



UNSW
SYDNEY

MEALMATCH

COMP9900 PROJECT REPORT

Abstract

People tend to have a limited set of ingredients on-hand with which to prepare their meals. They can often be inexperienced with the recipe options that are possible given a limited set of ingredients. 'MealMatch' allows a user to enter in their available ingredients and provides the user with a set of recipe options that are possible based on the input ingredients.

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1. Overview

1.1 Background

There is enough food produced in the world to feed everyone [1], but sadly one in every nine people do not have enough food to eat, that is 793 million people worldwide who are undernourished [2]. Globally, the impacts of food waste are astounding. Eliminating global food waste would save 4.4 million tonnes of CO₂ a year, the equivalent of taking one in four cars off the road [3]. These are staggering figures. Wasted food not only affects the environment but also our livelihoods and health. Australians discard up to 20% of the food they purchase. This equates to 1 out of every 5 bags of groceries they purchase [4]. The Government estimates food waste costs the Australian economy \$20 billion each year [5]. These facts are alarming. While waste occurs throughout the food value chain in Australia, roughly two-thirds of food waste is generated in consumer-facing businesses (e.g. restaurants and retail outlets) or in the home. Most people just have to look inside their fridge for proof. Thus, food wastage problem is one of the most critical ones which needs to be addressed and the issue can be partly tackled by reducing the amount of food discarded.

Cooking is everyday practice of life. It is an ordinary and necessary part of living. Family meals and domestic food consumption have become entrenched in societies and are specific to regions. Essentially, the societies have developed a template for the kinds of meals they have. This often leads to food fatigue resulting in poor nutrition choices when people see alternative foods. Having a database of diverse food items that can be prepared from available ingredients would help to reduce this food fatigue and improve the menu of choices available.

‘MealMatch’ helps to solve these problems by suggesting recipes to the users from the available ingredients at home. The service could be also be useful at a restaurant or a workplace for specially crafted items on the menu. This would help the users to waste less food and have great meals. ‘MealMatch’ perfectly learns what flavours and textures would work best together using ingredients in the fridge and pantry which are easily available. With thousands of recipes in its database, it would do all the brainstorming work for the enjoyer.

1.2 Architecture of the overall system

The system architecture consists of 5 different layers, Database layer, Middleware layer, View layer, API integration and Infrastructure layer. The chief languages used for programming are React JS for front-end development and python for back-end development because of the nature of project requirements. SQLite is used for data storages purpose. All the different layers are explained in detail as below:

1.2.1 Database Layer

The database layer comprises of a SQLite3 database engine connected to a Python-based middleware. SQLite is a relational database management system that supports the CRUD (Create, Read, Update, and Delete) operations for data creation and manipulation. In contrast to MySQL, SQLite is a serverless database as it does not need a server for interaction; it can also be categorized as an embedded database since it can be embedded into the Python application itself. The aforementioned quality makes SQLite the ideal choice for our database layer.

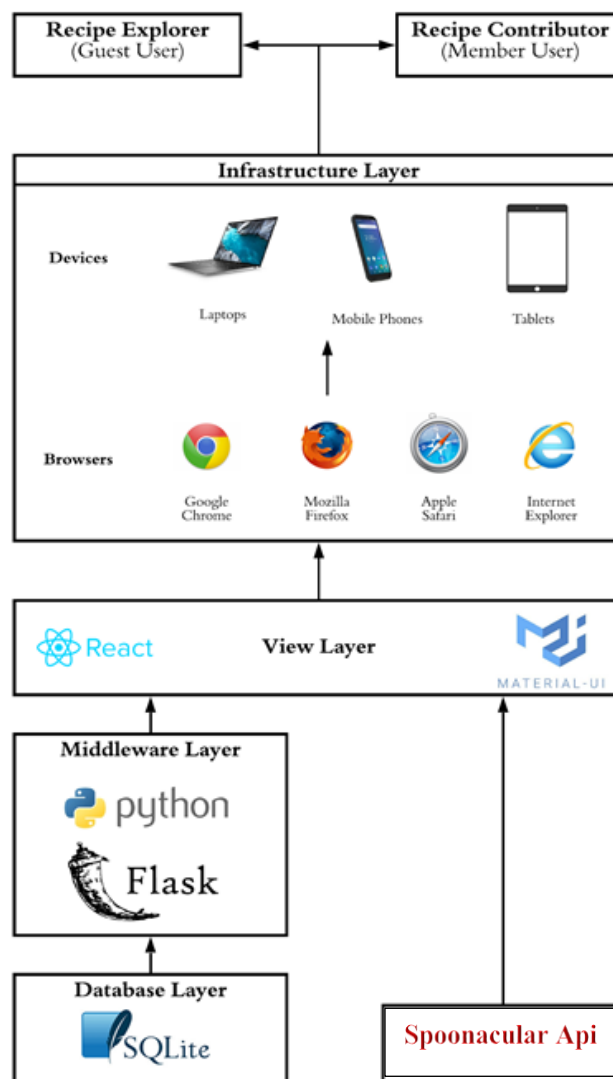


Fig. 1: Interaction of different layers in the architecture diagram

1.2.2 Middleware Layer

The middleware layer comprises of the Flask web application framework for Python and is responsible for connecting the view layer and the database layer using endpoint URLs. Each endpoint URL has a specific purpose and makes a specific dataset available, which can then be utilized by the view layer for various purposes. Flask has been chosen since it is a minimalistic, light framework with few dependencies that can be restricted as required, while also providing easy integration with the database layer.

1.2.3 View Layer

For the view layer or the front end, a JavaScript library called React along with a templating framework Material UI is used. Material UI allows the utilization of pre-configured React components and modification of the style details to suit our needs. The view layer interacts directly with the Flask-based middleware in order to display data which is delivered in the form of a JSON Object response to the request invoked by the client.

1.2.4 'Spoonacular' APIs

'Spoonacular' APIs is a set of APIs that have been developed by 'Spoonacular' in order to allow communication with 'Spoonacular' Services as well as other integrated services. They are used to provide a database of the ingredients and the recipes that can be prepared from any specific combination of the ingredients and interact with the view layer where their results are directly rendered. **Please also refer to section 2.3.**

