

COMP3900 Computer Science Project

Project 1 - Meal Recommendation system

3300-F18B-Octopus

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1. Background

1.1. About the project

The goal of this project is to allow explorers to find others with similar interests and passion in cooking and sharing. We want users to be able to develop a community where they can interact and post recipes they are proud of to allow others to enjoy their creations. In order to do that there must be a system in place to guide users towards each other. Within our site we would allow users to post their own recipes as well as allow explorers to comment and encourage further discussion through their own recreations or by simply saying how they felt about the recipe. To streamline this recipes are required to be organised with a title, ingredients, meal types, style, etc. This allows filtering later for searches to more accurately reflect an explorer desired dishes. Our site would also have a customised feed to show users content we think they would be interested in. The primary difference between our system and currently existing ones are in how we handle user interaction as well as user retention. These metrics would be further explained in our novel methods.


TYPE OF DISH ▾
DIET ▾
PREPARATION TIME ▾
MAIN INGREDIENTS ▾
CUISINE ▾

Type: RECIPES ▾
Sort by: RELEVANCE ▾




3,159
45 min.

Sheet pan pumpkin soup with halloumi bites




Carolin Roitzheim
Kitchen Stories




2,609
40 min.

One-pot vegetarian lasagna




Zazie Atkinson
Kitchen Stories




3,321
35 min.

One-pot shrimp and tomato pasta




Marco Hartz
Kitchen Stories



2,950
30 min.

Chicken teriyaki with cucumber radish salad




Xueci Cheng
Kitchen Stories

kitchen stories
Recipes
Stories
Videos
Community

Recipes From The Community




Middle Eastern Chicken Wraps

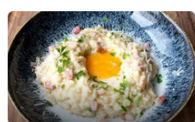

Encore & More
2 years ago

[See all Community Recipes](#)



Vegan Banana Oat Pancakes


Frey
2 years ago



Risotto Carbonara


Kelly Gillikin Schoueri
3 years ago



Vegan Cardamom Cake


Niloufar Doroud
3 years ago

Upload Your Own Recipe





Upload your own recipes and share your skills with the community


[Add your recipe](#)

Kitchen stories (Kitchen Stories | anyone can cook, n.d.) is a popular instagram style of food posts that allows users to post an attractive cover photo while hiding the recipes inside the post once a user clicks into it. Their main menu has various unsorted recipes that an algorithm decides which is presented to a user when they first reach the homepage. Within some of their side tabs users can then sort by several metrics such as, meals for different times of day, diet, cuisine, and ethnicity. There also exists a function of community showcases and short videos for basic cooking techniques. One very handy feature of this system is the quick conversion between metric and imperial units, this provides seamless transitions into beginning a recipe on a whim. Another nice feature is the ability to sort by user feedback in tandem with dietary restrictions.

For this system however there exists several drawbacks. The first of all is that the comment section seems to be very scattered, there is no structure for user feedback versus recreation attempts. This ties in with one of our novel implementations mentioned later. Secondly there doesn't really exist anything to showcase "hot" recipes by the community as the landing page only showcases affiliated staff created recipes. Lastly within the community tab, there seems to be a lack of updates to push more recent recipes onto the main focus as existing recipes are all over a year old.

chicken  

4,225 RESULTS FOR "CHICKEN"

SORT BY Relevance 

VIEW RECIPES ONLY ☐

HAS PHOTO ☐



Chicken recipes



Best chicken recipes



Chicken breast recipes



Chicken curry recipes



Chicken pasta recipes



Baked chicken recipes



Chicken soup recipes



Chicken thigh recipes

 **Join Australia's Best Recipes!**

Sign up to rate and review recipes, create your own cookbooks and more...

[Create my account](#)

Already a member? [Log in here.](#)

Bestrecipes (Australia's Best Recipes, n.d.) is one of Australia's relatively popular recipe sharing sites. They have advertised themselves with community driven recipes as well as articles to allow users to quickly skim through selected meals. Their UI is simple, with several main tabs leading to very distinct categories. They also have an in season page that documents the best choices of fresh ingredients to use for the month.

For this system there once again exists some drawbacks. Within the comments section there doesn't exist a single photo where a user can upload to showcase their own recreations, everything is purely in text and very bland. Additionally a lot of the comments seem to be independent with very little interaction between different explorers. This could possibly be increased when other users can see visually the difference between various recreation attempts. Secondly when searching for anything there isn't a clear way to gauge the popularity of a dish. Since all search results return categories, a user has to click into the search result, scroll around then return to a different category to compare. There also seems to be a large overlap in category naming as chicken-breast, chicken pasta, chicken soup all fall under chicken recipes leading to an overwhelming amount of categories that could be better filtered within the parent chicken category. Lastly, several recipes are gate kept behind a signup wall which could increase the bounce rate of the site since users would generally prefer a hassle free method of previewing a recipe.

2. Novelty Methods

One problem we have come across is explorer feedback. Usually when a user posts a recipe they can gain feedback about their own recipe based on popularity and comments, however explorer's of these recipes usually don't gain any feedback about their attempts of these recipes. With a thread based commenting system we could allow subthreads of the parent recipe to allow for extended discussions and creation of further improvements of the original recipe. This would allow for a greater sense of community and engagement instead of purely browsing the site for recipe resources. This could be expanded to have tags based on their cooking techniques such that users could sort through different variations of the same dish but with techniques that prioritise time or flavour.

To implement this in a straightforward manner, all discussions about the parent recipes must be within the same page inside an organised thread. To allow for better organisation regular comments should be placed in another thread separate from cooking attempts. Within cooking attempt threads, users can then reference other threads through a special link to allow for more integrated discussions and feedback.



A common theme amongst cooking websites is that they allow for user created content to be posted, however revenue goes strictly towards the host site instead of the users who actually produce the content. To tackle this problem we decided to create a tiered incentive program to reward users for their loyalty and contribution to the site through various rewards. This would allow the site to grow in popularity while attracting attention against competing sites.



As a sample we have created 6 tiers of rewards each with more compelling incentives than the last. This tiered reward system is incremented based on the amount of user ratings, discussions, and popularity of a recipe. When a user submits a recipe all of these factors will be combined to provide a flat score which would then be added to a user's total. When a certain amount of score is reached they advance towards the next tier. However this is not the only way a user can earn points; they can also earn these scores by contributing to an ongoing discussion or on a new thread that creates more user interaction. Contributors will also be given points based on the above requirements. This allows different types of users to all earn incentive points.

Starting from the bottom we can first distribute vouchers for grocery store discounts to further encourage users to purchase ingredients in order to recreate and improve upon existing recipes on the site. On the next tier user's can gain a free copy of the digital cookbook based on the highest tier's rewards, more on this later. The following tier allows users to place their own donation links which fan's can directly contribute to the user's income allowing them more freedom and capital to create new recipes and explore. The green tier would be a sort of weekly/monthly special category where any user within the green tier can choose a recipe they want to showcase on the frontpage of the website, these would then be sorted by the same metrics as above to create an ordered ranking. This can also be further expanded into different categories to allow the users to specialise more into one type of cooking. Finally the last two tiers would be very difficult to access; The first of which is an interview which could then be posted in textform or podcast style onto the websites. In the interview they could talk about their creative process, or favourite cooking methods or even about themselves. This would provide a nice way for high tiered users to interact with their fans and let their fans know more about themselves. The final tier would be the most exclusive which allows a user to partner together with us to create their very own cookbook which would then be up for sale with parts of the revenue being split with the site and themselves. This cookbook would also be part of the free digital cookbook in the purple tier.

