysis

Interviewer	Interviewee	Analyst Comment
Ruba	Rasha, phycologist, September 6th Fawzzia, teacher, September 7th	They rate themselves between low to medium in cooking skills. They mostly use TikTok, Snapchat and Pinterest but the issues with these apps are that they cannot save the recipe properly, does not give enough information, not so common ingredients and they cannot skip some parts or speed it up. They suggest to add a couple more feature. First a timer for cooking time, fermentation and marination. Second to let the app give alternatives to some ingredients if they were unavailable. Thirdly the app tells you the health benefits of some ingredients. Fourthly they struggle with portion sizes so they want to control how much food they want to make by choosing how many people are eating so no food go to waste. Fifthly to inform them on how to store the recipe they made. Lastly they can filter the recipes according to how much time they have and filter their preferences based on whether they intend to use an oven or a stove or not. they stated that they would use the app once or twice per day, on average.
Nujud	Lama, student, September 6th Noor, student, September 7th	She is a beginner cook looking to improve, uses applications like Cookpad and AllRecipes but is frustrated by advertisements and the lack of precise filtering options. They propose a feature that organizes shopping lists based on chosen recipes to make grocery shopping and meal preparation easier. They would engage with an application daily if it provided support with meal planning and ingredient management. Additionally, they struggle with portion sizes and suggest the application offer guidance on this, along with a system for tracking leftovers. She considers her cooking skills to be at an intermediate level and currently uses Cookpad for recipes, though she finds it sometimes unclear and prefers visual aids like videos to better understand the cooking process. She suggests adding video tutorials to the application to enhance clarity. She plans to use the application primarily for trying new recipes or

		recalling ones she has used before. She faces challenges with managing food waste, particularly with cooking appropriate portions and dealing with leftovers and expired ingredients. To address these issues, she proposes that the app should offer portion suggestions, track leftovers, and provide reminders to use ingredients before they expire, which would help reduce food waste effectively.
Hanin	Ruba, student, September 5th Renad , student, September 6th.	Her cooking skills are average, and she currently uses TikTok for recipes. She suggests adding multilingual support to the app to make it more inclusive. She expects to use the app once or twice daily. Her main issue with food waste is preparing excessive quantities, and she thinks the app could assist by offering personalized portion size recommendations based on factors such as weight and age. She rates her cooking skills as ranging from average to excellent and uses a lot of sources for recipes, including TikTok, YouTube, and of course her mom is the "main source for recipes ". She used a lot of apps and most of the time she does not have all the ingredients for the recipe, so she needs to go to the supermarket to buy the ingredients listed in the recipe. She said she will use our app every time she needs a new recipe. She often forgets about the ingredients she has, and they expire. Our app could help by suggesting recipes based on what I already have, reducing waste.
Raghad	Ghala, Student, September 8th Rahaf, Business women, September 8th	Her cooking skills range from very good to excellent, and she usually searches for recipes on TikTok. However, she sometimes struggles to find specific ingredients, and the measurements are not always precise. One feature she would suggest adding is a categorization of recipes by preparation time, as she would use the app three to four times a week. Additionally, one of the challenges she faces is that many recipes do not specify the number of servings, which causes her to cook more than what she intended. She said it would be great if the app could include the number of servings in each recipe. She would describe her cooking skills as proficient and uses Pinterest and Instagram for recipes. She dislikes the lack of detailed ingredient lists and precise measurements. She suggests adding a meal planner feature to help users organize their weekly meals and would use the application three times a week. She often buys too many ingredients that go unused.

		The app can help by suggesting recipes based on what she has and providing portion control options to minimize waste.
Israa	Aryam, student, September 6th	The study results showed that the participant possesses cooking skills ranging from good to excellent. According to her responses, she uses TikTok to search for recipes but faces difficulties in saving them. She also encounters issues in managing food waste, such as missing certain ingredients for a dish or struggling to find a recipe for a specific ingredient. Therefore, after we explained our app to her, she expressed a desire to use it two to three times a week.
	Mervat, housewife, September 7th	The responses of this participant indicated that her cooking level ranges from poor to good. She finds it difficult to discover easy recipes on TikTok or other apps, and she also faces issues in managing food waste, as she often does not know what to buy to prepare a specific recipe. After we explained our app, she suggested adding simple and easy recipes to help improve her cooking skills. She expressed her interest in the app by stating her desire to use it two to five times a week.

3.2.1 Table

After we interviewed individuals, we discovered that:

Most people struggle with many difficulties, such as:

- Adds.
- Saving the recipe.
- Not enough information.
- Not so common ingredients.
- Cannot skip some parts if it was a video or speed it up.
- Cannot filter the options.
- Not precise measurements.

And because of these issues they suggested a couple of features and additions that they would like to have in our program, such as:

- A timer.
- Some ingredients alternatives.
- A calendar for meal planning.
- Can control the number of servings by choosing the amount of people, their age and weight.
- How to store the recipes correctly.
- A filter for displaying recipes based on difficulty and complication.
- A filter for the duration of the cooking process.
- A filter for usage of oven, microwave, stove.
- Organizing the shopping lists based on the recipes.
- Visuals (photos and videos).
- Tracking leftovers.
- Expiration reminders.
- Multilingual.
- Display health benefits.

4 Planning Phase

4.1 Project Goals

The purpose of the project

Some people struggle to determine the ingredients required for a specific meal or what they can cook with the ingredients they have available. Others may feel bored from repeating the same meals, either due to a lack of cooking skills or the unavailability of the necessary ingredients. Therefore, our app displays various recipes, cooking methods, and alternatives for ingredients in case they are unavailable. This helps users try new and easy recipes while also reducing food waste by offering recipes based on the ingredients currently available to the user.

Our motivation is to reduce food waste and make people’s lives easier.

Since cooking is an essential life skill that everyone should know and plays an important role in our day-to-day life. Our goal is to make life easier for those who lack the ability to develop this skill or do not have enough resources to explore new recipes and enjoy the art of cooking. Additionally working on the app is a great opportunity to improve our CVs, and If it succeeds, it could even turn into a full-time job for us.

Preliminary report

The problem:

Many people struggle with cooking because they either lack the necessary skills or don't have the right ingredients. Recipe Finder aims to solve these problems by helping users create recipes based on the ingredients they have, which encourages more productive use of their resources and reduces food waste.