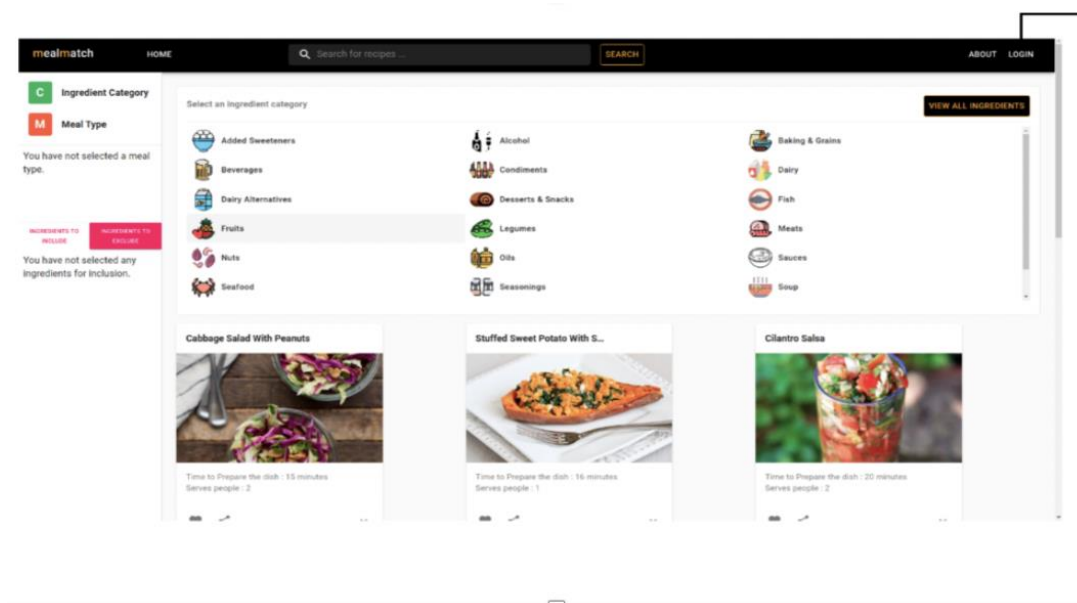
1.2.5 Infrastructure Layer

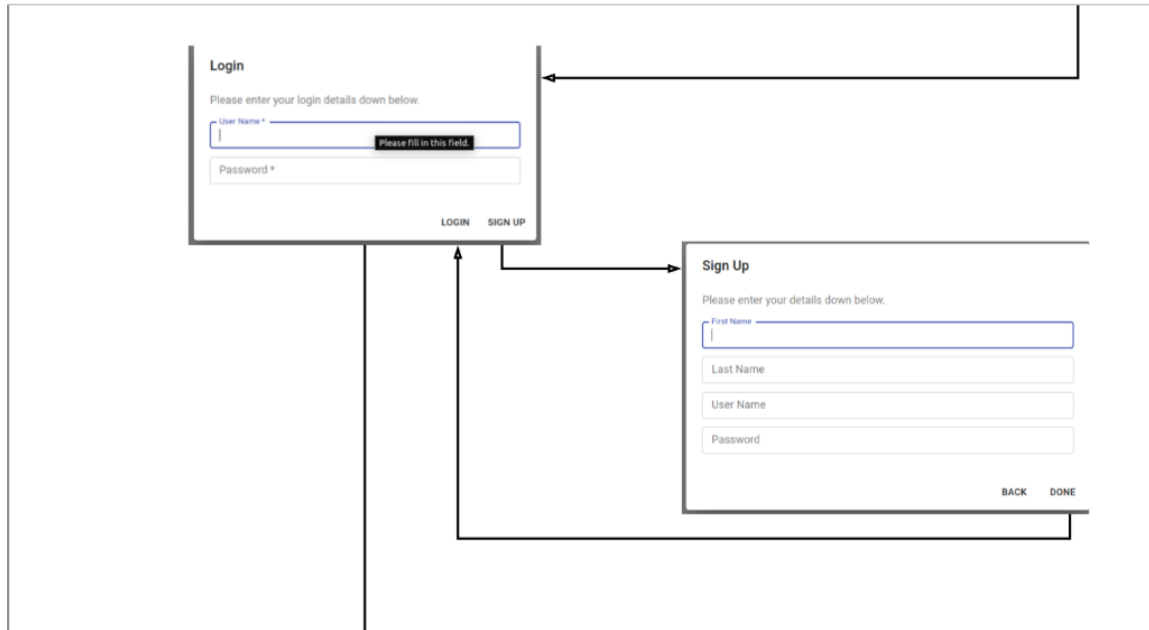
For the infrastructure layer, the end product supports a range of client browsers such as Google Chrome, Mozilla Firefox, Apple Safari, and Internet Explorer. In addition, the browser support for the product is extended to allow hosting on different device types such as desktops, laptops, mobile phones, and tablets.

1.3 Design of the Functionalities

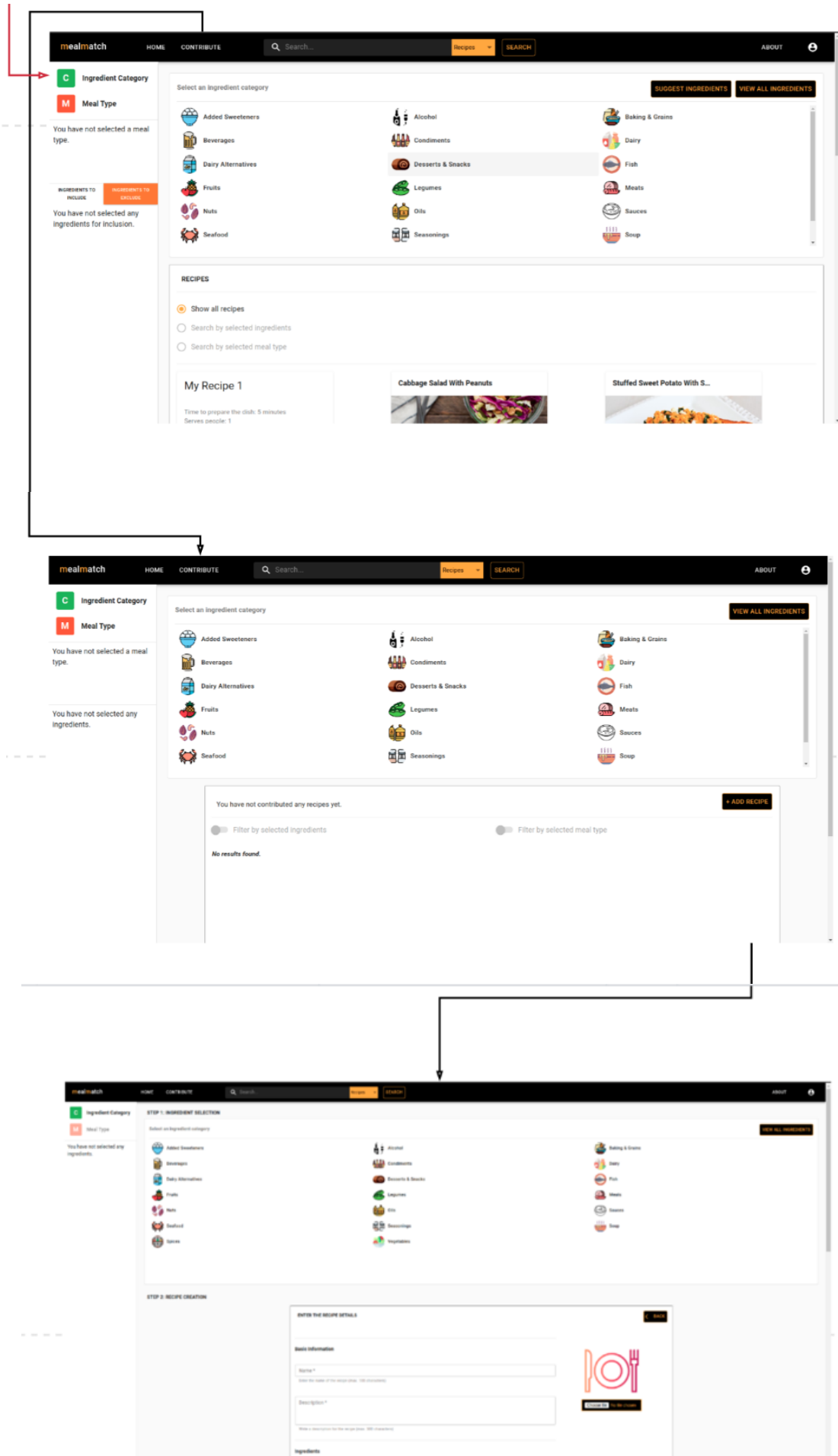
Design of the functionalities is illustrated sequentially in the below figure. Please note that description of these functionalities is explained in detail in Section 2: Functionalities and Implementation.

1. The Home page for the Meal Match is accessible to all the users (recipe explorers). In the landing page user can search recipes by Ingredient Categories or by Meal type. The user may also register on the website to be a recipe contributor.
2. Clicking the *Login* button on the landing page (located at the top right corner of the page) will navigate the user to the Login interface. The user can then enter his/her username and password to sign into their account. If the user does not have an account and wishes to sign up, he/she will need to click the *Signup* button on Login Page and enter the relevant information to create a new account on the website.
3. After the User has logged in, he/she can search recipes or ingredients. The user may use meal type filter to filter search results based on the selected meal type.
4. By selecting Ingredient Categories, user can explore ingredients according to their categories and can filter recipes based on the selected ingredients.
5. Contributor page allows users to contribute their own recipes and add new recipes on the system.





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2. Functionalities and Implementation

The overall functionalities can be broadly divided into 2 main categories, Recipe Explorer and Recipe Contributor. Recipe explorer does not necessarily need to register on the website. This is to increase the customer base so that a large number of customers can access the website without embracing laziness in the sign-up process. However, recipe contributors must first register on the website so that they can retrieve their recipes contributed whenever they log on to the website.