As a bonus method, we might also decide to add in a method to tackle waste. Food waste is a major concern in modern society with approximately a third of all produced food is treated as waste and is a consequential producer of global greenhouse emissions. This problem is largely ignored within both of the current existing meal recommendation systems, allrecipes and kitchen stories. Both of these websites offer recipes based on various ingredients and users may not have them at hand, therefore they have to go out and purchase the ingredients if they desire to make the recipe. Since stores don't always have the exact amount for sale, and economies of scale usually benefit bulk purchases, this trends towards food waste as the customer might not be able to consume their goods prior to the expiration date.

A method of contributing to tackling this problem is to offer users a method of utilising their waste. Allowing users to input their own remaining ingredients into a form of sorts would help reduce food waste. This can also be extended to include price points for more budget friendly options. However this option is already present in several websites but they also do not have a user-friendly way to sort through a larger library of recipes.

3. User stories and Sprints

3.1. Project backlog

See appendix A for typed user stories.

▼ Backlog (34 issues)		92	0	0	Create sprint
BZ3900-1	As a user, i want to login to the meal recommendation system. AUTHENTICATION	1	TO DO	▼	👤
BZ3900-2	As a user, i want to logout of the meal recommendation system so that my account is secured when i'm not using. AUTHENTICATION	1	TO DO	▼	👤
BZ3900-21	As a user, i want to create an account for the meal recommendation system so that i can access all function of the system. AUTHENTICATION	1	TO DO	▼	👤
BZ3900-3	As a user, i want to edit my username so that i can change it if i want. MAINTAIN PROFILE	1	TO DO	▼	👤
BZ3900-36	As a user, i want to edit my email address in my profile so that my details are up-to-date. MAINTAIN PROFILE	1	TO DO	▼	👤
BZ3900-4	As a contributor, i want to post recipes to the system so that explorers can follow through and make their own meal. MAINTAIN RECIPE	1	TO DO	▼	👤
BZ3900-22	As a contributor, i want to include in my recipes details such as food name, ingredients, method, meal-type, photo(s) and video(s) to make sure my recipe is easy to follow. MAINTAIN RECIPE	5	TO DO	▼	👤
BZ3900-6	As a contributor, i want to edit/delete my recipes so that i can have full control on how my recipes look like. MAINTAIN RECIPE	3	TO DO	▼	👤
BZ3900-5	As a contributor, i want to reply to comments under my recipes to interact with my followers. FEEDBACK	5	TO DO	▼	👤
BZ3900-32	As a contributor, i want to make a lot of recipe posts so that i can unlock new titles. REWARD	3	TO DO	▼	👤
BZ3900-33	As a contributor, i want to receive a lot of likes so that i can unlock new titles. REWARD	3	TO DO	▼	👤
BZ3900-26	As a contributor, i want to like a review post or make a comment under a review post so that i can provide feedback on the explorer's cooking skill. FEEDBACK	1	TO DO	▼	👤
BZ3900-7	As an explorer, i want to search recipes using recipe names with applied filters of ingredients, method, meal-type(s) so that i can find exactly what i want. SEARCH RECIPE	5	TO DO	▼	👤
BZ3900-8	As an explorer, while browsing the news feed/ search result list, i want to be show a summary of each recipe that includes the name and thumbnail to give me an idea what are they like. SEARCH RECIPE	2	TO DO	▼	👤
BZ3900-9	As an explorer, i want to be directed to the recipe page by clicking on the thumbnail of the recipe so that i can learn more about the recipe. SEARCH RECIPE	5	TO DO	▼	👤
BZ3900-10	As an explorer, i want to see details of a recipe including recipe name, ingredients, method, meal type(s) and photo(s) so that i can follow through the cooking tutorial. SEARCH RECIPE	1	TO DO	▼	👤
BZ3900-14	As an explorer, i want to see the online teaching video to know the details of cooking SEARCH RECIPE	1	TO DO	▼	👤

Figure 2.1.1 Product backlog of user stories 1/2

BZ3900-11	As an explorer, i want to see the number of likes and comments for the recipe so that i can decide to use it or not based on the feedback of other users. FEEDBACK	1	TO DO	▼	👤
BZ3900-12	As an explorer, i want to express my opinion on recipes by giving a like and/or commenting under the recipe. FEEDBACK	3	TO DO	▼	👤
BZ3900-13	As an explorer, i want to share the recipes to my friends so they could use it.	2	TO DO	▼	👤
BZ3900-15	As an explorer, i want to subscribe to other contributors so that they will appear on my newsfeed whenever they created or edited a recipe. SUBSCRIBE	2	TO DO	▼	👤
BZ3900-23	As an explorer, i want to unsubscribe to other contributors so that they will be removed from my newsfeed permanently.	1	TO DO	▼	👤
BZ3900-16	As an explorer, i want my newsfeed to have recipe posts that are recently added or edited by contributors that i subscribed. SUBSCRIBE	5	TO DO	▼	👤
BZ3900-17	As an explorer, i want the posts in my newsfeed to be sorted by most recently added/edited to oldest, then by how much i liked the contributors so that my newsfeed is always up to dated. SUBSCRIBE	5	TO DO	▼	👤
BZ3900-18	As an explorer, while on a recipe page, i want to see recommendations of similar recipes by ingredients so that i can have more options. RECOMMENDATION	2	TO DO	▼	👤
BZ3900-19	As an explorer, i want my recommendation recipes to be sorted from closest match to furthest match, by ingredient. RECOMMENDATION	5	TO DO	▼	👤
BZ3900-20	As an explorer, i don't want unrelated recipes appear in my recommendation. RECOMMENDATION	1	TO DO	▼	👤
BZ3900-24	As an explorer, i want to post the end result of a recipe (review post) that i used so that i can receive feedback on my cooking skills. REVIEW	5	TO DO	▼	👤
BZ3900-25	As an explorer, i want to rate a recipe out of five stars when i'm posting a review post of it so that i can quantify how i liked the recipe. REVIEW	2	TO DO	▼	👤
BZ3900-27	As an explorer, i want to reference to the original recipe when making a review post so that people knows that which recipe i'm reviewing. REVIEW	2	TO DO	▼	👤
BZ3900-28	As an explorer, i want to see the list of popular recipes so that i can learn to cook the best dishes. POPULAR DISHES	5	TO DO	▼	👤
BZ3900-29	As an explorer, i want to make review posts consistently so i can be rewarded with a physical cookbook with popular recipes. REWARD	5	TO DO	▼	👤
BZ3900-30	As an explorer, i want to make a lot of review posts so that i can unlock new titles. REWARD	3	TO DO	▼	👤
BZ3900-31	As an explorer, i want to receive a lot of likes so that i can unlock new titles. REWARD	3	TO DO	▼	👤