However, our interviews reveals several issues with existing systems. They often lack flexibility when it comes to changing recipes for missing ingredients. Also they don't offer options for doing the recipes based on the number

of people and their preferences. They often lack effective filtering options for factors like cooking time, or the type of equipment available, This makes it hard to find recipes. Managing ingredients and leftovers adds another layer of complexity. People often forget what they have in their fridge, leading to wasted food. There's a need for better tools to help with meal planning, tracking leftovers, and reminders about expiration dates. Obviously most systems don't fully address the real-world challenges people face in their kitchens daily.

Findings:

- Difficulty finding ingredient alternatives.
- Issues with saving and organizing recipes.
- Lack of recipe information.
- requiring uncommon ingredients.
- Inability to skip or speed up video instructions.
- Limited options for filtering recipes.
- Inaccurate ingredient measurements.

Recommendation or proposed solution:

- Adding a timer.
- Providing ingredient substitutes.
- Allowing changes based on the number of people, their age, and weight.
- Offering tips on storing recipes.
- Adding filters for recipe difficulty and complexity.
- Including filters for cooking time and methods (oven, microwave, stove).
- Organizing shopping lists by recipe.
- Adding photos and videos.
- Sending expiration reminders.
- Supporting multiple languages.
- Displaying health benefits of recipes.

4.2 Cost and schedule estimation

Project Estimated Costs

Resources	Estimated cost
Business Analyst	30,000 SAR-75,000 SAR
Project Manager	7,000 SAR-18,000 SAR
UX/UI Designer	22,500 SAR- 37,500 SAR
Technical Writer	7,500 SAR-18,750 SAR
Hardware	3,000 SAR – 30,000 SAR
Software	20,000 SAR – 75,000 SAR
Software Architect	37,500 SAR-75,000 SAR
Developer	150,000 SAR – 225,000 SAR
Data Scientist	75,000 SAR - 112,500 SAR
Data Analysis	2,000 - 5,000 SAR
Necessary Adjustments	5,000 - 15,000 SAR
Development and Updates	10,000 - 40,000 SAR
Testing and Quality Assurance	3,000 - 10,000 SAR

4.2.1 Table

Project Estimated Schedule

Tasks	Estimated duration	Start date	End date
Define specifications	1 week	13\Sep\2024	19\Sep\2024
Design	3 weeks	21\Sep\2024	10\Oct\2024
Project implementation	5 days	14\Oct\2024	18\Oct\2024
Validation	5 weeks	20\Oct\2024	21\Nov\2024
Evolution	6 weeks	25\Nov\2024	3\Jan\2024

4.2.2 Table

4.3 The Feasibility Study

1 Problem Definition:

Main problems: many people lack cooking skills, and limited availability of specialized ingredients.

Sub-problems: Difficulty focusing on the recipe due to ad placement, problems accessing saved recipes, inability to skip or speed up video tutorials, difficulty in finding recipes that match specific requirements, and recipes with unclear measurements.

2 Scope Objectives of “new system”:

Proposed Name: Recipe Finder

Objective of the New System: The Recipe Finder system aims to transition from manual recipe discovery and ingredient management to an electronic platform that simplifies the cooking process. The system will provide users with an efficient way to find recipes and manage ingredients.

Overall Concept of the System: Recipe Finder is a digital solution designed for helping users approach meal planning and recipe creation. The system has various functionalities, offering users a Simplified experience in discovering and preparing meals based on the ingredients they have on hand. It combines intelligent algorithms, user-friendly interfaces, and real-time data to provide personalized recipe suggestions.

Procedure to Meat User Requirements and What Distinguishes Our System:

- Ingredient input
- Recipe generation
- Recipe filtering
- Nutritional information
- Quantity adjustment
- Favorite recipes
- Substitute suggestions
- Ratings and reviews
- Shopping list

3 Alternative Solutions:

Solution 1: Develop a new app.
Solution 2: Enhance existing apps by adding new features.
Solution 3: Take no action, allowing users to continue using the apps they are familiar with.

4 Cost And Benefits of Alternatives:

Alternatives	*Cost*	*Benefits*	*Drawbacks*
Solution 1: **Develop a new app**	-Development: 150,000 SAR -Marketing: 50,000 SAR -Maintenance: 20,000 SAR	Customization for specific user needs	High costs and a long time required**.**
Solution 2: **Enhance existing apps**	- Feature enhancements: 90,000 SAR - Annual updates: 50,000 SAR	Faster implementation	Dependency on existing app limitations
Solution 3: **Take no action**	- No costs: 0 SAR	Users remain with familiar tools	Loss of the opportunity for innovation

4.3.1 Table

5 Software Impacts:

Additions and modifications from existing software:

- Search bar
- Photos and videos
- Filtering
- Supporting multiple languages
- A timer

6 Potential Changes in the Organization:

Our app can help change those who lack cooking skills lives. By offering easy recipes, step-by-step guides, and meal planning, changing cooking into a creative and an adventures activity.

7 Recommended Alternative of the Course of Action:

The best alternative is to create the Recipe Finder app. It will change people's lives and is cheaper in the long run and more effective to create a whole new app than to precede with any of the other alternatives due to the need of more features and customization.