2.1 Recipe Explorer

2.1.1 Home Page View

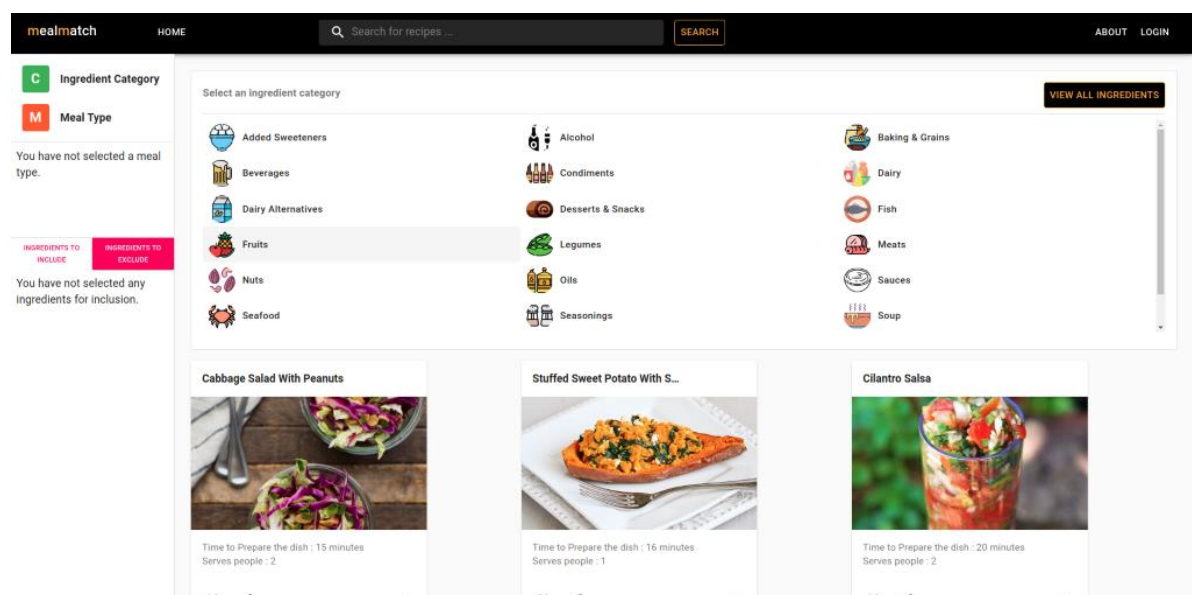


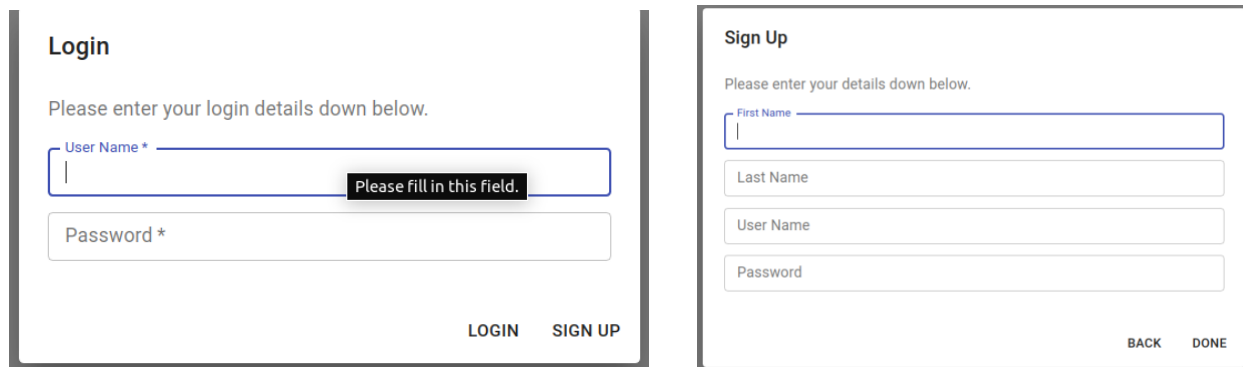
Fig.: MealMatch Home page

The home page displays the trending recipes, fetched from the API. This page is mainly divided into 3 panes, left and right. The left pane shows categories and the running list of ingredients. The right pane is further divided into 2 parts: ingredient or meal-type box and recipe box. By default, ingredient box is displayed showing categories of different ingredients. On clicking meal-type button in left pane, this box is replaced by meal-type box showing different meal types. All the users (guest or registered) can access the home page and explore recipes. The toolbar on the top has 'Home', 'About' and 'Login' buttons. Since React uses functional components, views of only certain sections are changed on navigating to a different page and tool bar and the left pane remains static. This helps in quick rendering of different pages.

2.1.2 Login / Sign-up

Once the user clicks on the Login button located on the toolbar, he/she can enter the registered username and password. The user can click on signup button on the login page to register on the website. The user details are sent from front end to back end through 'Axios' Post request to ensure security. The user is redirected to login page after a successful sign up. On successful signup, flask returns 201 as response code and redirects to login page whereas if username already exists, flask returns 404 as response code along with the error message.

A new user can sign up by simply entering basic information like first name, last name, username, and password.

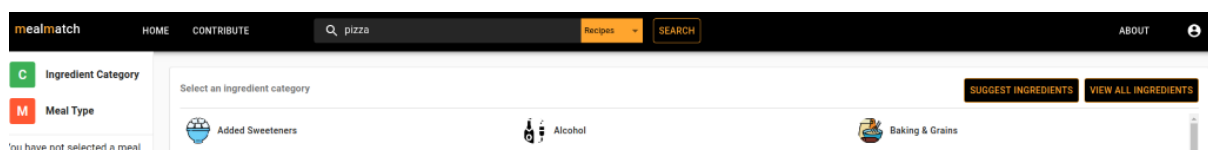


The image shows two side-by-side forms. The 'Login' form on the left has a title 'Login', a prompt 'Please enter your login details down below.', a 'User Name *' input field with a 'Please fill in this field.' tooltip, a 'Password *' input field, and 'LOGIN' and 'SIGN UP' buttons. The 'Sign Up' form on the right has a title 'Sign Up', a prompt 'Please enter your details down below.', and input fields for 'First Name', 'Last Name', 'User Name', and 'Password'. It includes 'BACK' and 'DONE' buttons.

Fig.: Login and Sign up page

2.1.3 Recipe Search by Name

The user can search recipe by entering name of the recipe in the search bar and selecting the search filter as 'Recipes'. By default, the search filter in the search bar is 'Recipes'. The recipes would appear as recipe cards in the recipe box. These cards can be expanded to see recipe steps and other information. Various functional components and handlers are used while coding which enable different views.



2.1.4 Search by Meal Type

By clicking on the Meal Type tab, user can see all the available meal types and recipes can be filtered by selecting a particular meal type using a radio button. For e.g. in the image below, only recipes which belong to the category 'soup' are selected. recipes related to soups.