Figure 2.1.2 Product backlog of user stories 2/2

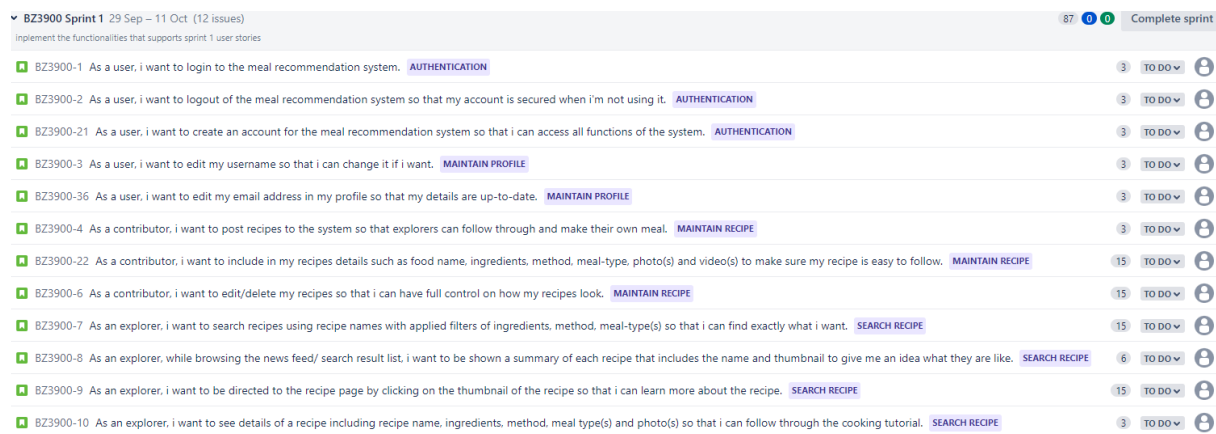
3.2. Sprint structure

	Start date	End date
Sprint 1	27 Sep (Tue)	11 Oct (Fri)
Sprint 2	11 Oct (Tue)	1 Nov (Fri)
Sprint 3	1 Nov (Tue)	15 Nov (Fri)

Table 2.2.1 start-date and end-date of the three sprints

3.3. User stories in the first sprint

During the first sprint, some of the most fundamental objectives of the system will be implemented. The objectives are user authentication, maintaining user profile, maintaining recipes, and searching recipes.



BZ3900 Sprint 1 29 Sep – 11 Oct (12 issues)		87	0	0	Complete sprint
Implement the functionalities that supports sprint 1 user stories					
1	823900-1 As a user, i want to login to the meal recommendation system. AUTHENTICATION	3	TO DO		
1	823900-2 As a user, i want to logout of the meal recommendation system so that my account is secured when i'm not using it. AUTHENTICATION	3	TO DO		
1	823900-21 As a user, i want to create an account for the meal recommendation system so that i can access all functions of the system. AUTHENTICATION	3	TO DO		
1	823900-3 As a user, i want to edit my username so that i can change it if i want. MAINTAIN PROFILE	3	TO DO		
1	823900-36 As a user, i want to edit my email address in my profile so that my details are up-to-date. MAINTAIN PROFILE	3	TO DO		
1	823900-4 As a contributor, i want to post recipes to the system so that explorers can follow through and make their own meal. MAINTAIN RECIPE	3	TO DO		
1	823900-22 As a contributor, i want to include in my recipes details such as food name, ingredients, method, meal-type, photo(s) and video(s) to make sure my recipe is easy to follow. MAINTAIN RECIPE	15	TO DO		
1	823900-6 As a contributor, i want to edit/delete my recipes so that i can have full control on how my recipes look. MAINTAIN RECIPE	15	TO DO		
1	823900-7 As an explorer, i want to search recipes using recipe names with applied filters of ingredients, method, meal-type(s) so that i can find exactly what i want. SEARCH RECIPE	15	TO DO		
1	823900-8 As an explorer, while browsing the news feed/ search result list, i want to be shown a summary of each recipe that includes the name and thumbnail to give me an idea what they are like. SEARCH RECIPE	6	TO DO		
1	823900-9 As an explorer, i want to be directed to the recipe page by clicking on the thumbnail of the recipe so that i can learn more about the recipe. SEARCH RECIPE	15	TO DO		
1	823900-10 As an explorer, i want to see details of a recipe including recipe name, ingredients, method, meal type(s) and photo(s) so that i can follow through the cooking tutorial. SEARCH RECIPE	3	TO DO		

Figure 2.3.1 User stories allocated to sprint one

The above user stories (as shown in figure 2.3.1) was chosen to be implemented in sprint one because it takes up relatively small story points (each story points equals to one hour) to realistically fit in the small time frame of sprint one. Furthermore, the user stories in sprint one covers up the majority of the webpages of the web application to prepare for the smooth transition from sprint one to sprint two.

3.4. Project objectives and its relevant user stories

3.4.1. User authentication (BZ3900-1, BZ3900-2, BZ3900-21)

User authentication aims to give every registered user a unique identity which the system is able to verify the user is who they claim to be. This objective is achieved by satisfying user stories which allow users to sign up an account, log in to an existing account and log out. This objective is crucial to the system for providing users safe and secured access to the system. During account registration, users need to provide an existing valid email, a strong password and an appropriate username for successful registration. The email provided is checked if it is an existing email, is in a

valid email format, and is not already registered. The password is the most important parameter to ensure the security of the system so it must be determined a “strong” password by a checking function. The username is what a user wants to be called by other users, it is checked if it is in a reasonable length, and if it contains inappropriate language. Once a user is successfully registered, a number is assigned as their unique identifier so users with the same username will not get mixed up. The username, email and the unique identifier will be displayed in the user’s profile page.

3.4.2. Maintain recipes (BZ3900-4, BZ3900-22, BZ3900-6)

Once logged in to the system, users can make contributions by posting recipes to the system. This type of user is called “contributors”. Contributors can manage their recipes by editing and deleting them. To successfully post a recipe, users are required to provide compulsory information including recipe name, image, ingredients, meal types and cooking method. There is also an option to include videos but it is not required. Users can edit their recipes at the edit profile page and it will be successful if all the required fields are not blank, after editing, the likes and comments on the recipe are preserved.

3.4.3. Searching recipe (BZ3900-7, BZ3900-8, BZ3900-9, BZ3900-10, BZ3900-14)

Every user, either as a guest or as a logged-in user, can search for recipes. This type of user is called “explorers”. Explorers can search using applied filters and/or input keywords. The output of the search displays the thumbnail and name of the matching recipes which the explorer can click on and be directed to the recipe page. When a user clicks on the search bar, a drop down menu will appear under the search bar, where there are pre-set filters such as meal types, ingredients, etc, that the user can select. The search bar only searches for the dish names, which means for instance, if a user wants to search for lunch recipes, he/she will have to apply the preset filter rather than searching with the keyword “lunch”, otherwise, it will return dishes that have the keyword “lunch” embedded in the dish name. The search result will replace the homepage news feed or the previous search result. To return to the news feed, users simply click on the home button on the top left.

3.4.4. Feedback (BZ3900-5, BZ3900-11, BZ3900-12, BZ3900-26)

Feedback system allows users to express their opinion freely within the system. Explorers can like or comment on recipes under the comment section to share their thoughts on recipes. Likewise contributors can like or comment on review posts to share their thoughts on the explorer’s cooking. Users can like a recipe/ review by clicking on the heart icon, the heart icon then turns red to indicate the liked status. Similarly, users can unlike by clicking on the red heart icon and the heart icon will return to normal status. Users can comment on posts by inputting into the text box in the comment section, a comment composed of the message, the profile picture and username of the user and the time it is commented.

3.4.5. Maintain user profile (BZ3900-3, BZ3900-36)

After a user creates an account, their username and email will be displayed in their user profile. Users can maintain their profile by editing their username and email

being displayed. The edited information is then checked against the criterias stated in 2.4.1.

3.4.6. Subscription (BZ3900-15, BZ3900-16, BZ3900-17, BZ3900-23)

Logged in users can subscribe to contributors they like. Once subscribed, the contributor's recently added/edited recipes will appear on the user's newsfeed. Users can also unsubscribe contributors which they have subscribed to, then the contributor's recipe will no longer appear in the user's newsfeed.