4.4 Project Plan

	Primary Column	Assigned To	Start	Finish	Duration
1	Define specifications	Business Analyst	13/09/24	19/09/24	1w
2	Design	UX/UI Designer	21/09/24	10/10/24	3w
3	Project implementation	Software Architect	14/10/24	18/10/24	5d
4	Validation	Data Analysis	20/10/24	21/11/24	5w
5	Evolution	Testing and Quality Assurance	25/11/24	03/01/25	6w
6					
7					
8					
9					
10					
11					

Fig 4.4.1

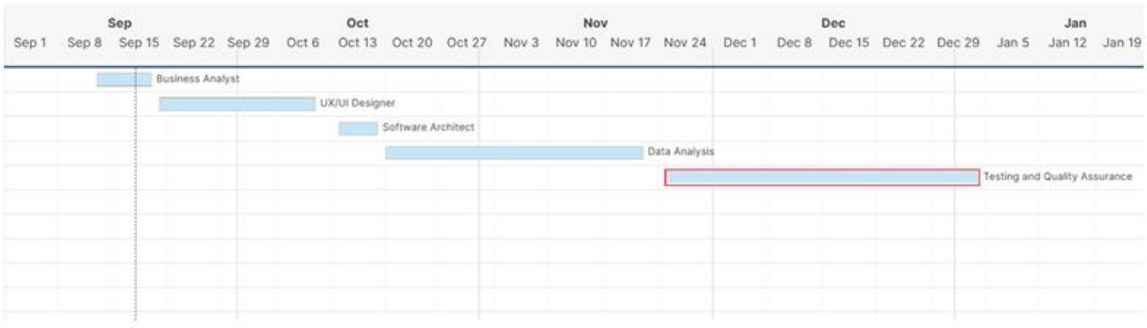

Fig 4.4.2

5 Analysis Phase

5.1 Stakeholders

1 The customer:

Anyone who would like to cook.

2 Saudi Food and Drug Authority:

Where we can take the nutritional information.

3 Cooking expert:

Who works to gather multiple recipes for various dishes.

4 Maintenance team:

Who are responsible for continuously monitoring and updating the app to ensure it is free from errors.

5.2 Context Diagram

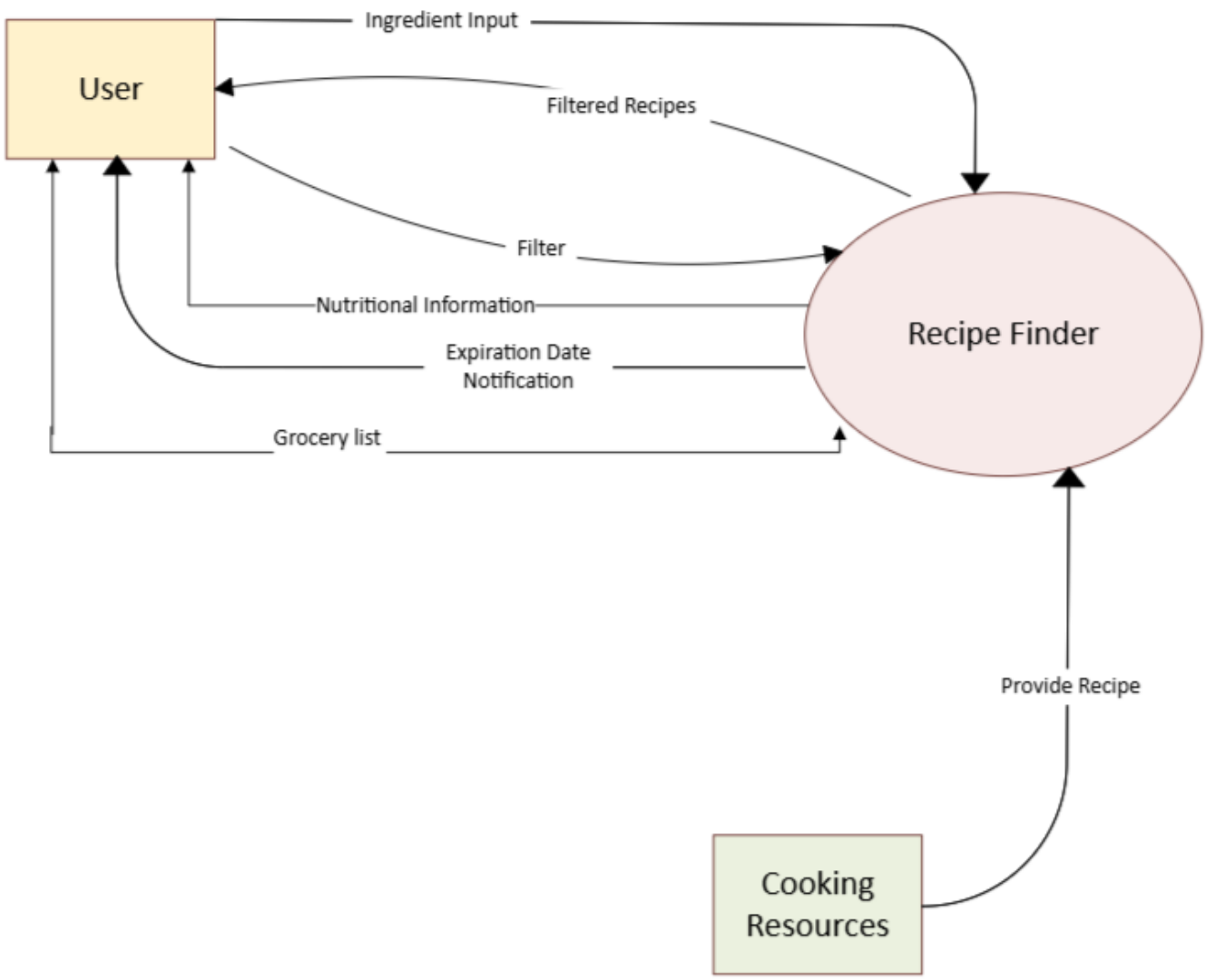

Fig 5.2.1

5.3 Event Table

Event Name	Input and Output	Summary
1.Receiving filtered recipes	Filter(in)	Receive the filtered recipes according to the user's request.
2. Filtered Recipes for User Preferences	Filtered Recipes (out)	Provide the user with the filtered recipes.
3. Entering Ingredients	Ingredient Input (in)	The user enters the ingredients into the recipe finder.
4. Nutritional Information for Recipes.	Nutritional Information (out)	The recipe finder provides detailed nutritional information for each recipe.
5. Notification of Approaching Expiration	Expiration Date Notification (Out)	The user receives a notification about the approaching expiration date of the ingredients.
6. Entering Grocery Items	Grocery list (in)	The user inputs the grocery items they have into the Recipe Finder.
7. Listing Missing Ingredients	Grocery list (out)	The recipe finder informs the user about the missing grocery items and lists the ingredients needed to make a recipe.
8. Recipe Collection	Provide Recipe (in)	Recipes are collected from external sources to be included in the recipe finder.

5.3.1 Table

5.4 Functional Requirements

FR1: The user shall be able to create an account that is uniquely identified be a unique username.