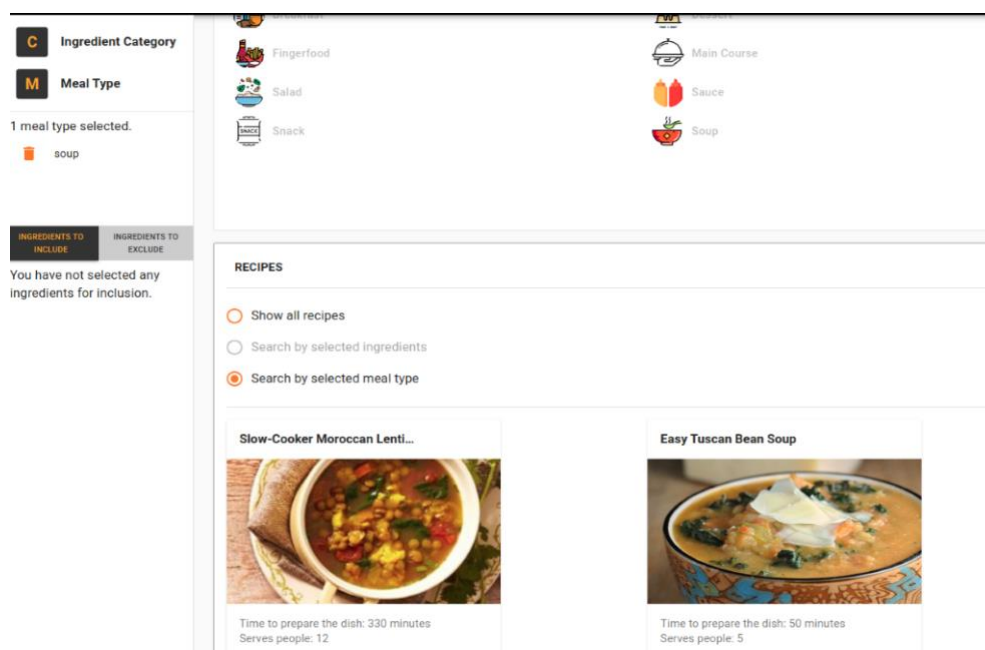


Fig.: search by meal type

2.1.5 Search by Ingredient Categories

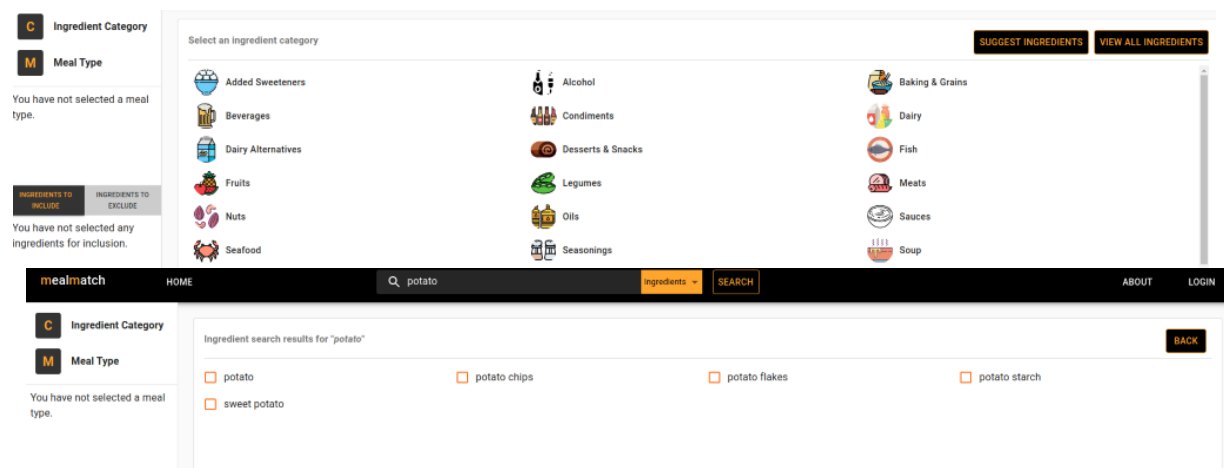


Fig.: search by ingredient categories

‘MealMatch’ has about 800 ingredients in its database which gives it a competitive edge as compared to other similar websites. Further, each ingredient is associated to a unique category. There are overall 20 unique categories, carefully chosen to cover all ingredients. By selecting the desired ingredient category, user can select from a wide range of ingredients which fall under that category, enabling choice and variety. The user can also an ingredient by entering its name or any part of it. The algorithm for this is designed in such a way, that all the search results are displayed alphabetically which contain that exact substring. This is done to add convenience for the enjoyer.

‘Search by selected ingredients’ radio button in the recipe box filters the recipes by the selected ingredients. The algorithm is designed such that results are returned which have the closest match to the ingredients in the cart. Number of missing ingredients are calculated and displayed so that user can further refine his/her selection. The names of missing ingredients are displayed by hovering over the missing number.

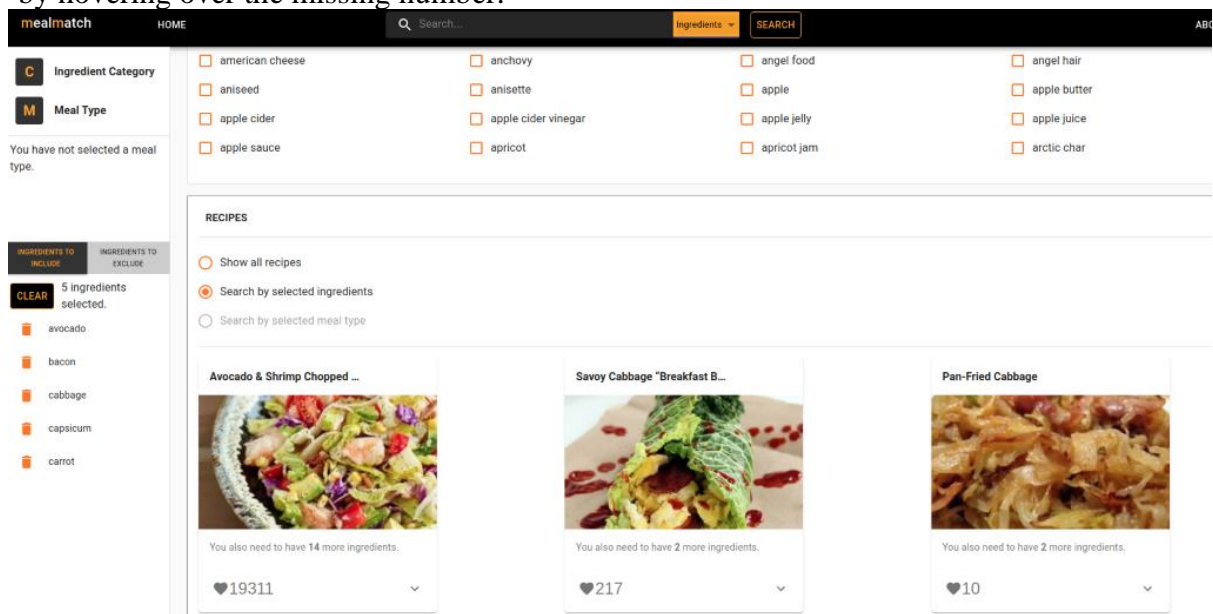


Fig.: search by selected ingredients

2.1.6 Delete Ingredients

While selecting ingredients user will have a running list of ingredients they have selected, and they can delete an ingredient by clicking on the trash icon next to the ingredient name. The user can also delete desired ingredient by unchecking the box next to ingredient name in the ingredient box.

2.1.7 Exclude ingredients based on allergy

User can exclude ingredients based on allergy, medical conditions or preference for specific ingredients. This is the **novel** feature introduced to hide the display of recipes containing allergic ingredients. This feature is particularly designed so that user does not select accidentally any recipe based on likes or other criteria for health-related issues. The system also does not allow user to select those ingredients from the ingredient box which are selected for exclusion.

The screenshot displays the application's ingredient selection interface. On the left, a sidebar contains filters for 'Ingredient Category' (C) and 'Meal Type' (M). Below these, a message states 'You have not selected a meal type.' Further down, a section titled 'INGREDIENTS TO INCLUDE' shows '4 ingredients selected.' with a 'CLEAR' button and a list of ingredients: apple juice, coffee, fruit juice, and kool aid, each with a trash icon for deletion. The main area, titled 'List of ingredients for category', shows a list of ingredients with checkboxes: apple juice, coffee, fruit juice, kool aid, orange juice, and tea. Below this list is a 'RECIPES' section with two radio buttons: 'Show all recipes' (selected) and 'Search by selected ingred'. A smaller inset window on the right shows a detailed view of the 'Beverages' category, listing ingredients like apple juice, coffee, fruit juice, kool aid, orange juice, tea, cherry juice, coke, ginger ale, lemonade, pepsi, and tomato juice, each with a checkbox.

Fig.: exclude ingredients based on allergy

2.1.8 Search Filters

User can search recipes by selecting any of the three filters. 'Search all recipes', 'Search by Selected Ingredients' and 'Search by selected Meal Type'. User can also select search by Ingredient or search by meal type and they will get results related to selected Ingredients or selected meal type. In the below example user selects Crab as Ingredient and by selecting the filter to search by Selected Ingredients they are getting recipes related to crabs.