3.4.7. Recommendation (BZ3900-18, BZ3900-19, BZ3900-20)

To save the effort of the explorers to search for similar recipes, users can view similar recipes by browsing on the recommendation section under a recipe page which they are currently on. The recommended recipes will have at least one ingredient in common with the recipe in the current recipe page that the user is viewing. They are sorted by the level of matching so a user is more likely to be interested in the recipes up at the front. Clicking on the thumbnail of the recommendation recipes will navigate them to the corresponding recipe page.

3.4.8. Novel - Review post (BZ3900-24, BZ3900-25, BZ3900-27)

Review post is a novel functionality which allows explorers to post a review of recipes that they have used. A review post includes the name of the dish, a photo of the dish, a rating out of five stars the user gives to the recipe, a comment paragraph allowing the user to share their thoughts on the recipe, and a link which directs users to the recipe page. Through this functionality, explorers can finally showcase their cooking skills and can improve through taking constructive feedback from other users such as the owner of the recipe. Before this function, explorers lacked the opportunity to receive any feedback on their cooking since the only way for them to interact with the system is commenting on recipes. The function maximises the explorer's benefit from the system, thus it is novel. Furthermore, the objective benefits contributors by having extra feedback from the review post, making improvements from it, and producing more quality recipes.

3.4.9. Novel - Popular recipe (BZ3900-28)

Popular recipe is an extension objective of the review post objective. Popular recipes will be selected based on incorporating its average rating from the review posts and the number of people reviewing it. With this objective, recipes are graded not by the number of likes but a more sophisticated review system (2.4.8), which is rated by a group of users who had actually tried the recipe. This objective has an emphasis on the quality of the recipe which helps encourage contributors to produce higher quality recipes. Explorers can easily find the best recipes using the "popular recipe" filter in the search function.

3.4.10. Novel - Reward system (BZ3900-29, BZ3900-30, BZ3900-31, BZ3900-32, BZ3900-33)

Reward system aims to encourage users to participate actively in the meal recommendation system. It provides incentives for explorers/contributors to post more review posts/ recipes through giving them rewards. Users can claim their rewards when they complete a certain mission which can be found in their user

profile. Those missions include but are not limited to: posting a certain number of recipes/ review posts, receiving a certain amount of likes, etc. Each mission corresponds to different rewards such as popular recipe cookbooks, titles, etc.