FR2: The system shall allow the user to log in from any device.

FR3: The system shall allow the user to search for recipes.

FR4: The user shall be able to input a list of ingredients.

FR5: The user shall be able to input the ingredients by photographing them.

FR6: The system shall suggest suitable recipes based on the entered ingredients.

FR7: The user shall be able to filter the suggested recipes.

FR8: The system shall suggest recipes based on the filters chosen.

FR9: The system shall identify allergens for each recipe, if any.

FR10: The system shall calculate the calories for each recipe.

FR11: The system shall identify the missing ingredients needed to prepare the recipe.

FR12: The user shall be able to rate and recipes.

FR13: The user shall be able to leave a comment (if they wish) under any recipe to share it with others.

FR14: The user shall be able to create a list of their favorite recipes.

FR15: The system shall remind the user when the expiry dates of available food items are approaching.

FR16: The user shall be able to share the link of the recipes on other apps.

FR17: The system shall suggest some recipes based on the user's favorite list.

FR18: The system shall offer a timer for each recipe that needs one.

FR19: The system shall display photos and videos of the recipe chosen.

FR20: The system shall display the chosen recipe's health benefits.

FR21: The user shall be able to quantity adjust the recipe they had chosen.

FR22: The system shall offer tips on how to store the recipe.

5.5 Non-Functional Requirements

2.1 Efficiency

NFR1: To ensure a smooth user experience, the application must process user requests and display search results within 2 seconds under average network conditions.

NFR2: Keeps operations running at no more than 50 MB of memory so that users' devices don't consume too many resources.

2.2 Product Requirements.

NFR3: The app should be written in the newest programming languages available to interface with the latest devices and operating systems.

NFR4 : The app must ensure that the information presented is 100% true, reliable and accurate, and does not provide any false content.

2.3 Privacy

NFR5: The app must act with data protection rule by allowing users to enter, change and cancel their personal information.

NFR6: The app should not share user data with third parties without the user permission.

5.6 Use case Diagram

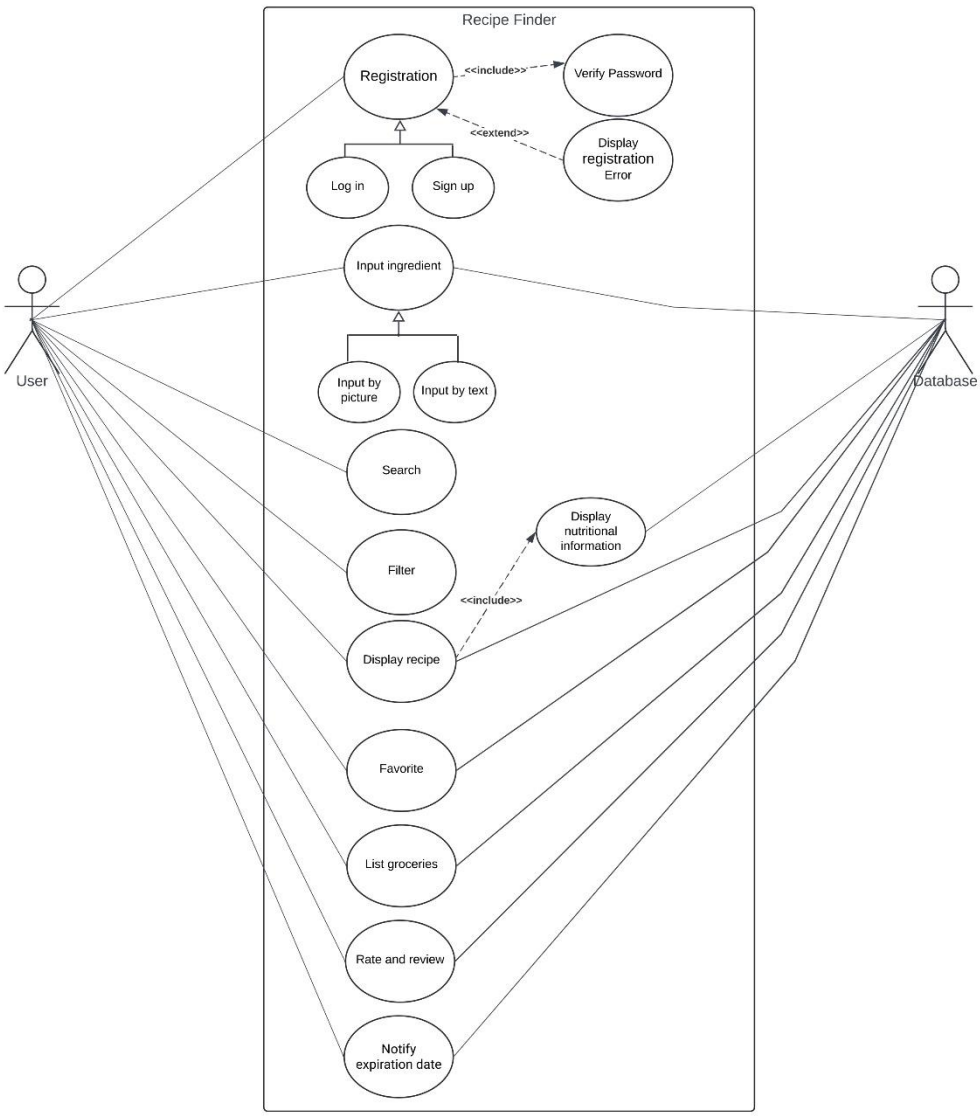

Fig 5.6.1

5.7 Scenarios

Name	Input ingredients
Id	UC2
Actors	User and Database
Precondition	The log in have completed successfully.
Path	1. System displays adding ingredients option. 2. User click on add ingredients. 3. System displays two ways to input (by text, or by picture). 4. User chooses the way they would like to add ingredients by. 5. User adds the ingredients. 6. System saves the ingredients.

5.7.1 Table

Name	Search
Id	UC3
Actors	User and Database
Precondition	The log in, input ingredient have completed successfully.
Path	1. System displays the search bar 2. User clicks on the search bar. 3. User enters a keywords. 4. System requests data from database. 5.Database sends searched recipe. 6. System displays suggestions based on the keywords.