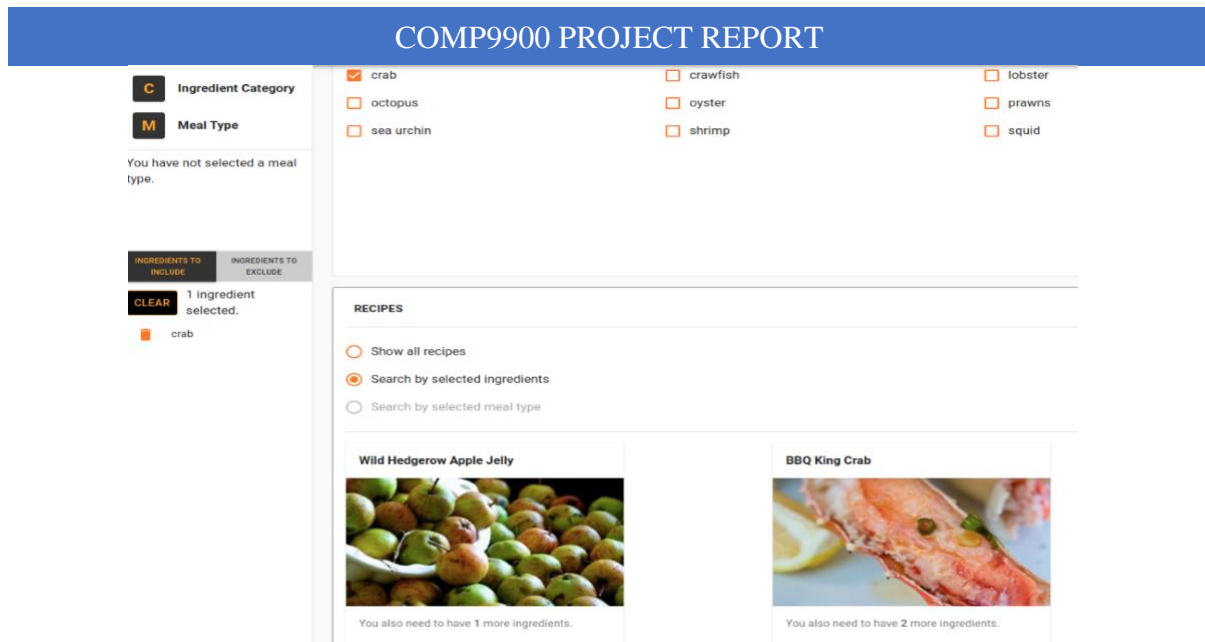


Fig.: search recipe by selected ingredients

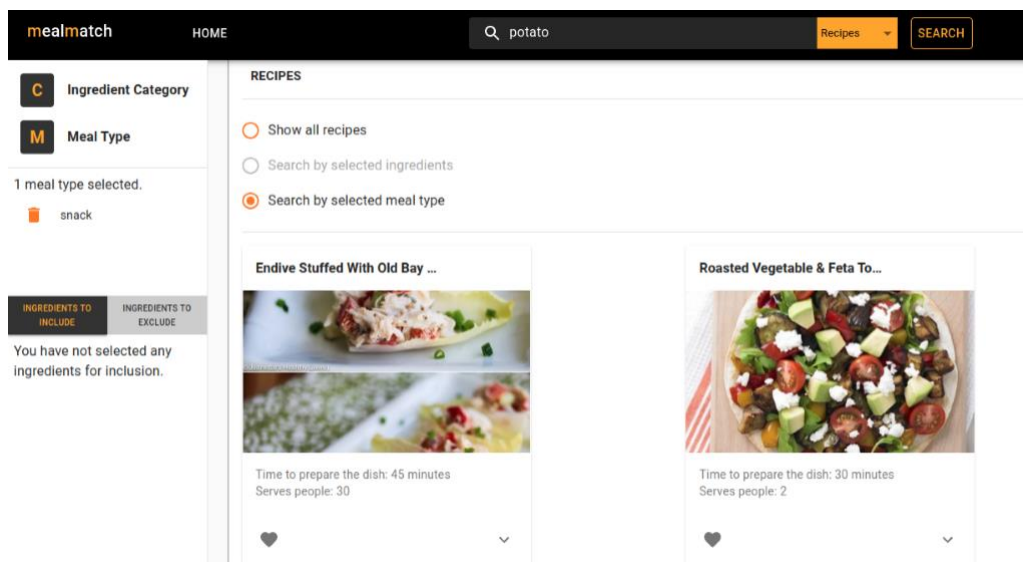


Fig.: search recipe by selected meal type

2.1.9 Number of missing Ingredients

As user gets the results based on what they have selected or entered the recipe details will also provide the missing number of ingredients for that recipe so that the user can either find an alternative or get that ingredient from the grocery store. As in the below screen show the recipes also shows the number of missing ingredients.

2.1.10 Popularity (Number of Likes)

User can select recipes based on its popularities as after searching they can see how popular it is and see the number of likes. As you can see in the below image, user can see the number of like for recipes related to selected ingredient coffee.

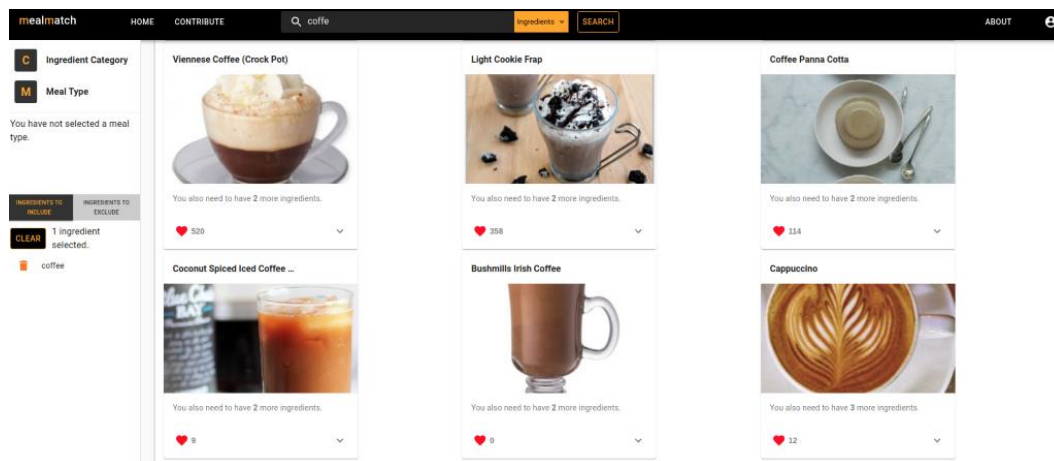


Fig.: number of likes

2.1.11 Suggest Ingredients

On the recipe explorer, if a user has selected some ingredients (for inclusion), clicking on the ‘Suggest Ingredients’ button (located in the Ingredient box) will return a list of ingredients that the user can select. The algorithm checks all the recipes fetched from the API and their associated ingredients, and dynamically updates the returned list of ingredients based on the current running list of ingredients selected for inclusion by checking which ingredients occur in combination with these ingredients in the API recipe list.

2.1.12 About Page

The about page mainly provides information about what ‘MealMatch’ is and illustrates the need of the website for the users. Also, it provides information about the team members who made this platform to provide on go solutions for people trying to make new recipes and minimise food wastage.

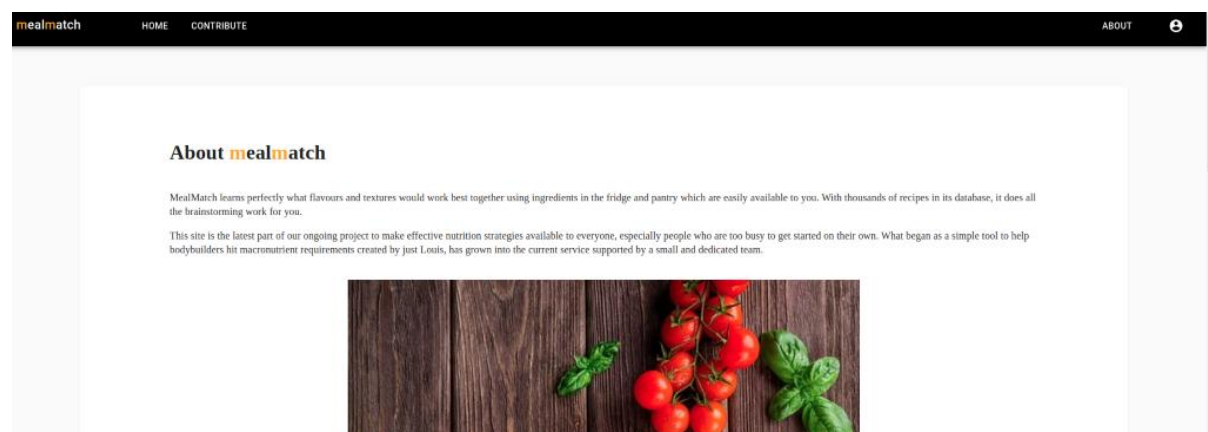


Fig.: About page

2.2 Recipe Contributor

To access the contributor view, the user must create an account on the platform and log in to be able to see the ‘Contribute’ button on dashboard. Once the user is logged in, on clicking on to the ‘Contribute’ button, the website re-directs the user to the contributor view.

2.2.1 Add a New Recipe

Once the user is on the contributor view, the user can choose to add a new recipe by clicking on the ‘+ Add Recipe’ button. Firstly, the user needs to select a list of ingredients, which can either be done by **searching for a specific ingredient** under the search section or by simply picking it from an ingredient category of choice. Furthermore, in the second step, the user can add various details corresponding to the recipe. Ideally the user begins by putting in the name of recipe, description and the meal type the recipe falls in. The pre-selected ingredients from the first step will be shown under the ‘Ingredients’ section which will show all the ingredients along with their corresponding quantity specified right next to it. The user can add multiple steps by clicking on ‘Add Step’ button repeatedly to generate a new input section for every new step. Once the steps are put in the user can also choose to delete the corresponding step by clicking on the bin icon right next to the corresponding step.

While adding the steps, the **user can choose to reorder the steps**, based on his/her preference, and delete them in real time.

Fig.: Add new recipe

On clicking the ‘Choose File’ button under the recipe image placeholder, the recipe contributor can choose to upload the image from the file system on the existing machine. On opening a suitable image, it replaces the existing placeholder and can be overwritten by another image if the user chooses to replace the existing image.

Under the ‘other information’ section the user can put in the information that is directly visible on viewing a recipe card (not expanded). This section includes the time of preparation, serving size and the viewability state of the recipe (private/public). Once the recipe is saved in the

database, the user can view the recipe in the form of a card on the contribute page and check the details by expanding the card.