4. Interface and Flow Diagrams

4.1. Flow diagram

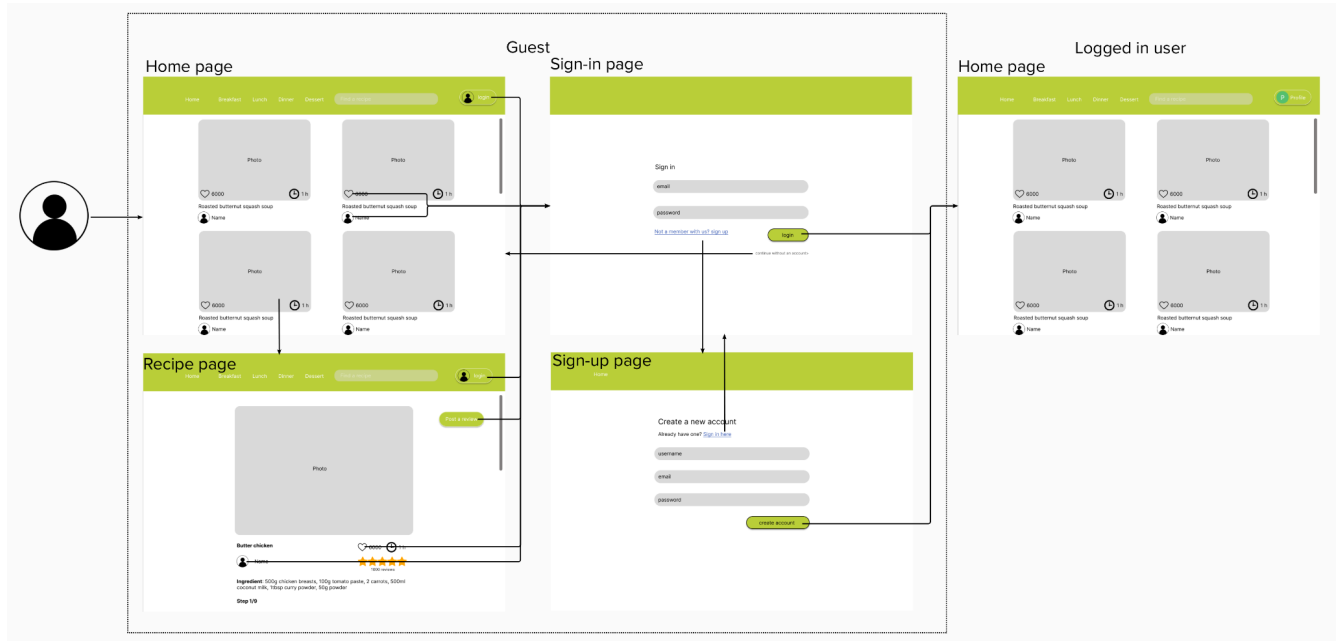


Figure 3.1.1 Flow diagram within the guest domain

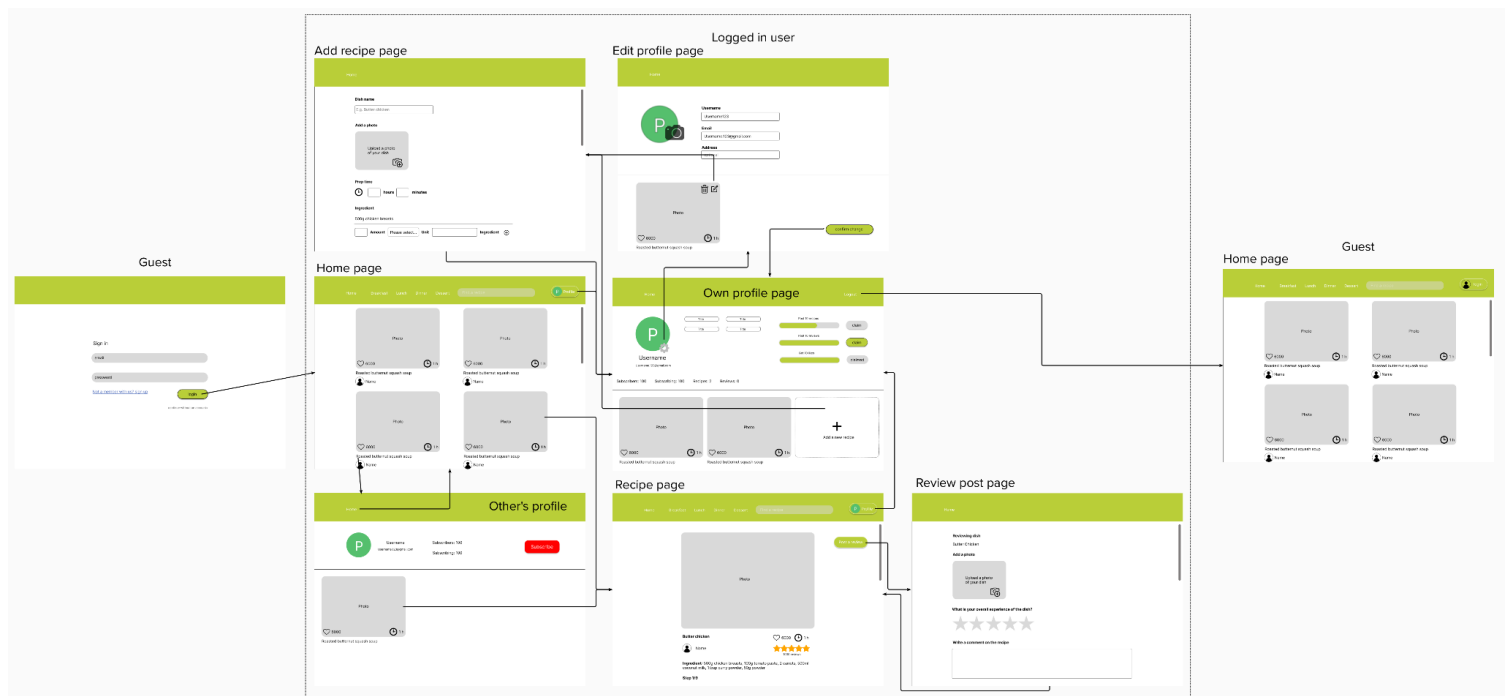


Figure 3.1.2 Flow diagram within the logged in user domain

4.2. User interfaces

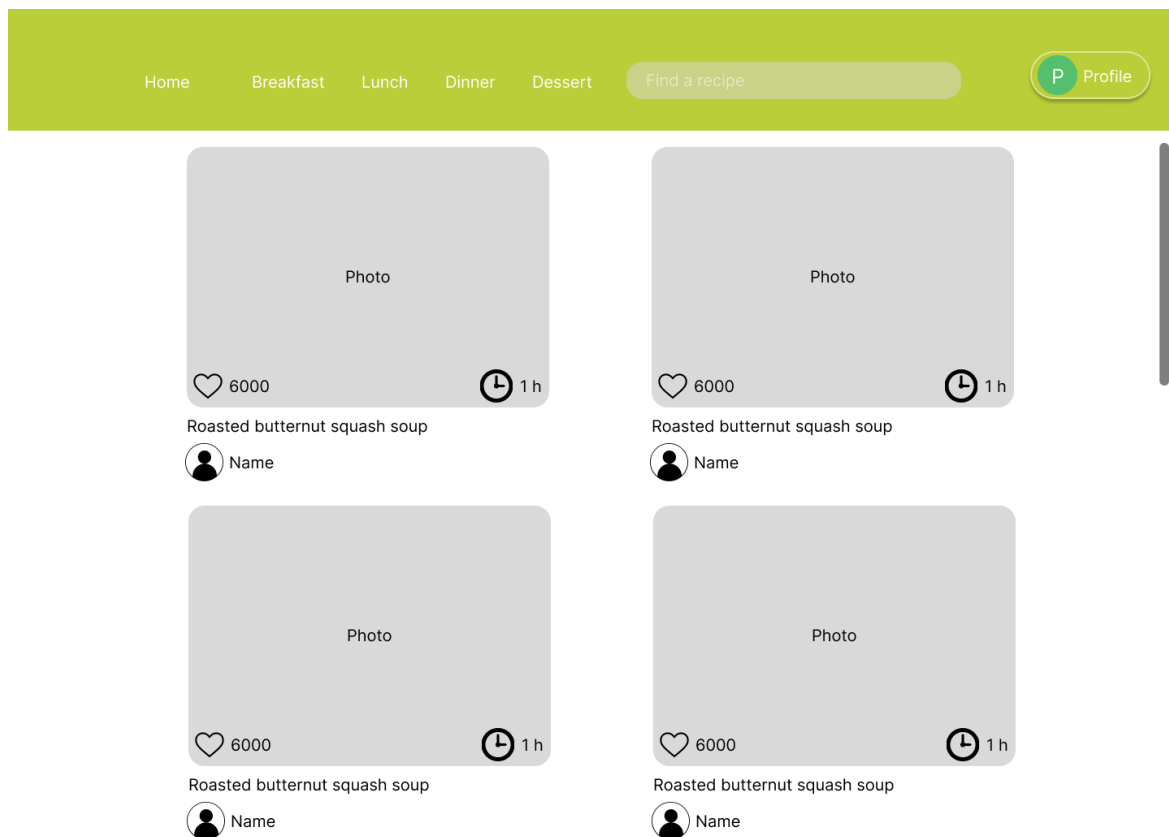


Figure 3.2.1 Home page

Home page is where all users begin after entering the web application. Users can perform the follow actions:

Clicking on the “login” button at the top right corner - to navigate to the login page, after login, the same button changes to become the profile button which navigates the user to the profile page.

Clicking on the recipe thumbnail - to navigate to the recipe page.

Clicking on the other users’ profile picture - to navigate to the users’ profile page or be directed to the login page if the user is not logged in.

Search using the search box - to replace the newsfeed/ previous search result by the searching result.

Clicking on meal type buttons on the top bar - to search for recipes with the corresponding meal type filter.

Clicking on home on the top bar - to clear the search result and replace it with news feed.

Create a new account

Already have one? [Sign in here](#)

Figure 3.2.2 Sign-up page

Sign-up page is where users create an account. Users can perform the follow actions:

Clicking on the “Sign in here” hyperlink - to navigate to the sign in page.

Clicking on the “create account” button - to create an account and navigate to the home page if all valid information is filled in the text boxes. If one or more fields are not valid, a corresponding error message is displayed and the user will be prompted to enter again.



Sign in

email

password

[Not a member with us? sign up](#)

login

[continue without an account>](#)

Figure 3.2.3 Sign-in page

Sign in page is where users login to the system using their login confidentials. Users can perform the follow actions:

Clicking on the “Not a member with us? Sign up” hyperlink - to navigate to the sign up page.

Clicking on the “login” button - to login and navigate to the home page if all valid information is filled in the text boxes. If one or more fields are not valid, a corresponding error message is displayed and the user will be prompted to enter again.