5.7.2 Table

Name	Filter
Id	UC4
Actors	User and database
Precondition	The log in, input ingredient and search use cases have completed successfully.
Path	1. User requests filtering. 2. System displays filtering options. 3. User chooses filters. 4. System request data from database 5. database offers filtered recipes 6. System displays filtered options.

5.7.3 Table

Name	Favorite
Id	UC6
Actors	User and Database
Precondition	The log in, input ingredient, search, filter and display recipe use cases have completed successfully.
Path	1. System displays favorite option. 2. User requests favorite. 3. System adds recipes to favorites.

5.7.4 Table

Name	Rate and review
Id	UC8
Actors	User and Database
Precondition	The log in, input ingredient, search, filter, display recipe, favorite and list groceries use cases has completed successfully.
Path	1. User selects a recipe to rate and review. 2. User enters a rating from 1 to 5 stars and writes a review. 3. System saves the rating and review for the recipe.

5.7.5 Table

6 Design Phase

6.1 System Sequence Diagram

1) **Use case scenario : input ingredients**

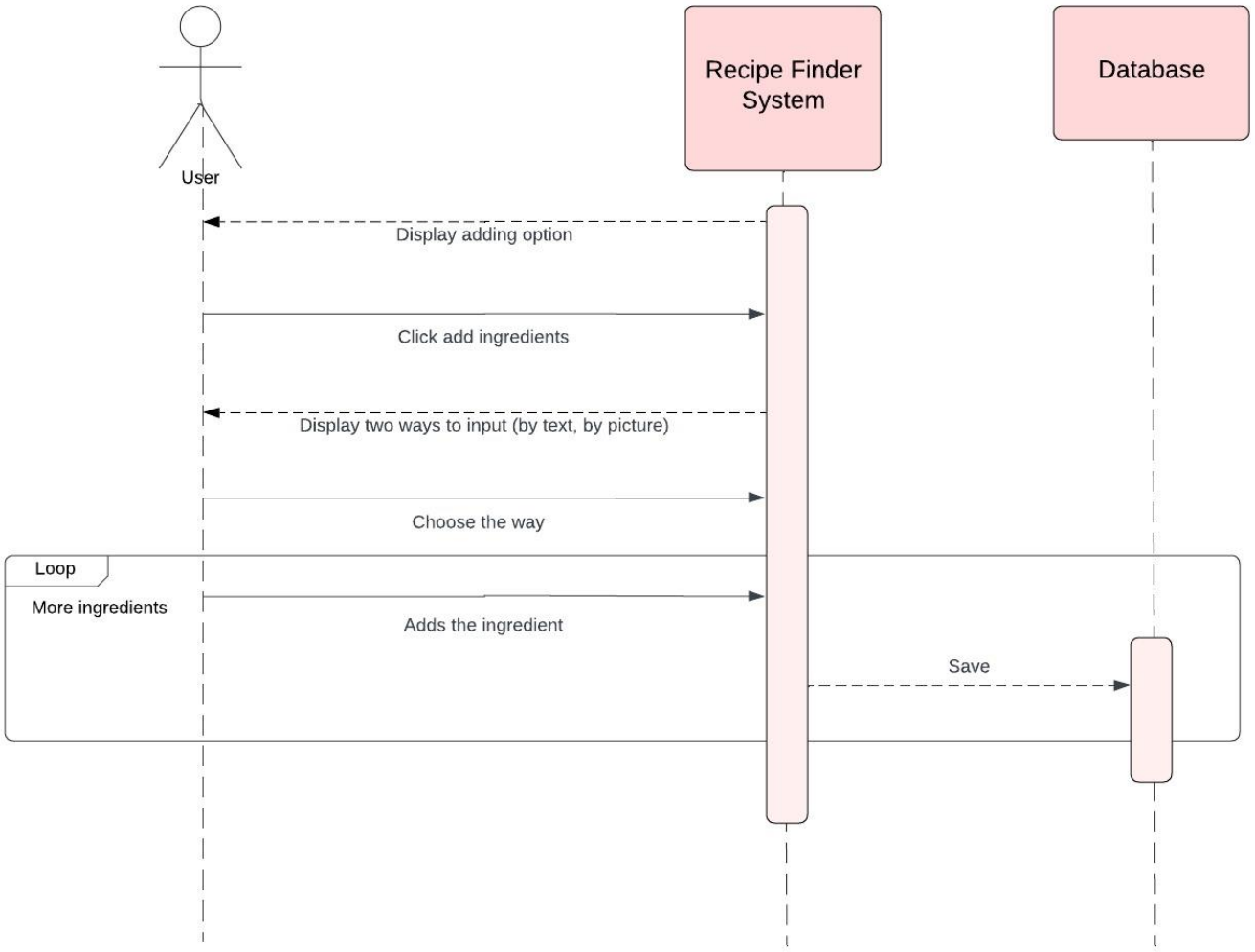

Fig 6.1.1