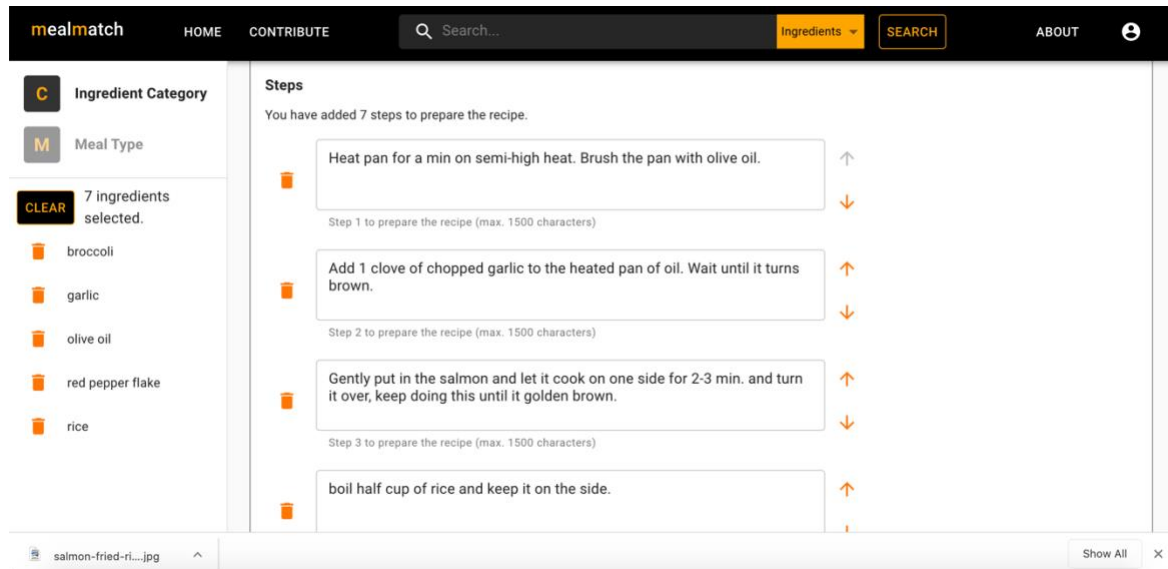


Fig.: Recipe steps

2.2.2 Try New Ingredients

When adding recipes on the recipe contributor page, the user has the option to select ingredients for which he has not contributed any recipes yet by clicking on the ‘Try New Ingredients’ button (located in the Ingredient box). The algorithm fetches the most commonly searched recipes from the API and their associated ingredients and returns the most frequently used ingredients that occur in combination with each other in these recipes, which are then rendered on the web page.

2.2.3 Edit an Existing Recipe

If in case the recipe contributor wishes to change any details of the recipe, he/she can choose to do so by clicking on the edit button on the card which will redirect the user to recipe details page with all the prefilled details for the corresponding recipe. Also, if the user does not wish to share a recipe, he/she can hide the recipe from being accessed by other users **by marking the recipe as private**.

2.2.4 Find an Existing Recipe

All existing recipes can be searched by the user in the contributor depending on two main criteria which are - meal type and ingredients in the recipe. This feature can be leveraged by the user on enabling the toggle buttons namely ‘Filter by Meal type’ and ‘Filter by Ingredients’.

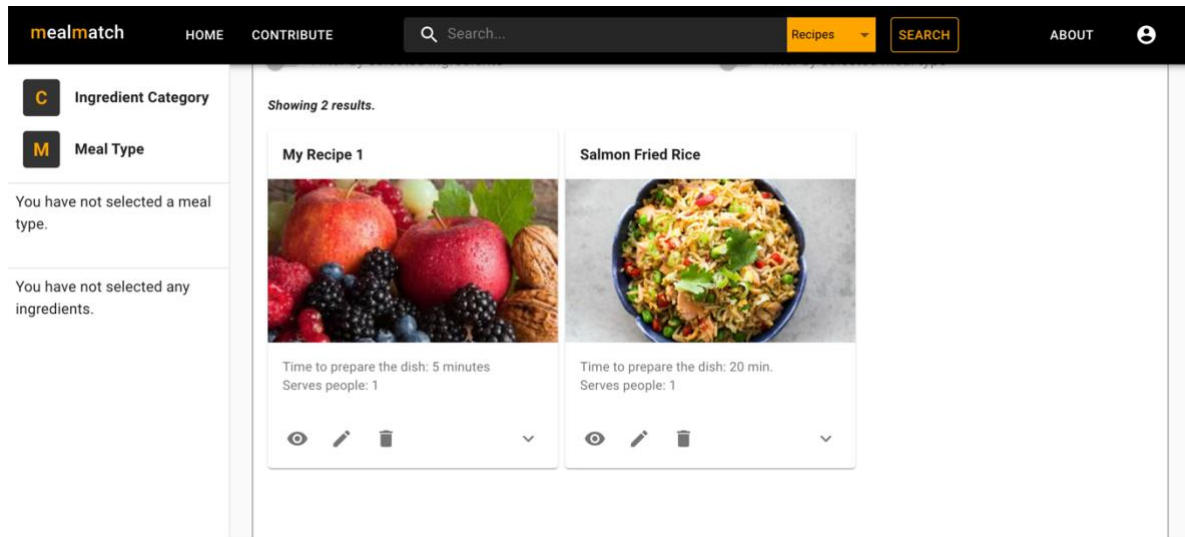


Fig.: Edit/Find Existing Recipe

2.3 Third party API, usage and licensing

The **Spoonacular recipe and food API** has been used to fetch and display recipes on the recipe explorer page. This API, developed by Spoonacular, provides a vast database of ingredients as well as recipes that can be prepared using any combination of ingredients. The results of the 'Axios' calls made to the API are rendered directly on the web page.

The Spoonacular API has been chosen as the search process for the API is highly advanced and follows a semantic approach for parsing any queries, in contrast to other APIs that just parse the keywords and tags from the query and thus tend to return incorrect results from their database as well. The semantic search offered by Spoonacular generally returns correct results to queries made by users. Apart from this, each recipe stored in their database contains several other useful information, such as the meal type, preparation steps, likes, preparation time, among others.

For the purposes of the 'MealMatch' product, the free license of the Spoonacular API has been used which limits the total number of daily points (usually 1 point per recipe search and 0.1 point per returned result) allowed for usage to 150. After the daily quota of points is exhausted, users can not search any further for the day. A premium account for the API exponentially increases this daily quota depending on the subscription selected.

3. Implementation Challenges

3.1 Interaction between the view layer and the middleware layer

The view layer for the ‘MealMatch’ website was developed using React while the middleware layer, which interacted with the database, was developed using the Flask framework of Python. In order to achieve interaction between these layers, a client HTTP API named ‘Axios’ was used which provided the advantages of request and response interception, as well as the automatic transformation of JSON data. ‘Axios’, since it provides in-built support for the Promise API, has been used to send GET, POST, PUT and DELETE requests, depending on the operation to be performed, to the Flask-RESTPlus server that is kept running in the background.

In addition, CORS (cross-origin resource sharing) has been enabled in the Flask app to allow resources to be sent to and from the view layer and the middleware layer. This is required since the React app, running on port 3000, and the Flask app, running on port 5000, have differing origins, and consequently the CORS mechanism is needed to enable access to selected resources.

3.2 Asynchronicity

There are several interactions between the view layer and the middleware layer that are asynchronous in nature, i.e., a request to the Flask server might be sent that is not expected to return an instantaneous response. Even though React is highly efficient in its handling of requests through the utilization of an event-driven system, the asynchronicity of call-backs is usually difficult to get right intuitively and can often give rise to the scenario of “call-back hell”, such as when multiple functions can form a nested waiting queue, i.e., an asynchronous callback occurs and is kept waiting within the body of another call-back. This makes the code obscure and difficult to follow.

To overcome this challenge as well, the `async/await` feature provided by React is used. In our product, asynchronous calls usually occur when the Axios client sends a request to the Flask

```
async getIngredients() {
  await axios.get('/ingredient')
    .then(response => {
      this.setState({
        ingredient_count: response.data.count,
        ingredient_list: response.data.ingredients
      });
    })
    .catch(error => {
      console.log(error);
    });
}
```

Fig.: Code snippet for asynchronicity

call to the server is preceded by the “await” keyword, that signifies that the call is an asynchronous operation and any further operations need to wait for it to return a response, and any function containing such a call is preceded by the “async” keyword. For example, in the figure below, the async/await feature has been used to fetch the list of ingredients from the Flask endpoint for ingredients, since it might not immediately return a response, and which is then rendered in the view layer.

3.3 Integrating ingredient exclusion feature

The ingredient exclusion feature posed a challenge in the method through which it would be rendered on the front-end and clearly separating the ingredients selected for exclusion from the ingredients to be included, as well as the filtering of recipes fetched from API, since ‘Spoonacular’ does not directly provide this feature.