Clicking on the “continue without an account” -

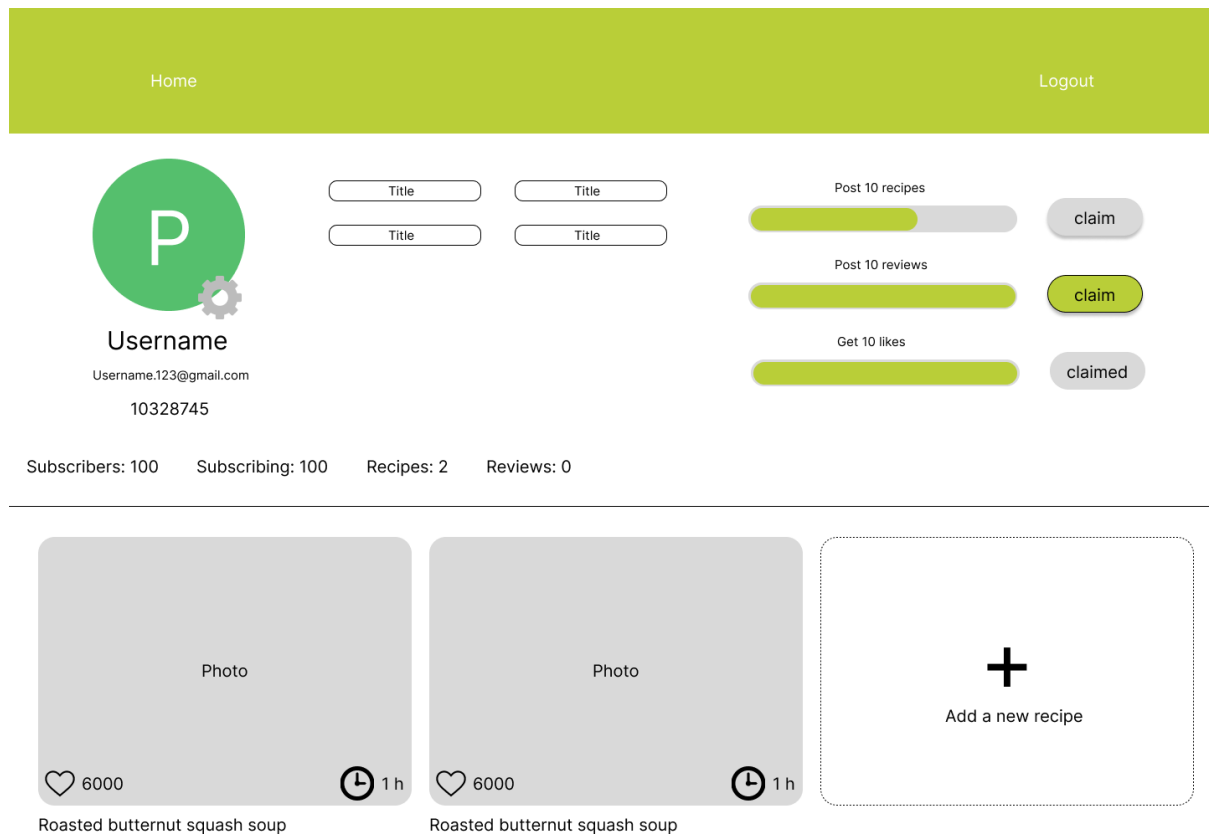


Figure 3.2.4 Own profile page

Profile page is where users display their information and recipes. Users can perform the follow actions:

Clicking on “home” on the top bar - to navigate to the home page.

Clicking on “logout” on the top bar - to sign out and navigate to the home page.

Clicking on the “claim” button - to claim a reward if the button is activated. If the button is not activated, nothing happens.

Clicking on the gear icon on the profile picture - to navigate to edit profile page.

Clicking on the recipe thumbnail - to navigate to the recipe page.

Clicking on the “add a new recipe” - to navigate to add recipe page.

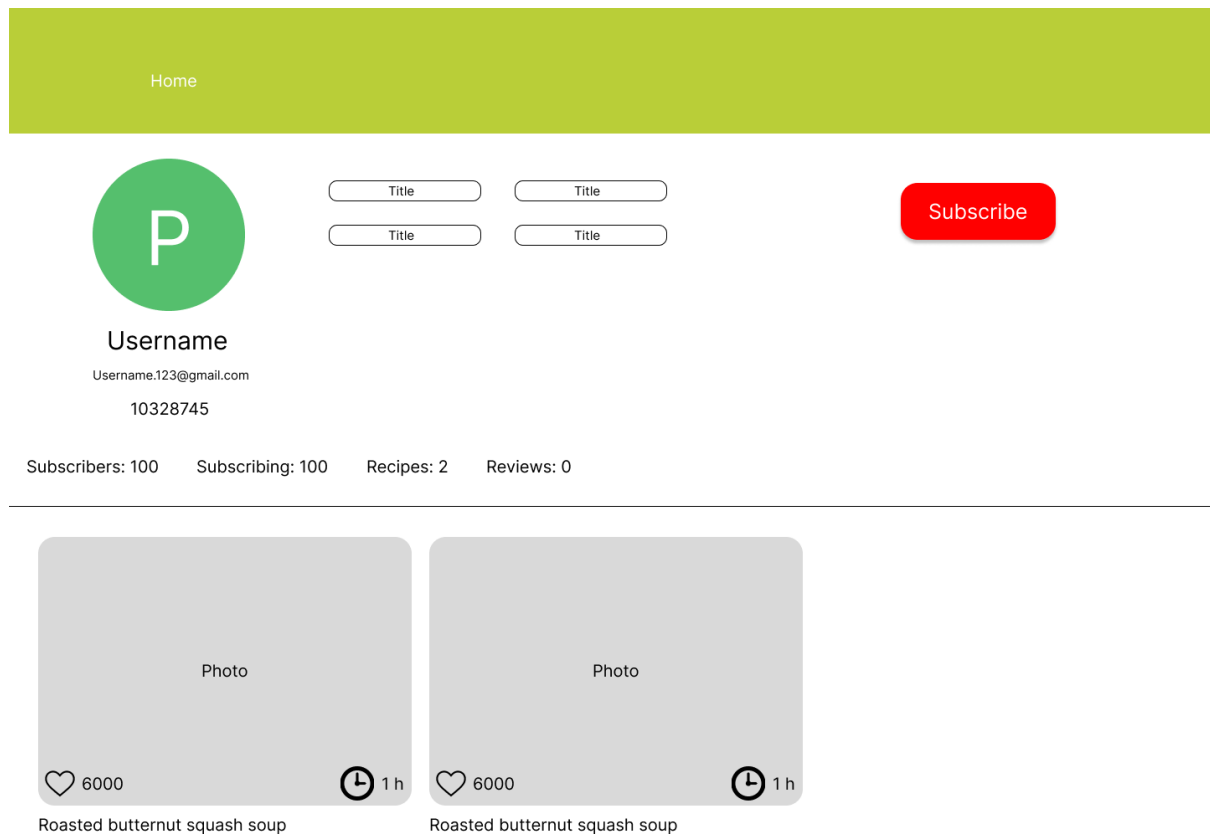


Figure 3.2.5 Other's profile page

Other's profile page is where users view other user's profiles, and subscribe to other users. Users can perform the follow actions:

Clicking on "home" on the top bar - to navigate to the home page.

Clicking on the "subscribe" button - to subscribe to the user.

Clicking on the recipe thumbnail - to navigate to the recipe page.

Home

Username
Username123

Email
Username.123@gmail.com

Address
optional

Photo

cancel

confirm change

6000 1 h

Roasted butternut squash soup

Figure 3.2.6 Edit profile page

Edit profile page is where users maintain their profile information and maintain their recipes. Users can perform the follow actions:

Clicking on “home” on the top bar - to navigate to the home page.

Clicking on the “confirm change” button - to successfully edit information if all text boxes are validly filled, otherwise a corresponding error message is displayed and the user will be prompted to edit the fields.

Clicking on the “cancel” button - to cancel any changes made and navigate back to the profile page.

Clicking on the camera icon on the profile picture - to change the profile picture by uploading an image.

Clicking on the garbage bin icon on recipe thumbnail - to delete the recipe.

Clicking on the edit icon on recipe thumbnail - to navigate to add recipe with all existing information filled in.


Home

Dish name


E.g. Butter chicken

Add a photo

Upload a photo of your dish



Prep time



hoursminutes

Ingredient

500g chicken breasts

Amount

Please select...

Unit

Ingredient




Figure 3.2.7 Add recipe page

Add recipe page is where users add a recipe. Users can perform the follow actions:

Clicking on “home” on the top bar - to navigate to the home page.

Clicking on the “add recipe” button - to successfully add a recipe if all text boxes are validly filled, and at least one photo is uploaded, otherwise a corresponding error message is displayed and the user will be prompted to edit the fields.

Clicking on the “cancel” button - to cancel adding a recipe and navigate back to the profile page.