2) **Use case scenario : Search**

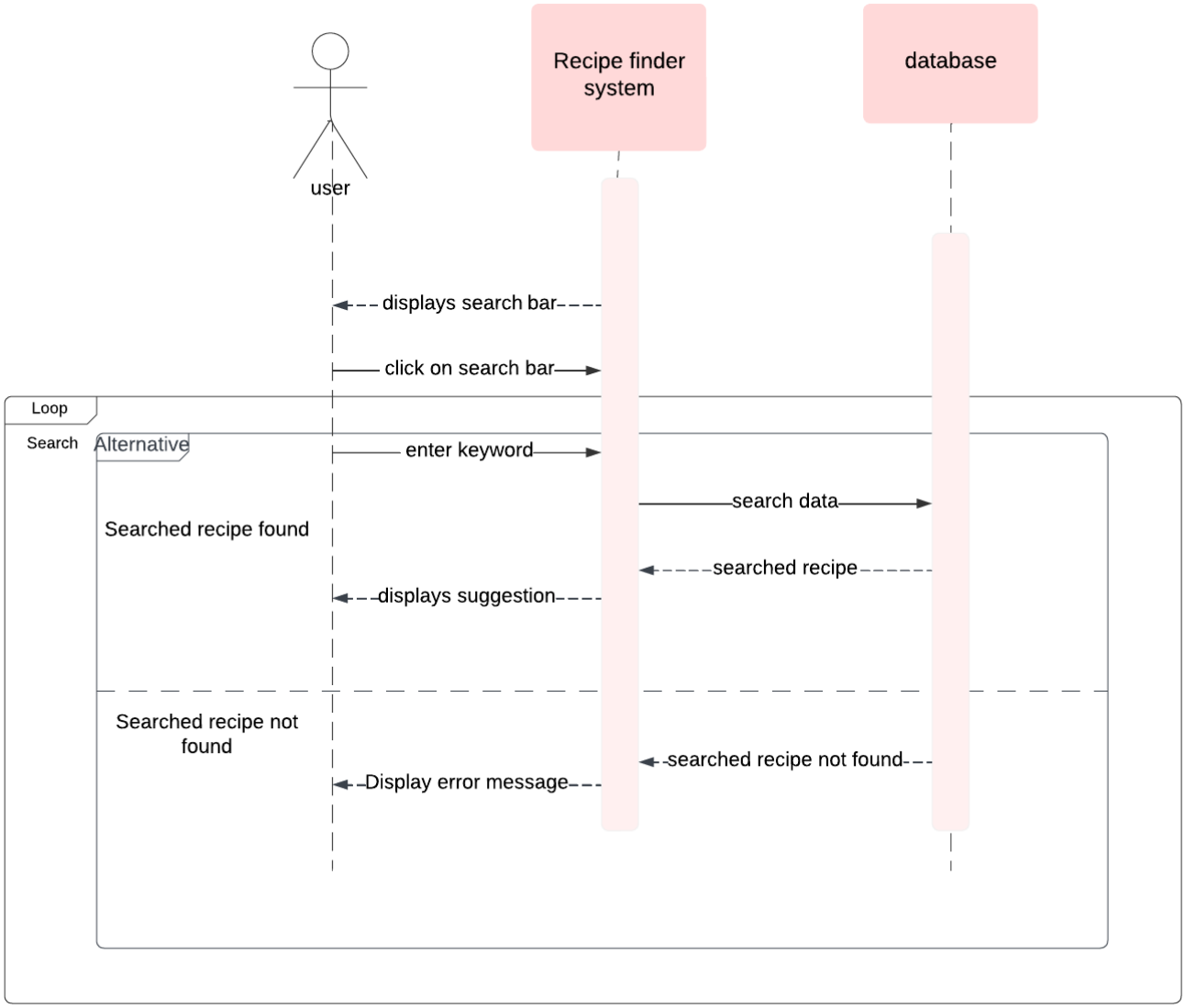

Fig 6.1.2

3) **Use case scenario : Filter**

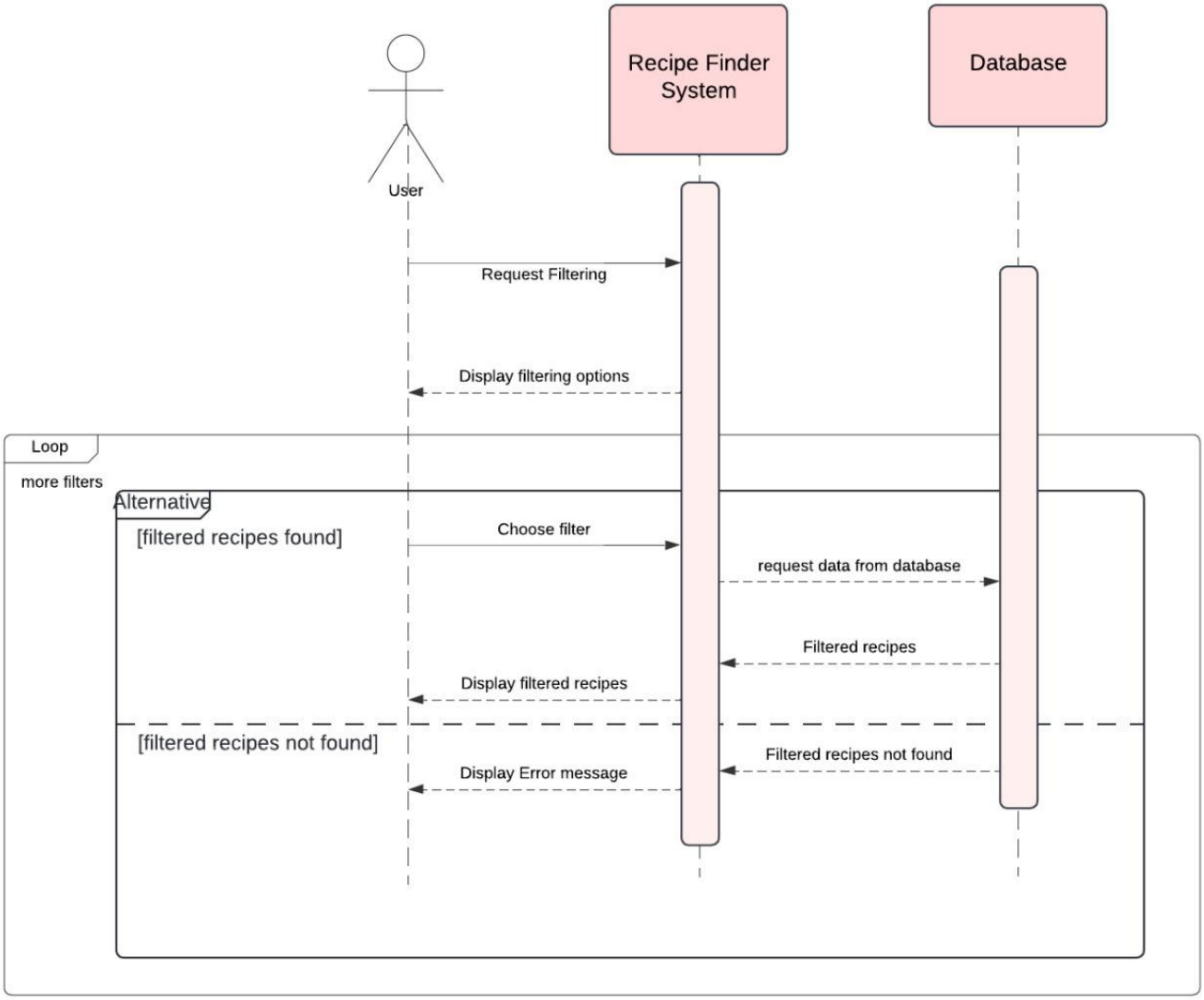

Fig 6.1.3

4) **Use case scenario : favorite**

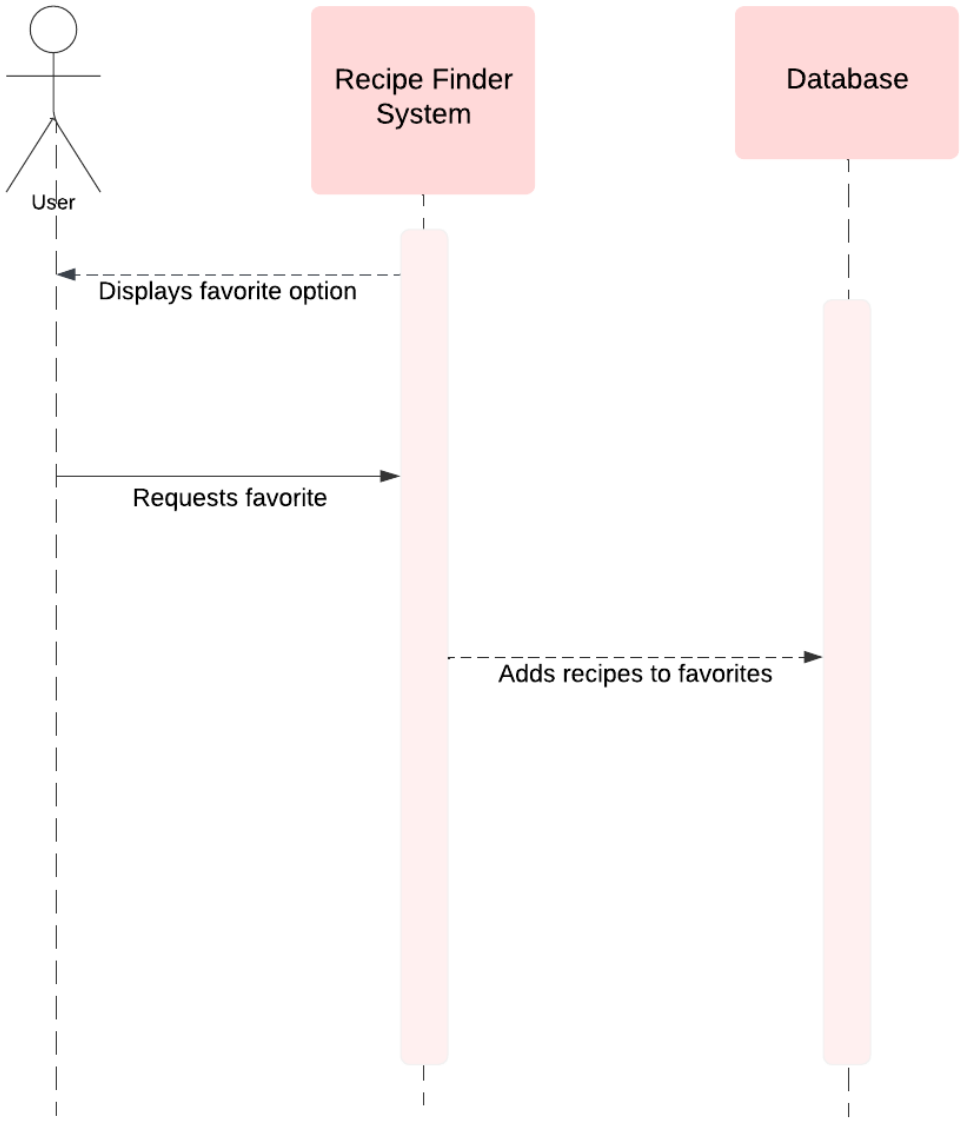

Fig 6.1.4

5) **Use case scenario : rate and review**

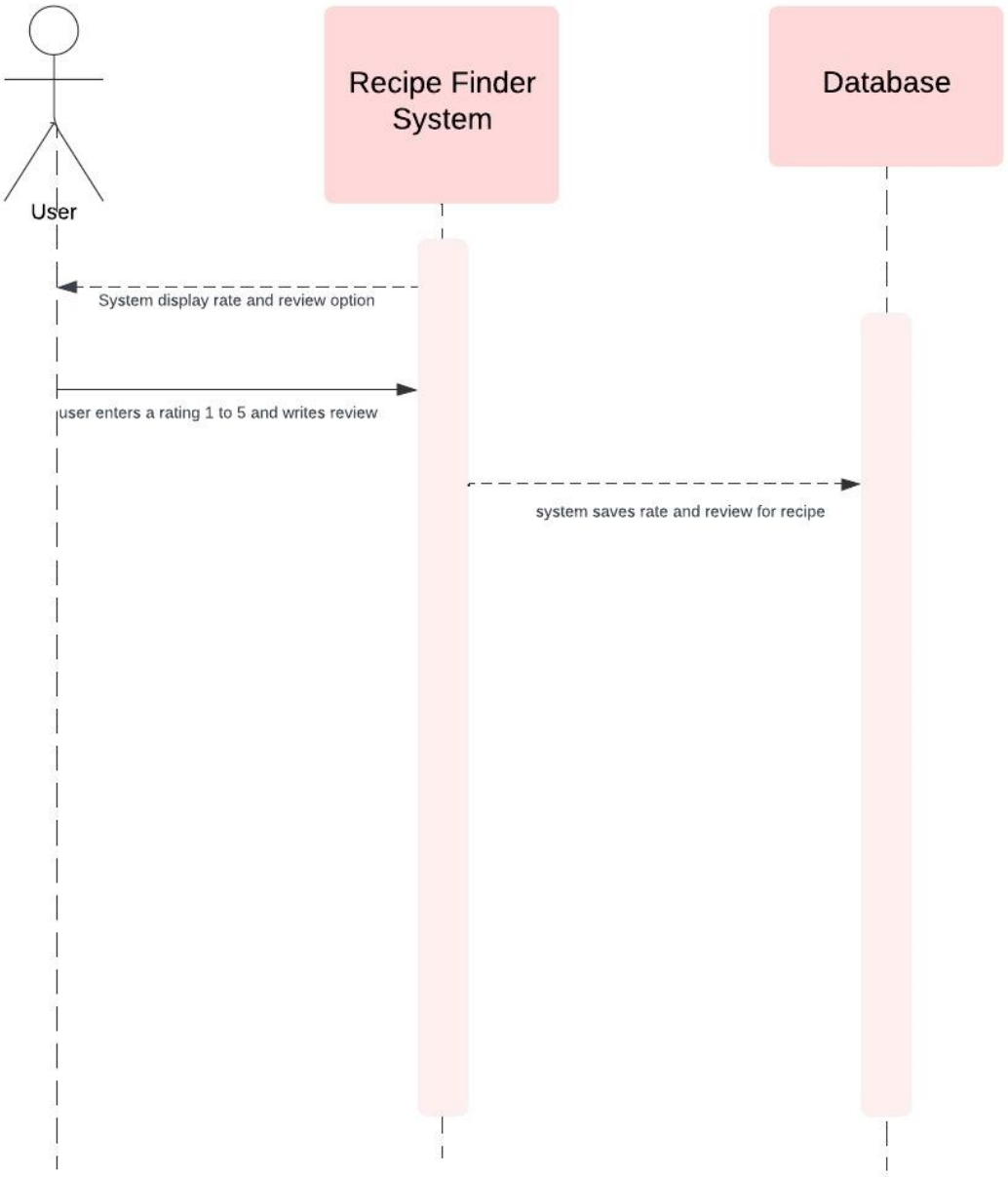

Fig 6.1.5

6.2 Class Diagram

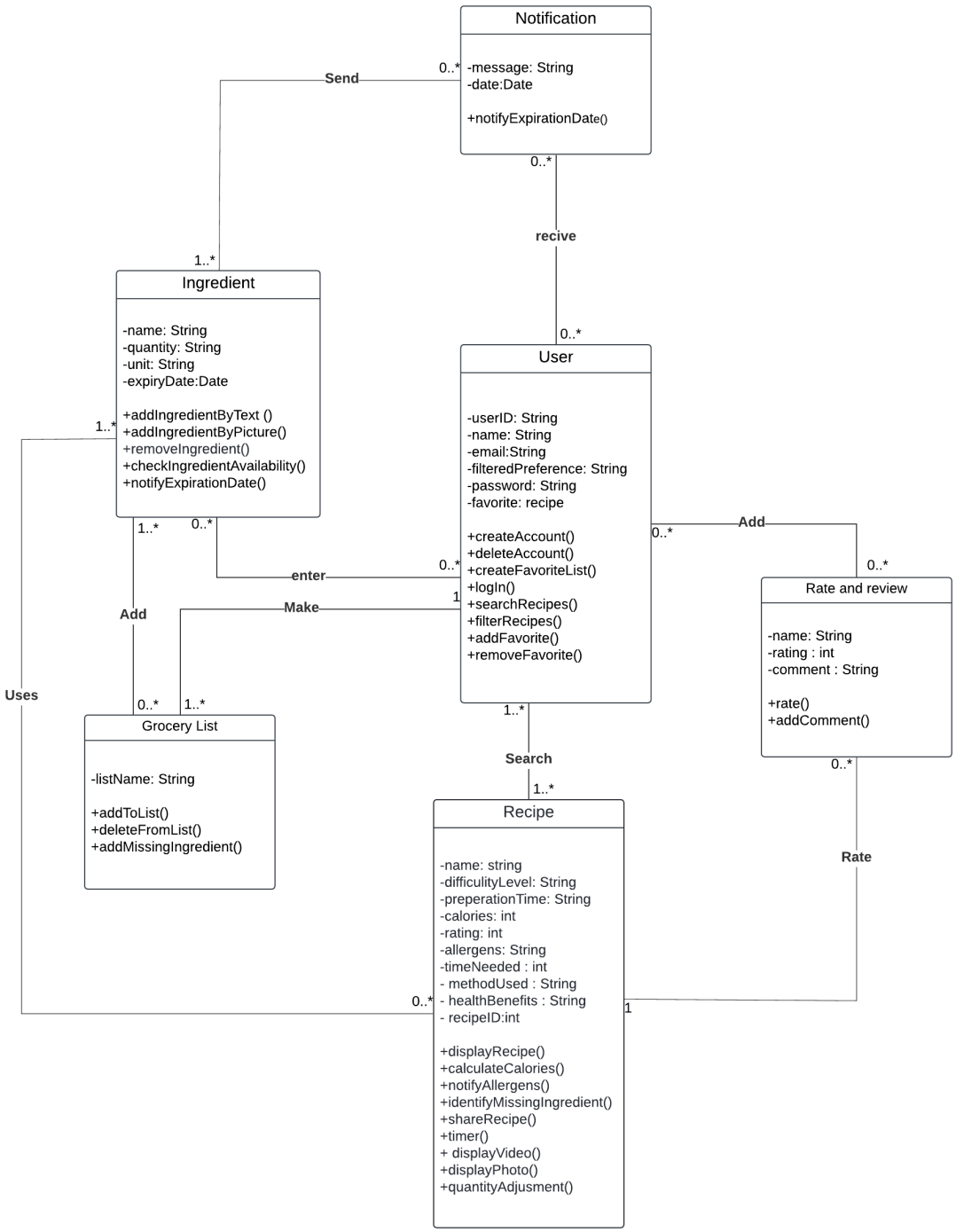

Fig 6.2.1

7 Conclusion

The Recipe Finder project aimed to address common cooking challenges, such as missing ingredients, difficulty finding recipes, and managing food waste. By gathering user feedback and incorporating features like ingredient-based recipe suggestions, timers, portion control, and other tools, we designed a system to make cooking simpler and more enjoyable.

Throughout the project, we faced challenges such as balancing user needs with technical feasibility and creating a user-friendly interface. Despite these obstacles, the experience enhanced our skills in requirement analysis, system design, and teamwork. We hope Recipe Finder will positively impact users by reducing food waste and making cooking more efficient and accessible.