*Fig.: **Ingredients to Include** tab is active. Checkboxes for ingredients selected for exclusion are disabled.*

For the first challenge, two tabs were provided in the left drawer, one for selecting ingredients to include and the other to select ingredients to exclude. When the “Ingredients to Include” tab is active, any ingredient selected from the list of ingredients would be added to this section. Also, the selection of any ingredients that have been selected for exclusion will be disabled.

*Fig.: **Ingredients to Exclude** tab is active. Checkboxes for ingredients selected for inclusion are disabled.*

The opposite of this happens when the “Ingredients to Exclude” tab is active, when any ingredient selected from the list would be selected for exclusion, and the selection of any ingredients that have been selected for inclusion will be disabled.

For the second challenge, the recipes are initially fetched from the API based on the ingredients to be included. Subsequently, the recipes are further filtered based on the ingredients to exclude by checking if any of these ingredients occur in the ‘missedIngredients’ (ingredients that are in the recipe but not in the list of ingredients selected for inclusion) list returned from the API.

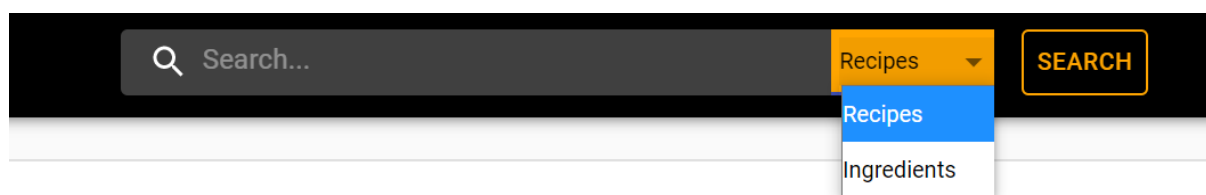
3.4 Consistency in displaying recipes fetched from database and from API

The recipes that are displayed on the recipe explorer page of the website have two sources: (i) the recipes that are fetched from the Spoonacular API, and (ii) the recipes that are fetched from the database, i.e., recipes that have been contributed by users on the ‘MealMatch’ website and which have been set to “Public” visibility by their contributor.

The recipes from the two sources are inconsistent in the amount of data they return, with the recipes being fetched from the database containing much more detail than those fetched from the API. However, since both have a common display space, there’s a need for consistency to be achieved in the recipe cards for both types of recipes. To counter this problem, some common data such as the recipe name, image, preparation time, are displayed on all recipe cards, and the remaining data can be viewed by expanding each recipe card.

3.5 Central search bar for recipes and ingredients

In the product prototype, two different search bars had been provided, one for searching recipes on the website and the other for searching ingredients. However, such an implementation may give rise to confusion among the users, and thus this feature was modified and a single search bar, positioned at the top app bar and shown in the figure below, has been provided through which both recipes and ingredients can be searched.



A dropdown menu has been provided to indicate the type of search that needs to be performed. When “Recipes” is selected, any text input in the search field will return matching results for recipes in the Recipe container. Otherwise, when “Ingredients” is selected, the search field input returns the matching list of ingredients in the Ingredients container. A point to note that the recipe search is disabled when the user opens the contribution form view, either to add or update a recipe, since the user only needs to search for ingredients while this view is open.

4. User Document

4.1 Front-End Initialisation

1. Open the terminal at the root directory of the project to initiate front-end setup. Change the directory of the command line path to reach the destination folder 'tech-nox' where all the front-end files are present.

Run:

```
cd Front-End/tech-nox/
```

2. The project is based on Node.js, which requires NPM environment to install all the needed packages.

Run:

```
npm install
```

This will install all packages the project needs according to the 'package.json' file in root path.

3. Run server file using the below run command. This would initiate the start script from the json package file.

Run:

```
npm start
```

4. Open the browser and navigate to <http://localhost:3000> to visit the home page of the website.

4.2 Back-End Initialisation

1. Open a new terminal at the root directory of the project to initiate back-end setup.
2. Using the python package installer pip3, install all the required libraries from the 'requirements.txt' file by running the below command.

Run:

```
pip3 install -r requirements.txt
```

- The flask command is installed by Flask and it must be told where to find the application in order to use it. This can be done by running the below command.

Run:

```
flask run
```

- Open the browser and navigate to <http://localhost:5000> to visit all the flask models running in the backend.

4.3 End-User Manual

This manual explains the many ways in which to use the website in order to get the most out of our vast resource. For all further questions, please get in touch with the ‘MealMatch’ team – the contact details can be found in the last page of the manual.

‘MealMatch’ allows a user to enter in their available ingredients and provides the user with a set of recipe options that are possible based on the input ingredients. It perfectly learns what flavours and textures work best together using ingredients in the fridge and pantry which are easily available. With thousands of recipes in its database, it does all the brainstorming work for the engineer.

Section 1: Home Page

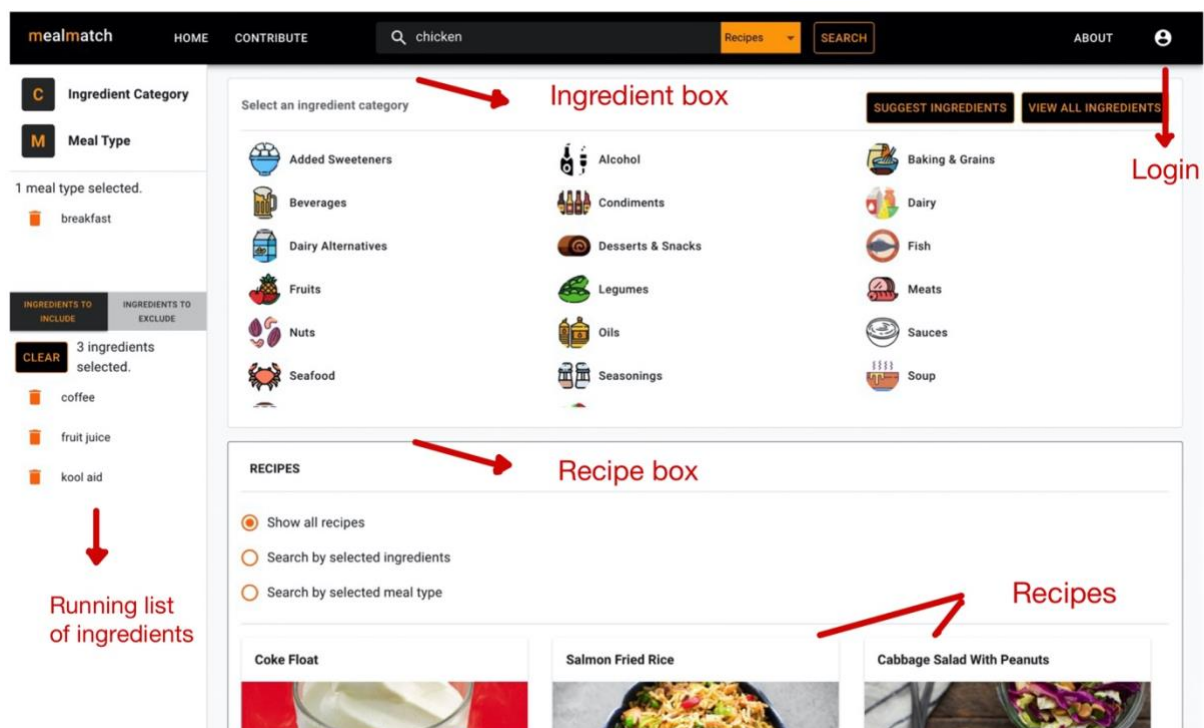


Fig.: Home Page

The home page of the website can be used to plan your meal and has the following features:

1. Search Filters

You can search for a recipe or an ingredient by selecting the appropriate filter from the drop-down menu in the search bar.

2. Search

Once you have selected the search filter, you can search for recipe/ingredient by either typing its name in the search bar or any part of it. (For e.g. to search for 'brown sugar', you may type 'sugar' / 'sug' / 'brow' etc.

3. Search Ingredient Results

After completing the ingredient search, you can select the desired ingredient by checking on the small box displayed next to the ingredient name in the 'Ingredient' box. Selected ingredients will start appearing in the extreme left section of the page under 'Ingredients to Include' as you select them.

4. Search Recipe Results

After completing the recipe search, you can see the results in the 'Recipes' box located below the 'ingredient' box. For each recipe, you can see recipe image, 'time to prepare the dish', and 'serves people'. You can also see number of likes for each recipe displayed next to the heart icon. Clicking on the down-arrow button will expand the recipe card and you can see all the detailed steps of the recipe. Clicking on the up-arrow button will again minimize the recipe card.