Clicking on the camera icon on the profile picture - to add a photo for the recipe.


Home

Reviewing dish


Butter Chicken

Add a photo

Upload a photo of your dish



What is your overall experience of the dish?



Write a comment on the recipe

Figure 3.2.8 Add review page

Add review page is where users add a review. Users can perform the follow actions:

Clicking on “home” on the top bar - to navigate to the home page.

Clicking on the “add review” button - to successfully add a review post if all text boxes are validly filled, and at least one photo is uploaded, otherwise a corresponding error message is displayed and the user will be prompted to edit the fields.

Clicking on the “cancel” button - to cancel adding a recipe and navigate back to the recipe page.

Clicking on the camera icon on the profile picture - to add a photo for the review.

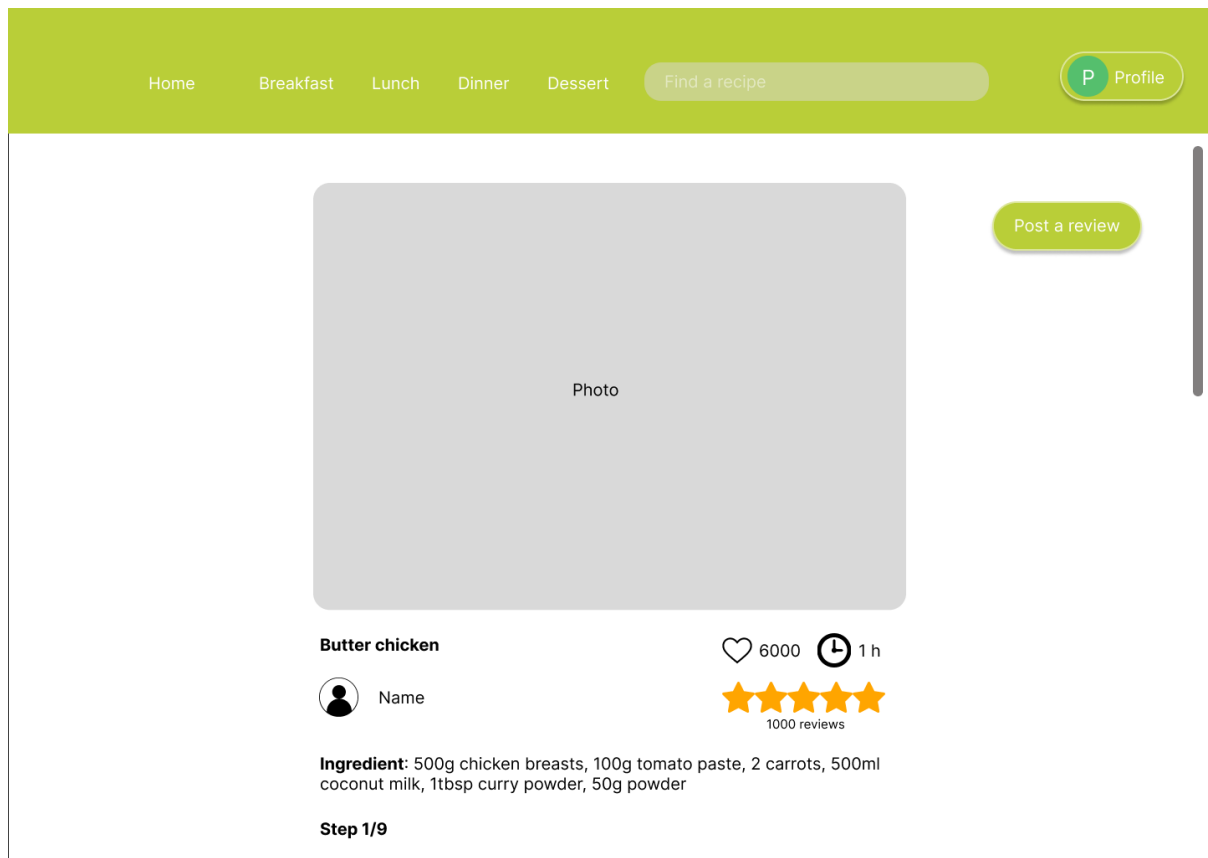


Figure 3.2.9 Recipe page

A recipe page is where users learn to cook a dish. Users can perform the follow actions:

Clicking on the “login” button at the top right corner - to navigate to the login page, after login, the same button changes to become the profile button which navigates the user to the profile page.

Clicking on the recommendation recipe thumbnail on the bottom of the page - to navigate to the recipe page.

Clicking on the other users’ profile picture - to navigate to the users’ profile page or be directed to the login page if the user is not logged in.

Clicking on the heart icon - to like/ unlike the recipe.

Clicking on the “post a review” button - to navigate to the add review page.

Typing on the text box under the comment section and hit enter - to write a comment.

Search using the search box - to replace the newsfeed/ previous search result by the searching result.

Clicking on meal type buttons on the top bar - to search for recipes with the corresponding meal type filter.

Clicking on home on the top bar - to clear the search result and replace it with news feed.

5. System Architecture

5.1. Infrastructure and framework diagram

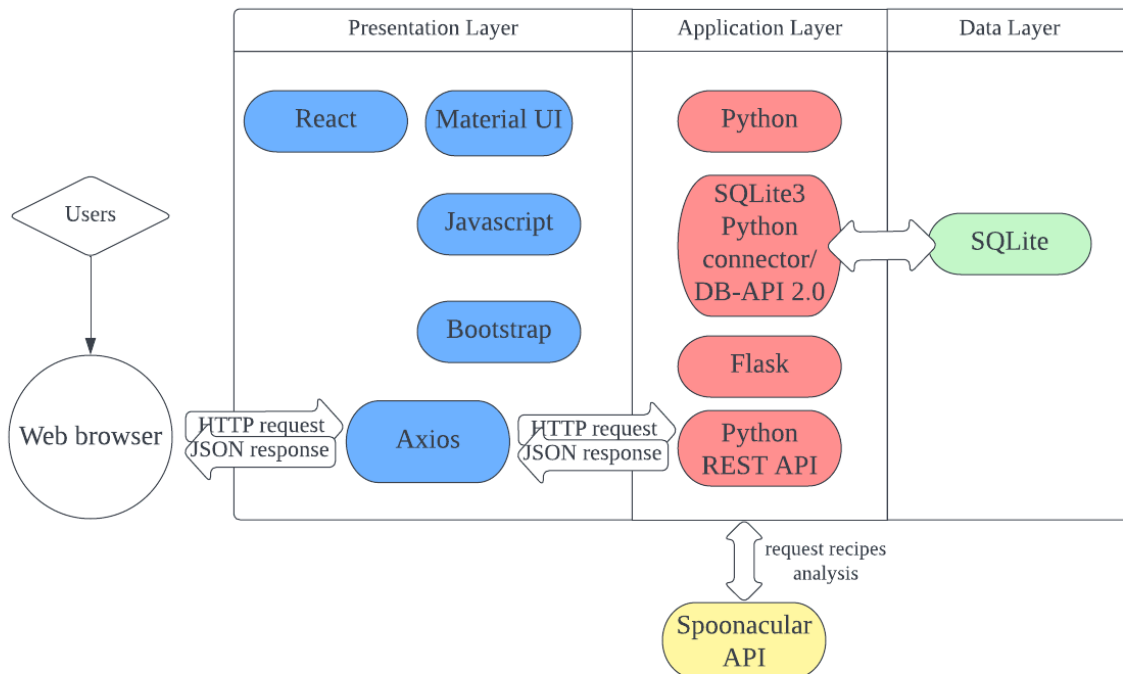


Figure 4.1.1 Infrastructure and framework diagram showing the components of the three layers.

The view layer (user interface, UI): mainly completes the UI interaction function of the recipe system. A good UI can improve the user experience and enhance the user's comfort when using the food forum system. UI interface design should also adapt to different versions of recipe systems and resolutions of different sizes to achieve good compatibility. The UI interaction function requirements are reasonable, and users must get the corresponding interaction results when conducting interactive operations, which requires the presentation layer to be well connected with the business logic layer.

Business logic layer: mainly completes the data processing function of the recipe system. The data transmitted from the presentation layer is processed by the business logic layer and delivered to the data layer. The data read by the system from the data layer is processed by the business logic layer and delivered to the presentation layer.

Data layer: Since the data of the recipe system is placed in the SQLite database on the server side, the part that belongs to the service layer can be directly integrated into the business logic layer, so there is only a database in the data layer, which mainly completes the data storage and management functions of the recipe system.

5.2. Technologies used

Presentation Layer

- **Javascript**

Javascript is the program language that will be used in the frontend. JavaScript is a cross-platform and object-oriented scripting language used to create webpages. It also supports many libraries and frameworks to assist web development.

- **React**

React is a declarative, efficient, and flexible JavaScript library for building user interfaces. A website consists of many components, which may have complicated structures. React helps to collaborate on these components to build a complete user interface.

- **Bootstrap**

Bootstrap is a free, open source front-end development framework for websites and web apps. Developers can customise different website components to implement the user interface.

- **Material UI**

Material UI is a react library which provides ready-to-use user interface elements including text fields, checkbox, buttons, radio buttons, drop down menus, etc. Like React JS, material UI is licensed under MIT and is free to use.

- **Axios**

Axio is a promises-based HTTP client which passes on the HTTP request from the web browser to the REST API.

Business Layer

- **Python**

Python is a dynamic and interpreted language suitable for developing large projects. Compared to other languages, Python's syntax is simpler and more readable. Also, team members all have some Python experience in previous courses. Therefore, Python is chosen as the backend development language.

- **Flask**

Flask is a web micro-framework that contains the core features needed to build a web application.

- **DB-API 2.0**

DB-API 2.0 is the python database API that defines the methods in which most python modules are accessing databases. This means the code between different database modules such as SQLite and mysql are more consistent and reusable between databases.

- **REST API**

REST (Representational state transfer) is an API used by python flask to communicate with the presentation layer module. It exposes a set of public URLs, also known as endpoints, to develop a uniform interface for accessing resources.

API Layer

- **Spoonacular**

Spoonacular allows us to analyse recipe information, understand relationships between ingredients, recipes, nutrition. It has a free tier to satisfy the requests of the project.

Data Layer

- **SQLite**

SQLite is a small and fast SQL database engine. It is basically an embedded SQL database engine. However, there is no need to have any separate server like SQL. The user can read and write directly to the SQLite file.

5.3. External actors

- **Viewer**

Viewers are users who want to find some random cooking recipes. They don't have much preference, and would be browsing the recommendations on the frontpage.

- **Explorer for specific recipe**

Explorers are users who want to find a type of meal or a specific recipe. They would be using the search and filter to achieve their goals

- **Content creator**

Content creators are users that have menu ideas and cooking techniques. Also, they are willing to share their recipes on our website.

They need to create an account to post recipes and get feedback.
There will be a reward system for their contributions to the community.

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7. Appendices

7.1. Appendix A: User stories

BZ3900-1: As a user, I want to login to the meal recommendation system.

BZ3900-2 : As a user, I want to logout of the meal recommendation system so that my account is secured when I'm not using it.

BZ3900-3: As a user, I want to edit my username so that I can change it if I want.

BZ3900-4: As a contributor, I want to post recipes to the system so that explorers can follow through and make their own meal.

BZ3900-5: As a contributor, I want to reply to comments under my recipes to interact with my followers.

BZ3900-6: As a contributor, I want to edit/delete my recipes so that I can have full control on how my recipes look.

BZ3900-7: As an explorer, I want to search recipes using recipe names with applied filters of ingredients, method, meal-type(s) so that I can find exactly what I want.

BZ3900-8: As an explorer, while browsing the news feed/ search result list, I want to be shown a summary of each recipe that includes the name and thumbnail to give me an idea what they are like.

BZ3900-9: As an explorer, I want to be directed to the recipe page by clicking on the thumbnail of the recipe so that I can learn more about the recipe.

BZ3900-10: As an explorer, I want to see details of a recipe including recipe name, ingredients, method, meal type(s) and photo(s) so that i can follow through the cooking tutorial.

BZ3900-11: As an explorer, I want to see the number of likes and comments for the recipe so that i can decide to use it or not based on the feedback of other users.

BZ3900-12: As an explorer, I want to express my opinion on recipes by giving a like and/or commenting under the recipe.

BZ3900-13: As an explorer, I want to share the recipes with my friends so they could use it.

BZ3900-14: As an explorer, I want to see the online teaching video to know the details of cooking.

BZ3900-15: As an explorer, I want to subscribe to other contributors so that they will appear on my newsfeed whenever they create or edit a recipe.

BZ3900-16: As an explorer, I want my newsfeed to have recipe posts that are recently added or edited by contributors that I subscribed to.

BZ3900-17: As an explorer, I want the posts in my newsfeed to be sorted by most recently added/edited to oldest, then by how much I liked the contributors so that my newsfeed is always up to date.

BZ3900-18: As an explorer, while on a recipe page, I want to see recommendations of similar recipes by ingredients so that I can have more options.

BZ3900-19: As an explorer, I want my recommendation recipes to be sorted from closest match to furthest match, by ingredient.

BZ3900-20: As an explorer, I don't want unrelated recipes to appear in my recommendation.

BZ3900-21: As a user, I want to create an account for the meal recommendation system so that I can access all functions of the system.

BZ3900-22: As a contributor, I want to include in my recipes details such as food name, ingredients, method, meal-type, photo(s) and video(s) to make sure my recipe is easy to follow.

BZ3900-23: As an explorer, I want to unsubscribe to other contributors so that they will be removed from my newsfeed permanently.

BZ3900-24: As an explorer, I want to post the end result of a recipe (review post) that I used so that I can receive feedback on my cooking skills.

BZ3900-25: As an explorer, I want to rate a recipe out of five stars when I'm posting a review post of it so that I can quantify how I liked the recipe.

BZ3900-26: As a contributor, I want to like a review post or make a comment under a review post so that I can provide feedback on the explorer's cooking skill.

BZ3900-27: As an explorer, I want to reference the original recipe when making a review post so that people know which recipe I'm reviewing.

BZ3900-28: As an explorer, I want to see the list of popular recipes so that I can learn to cook the best dishes.

BZ3900-29: As an explorer, I want to make review posts consistently so I can be rewarded with a physical cookbook with popular recipes.

BZ3900-30: As an explorer, I want to make a lot of review posts so that I can unlock new titles.

BZ3900-31: As an explorer, I want to receive a lot of likes so that I can unlock new titles.

BZ3900-32: As a contributor, I want to make a lot of recipe posts so that I can unlock new titles.

BZ3900-33: As a contributor, I want to receive a lot of likes so that I can unlock new titles.

BZ3900-36: As a user, I want to edit my email address in my profile so that my details are up-to-date.