5. Ingredient Category

You can also select the ingredients from a particular category by accessing 'Ingredient Category' option located on the top left of the home page. Once you click this button, all the ingredient categories will be displayed in the ingredient box. You can select the desired category which will display all the ingredients from that category. You can then select all the ingredients needed from that category by checking on the small box next to the ingredient name. A running list of the ingredients will appear in the extreme left section of the page under 'Ingredients to Include' once you add them.

- **Back button:** This will take you back to the ingredient categories.
- **Suggest ingredients button:** 'MealMatch' automatically suggests new ingredients based on the ingredients you have already selected. Clicking this button will give you new ingredient suggestions which you can select as described earlier.
- **View all ingredients button:** Clicking this button will display all the ingredients. This is an alternative way to select a particular ingredient if you don't know its category.

6. Delete an ingredient

You can delete an ingredient by either clicking on the trash icon displayed next to the ingredient name in the running list of ingredients (left section of the page) or by unchecking the box

corresponding to the ingredient name in the ingredient box (top section of the page). The ingredient will then disappear from the running list of ingredients.

7. Meal Type

You can select a particular meal type by accessing ‘Meal Type’ option located on the top left of the home page. Once you click this button, all the meal types will be displayed in the meal type box, from which you can select the preferred meal type by clicking on it. The selected meal type will then appear in the extreme left section of the page below ‘Meal Type’ button. Please also refer to point 8 in Section 1.

8. Recipes Box

Please refer to point 4 in Section 1. The ‘Recipes’ box also has 3 radio buttons to filter the type of results. At a time, only 1 of the 3 buttons can be selected. By default, ‘Show all recipes’ button is selected.

- **Show all recipes button:** Selecting this button will display all the recipes in the system.
- **Search by selected ingredients:** Selecting this button will filter the recipes based on the selected ingredients, if any. It will display the results showing the closest match to the ingredients selected and the recipe cards will also indicate the number of extra ingredients you will need to make that recipe. Hovering over the number, you can see the names of those ingredients.
- **Search by selected meal type:** Selecting this button will filter the recipes based on the selected meal type.

9. Ingredients to Exclude

‘MealMatch’ gives you the option to exclude any ingredients based on medical conditions, allergy or preference by accessing the ‘Ingredients to Exclude’ button located on the left section of the page. After clicking on this button, you can select the desired ingredients from the ingredient box which you want to exclude. When you click on the ‘Search by selected ingredients’ radio button in the ‘Recipes’ box, it will hide all the recipe results which have ingredients you want to exclude.

Please note: You do not need to necessarily register on ‘MealMatch’ in order to use the website. However, if you want to contribute and store your own recipes, you must first make a user account on the website. Please refer to the points 1 and 2 in Section 3 for this.

Section 2: About Page

Click on the ‘About’ button located in the right side of the tool bar on home page to open the About page. This page is divided into 4 sections. The first section gives an introduction of ‘MealMatch’. The second section illustrates the need of this product. The third section introduces the ‘MealMatch’ team members and their experiences. Lastly, the fourth section mentions ‘Attributions and Acknowledgements’.

Section 3: Signup and Login Page

1. Signup/Login

You can login on 'MealMatch' by clicking on the login button located in the top right corner of the tool bar on home page. Clicking this button will open a login page and will prompt you to enter your username and password. Remember that password is case sensitive. Once you enter these details, click on 'login' button.

If you are a new user, you will have to sign up on the website first. You can do this by clicking on the 'sign up' button located on lower right of the login page. This will open a signup page where you can enter your first name, last name, username and password in the fields indicated. After this click on the 'done' button. In case of successful registration, the login page would reappear where you can enter your login credentials, username and password, and login to the website.

You can see your login details by clicking on the 'user' icon located in the top right corner of the tool bar on home page.

2. Logout

Click on the user icon located in the top right corner of the tool bar on home page. Then click on the 'logout' button which appears in the drop-down menu to logout from the website.

Section 4: Contribute Page

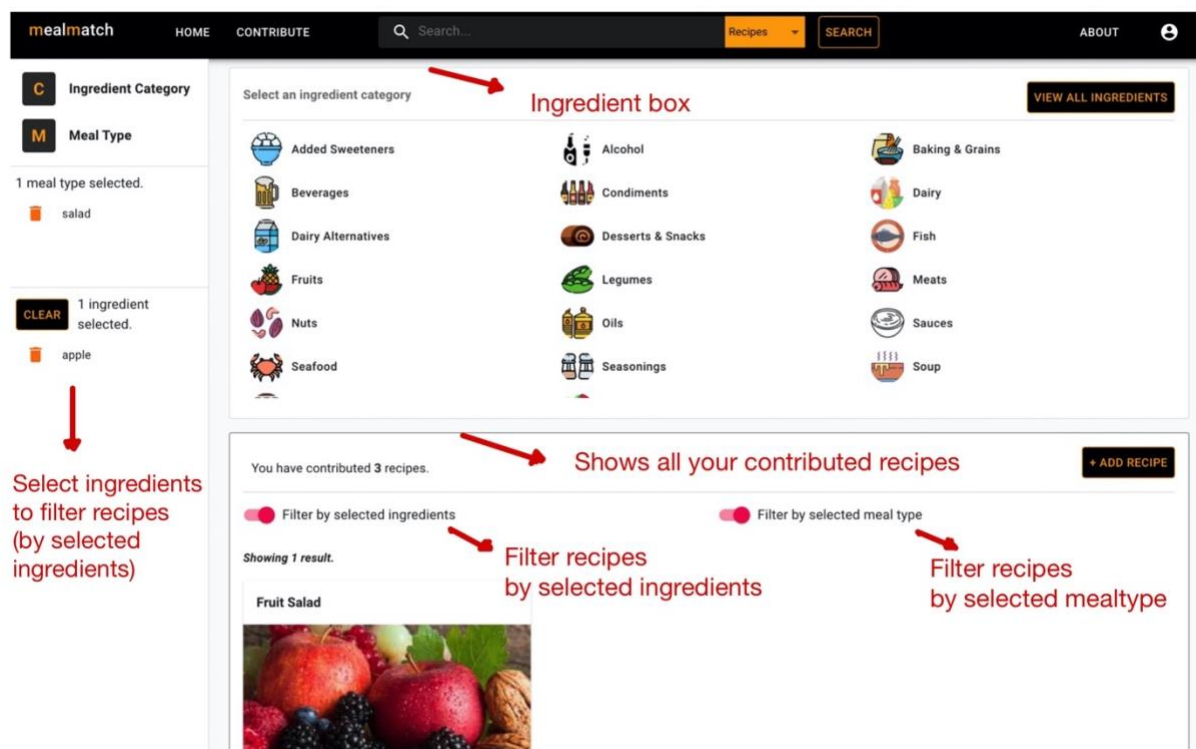


Fig.: Contribute Page

Click on the 'Contribute' button located in the left side of the tool bar on home page to open the Contributor page where you can add new recipes and see details of your existing recipes. The 'Recipes' box would indicate the number of recipes you have added.

1. Add recipe

You can add a new recipe by clicking on the '+ Add Recipe' button located in the 'Recipes' box. After clicking on this button, follow the below steps to add a new recipe.

Step 1: Ingredient Selection

Please refer to points 1, 2, 3, 5 and 6 in Section 1 to add or delete an ingredient.

- **Try new ingredients button:** This is an additional button which appears in the 'Ingredient' box of Contributor page. Clicking this button, shows the combination of most common ingredients for which you haven't contributed any recipe yet. You may select your preferred ingredients from this list.

Step 2: Recipe Creation

- **Basic information**
 - **Name:** Type the name of the recipe. This field cannot be left blank.
 - **Description:** Type the description of the recipe. This field cannot be left blank.
- **Ingredients:** This will show all the ingredients you have selected in Step 1. You can enter the ingredient quantity for each ingredient (for e.g. 2; 2 tblspoons; 2 cups etc.).
- **Steps:** You can add recipe step by clicking on the '+ Add Step' button. You can add more steps by clicking on the same button again. You can also delete a particular step by clicking on the trash icon located next to the recipe step. Further, the recipe steps can also be reordered using top-arrow and down-arrow keys. Clicking on the 'Clear' button will delete all the recipe steps.
- **Meal types:** You can select 1 or more meal types by selecting a meal type from the drop-down list. Clicking on the 'Clear' button will delete all the meal types you have selected.
- **Other information**
 - **Preparation time:** You can enter the approximate preparation time for the recipe (for e.g. 35-40 mins).
 - **People served:** You can enter the number of people that can be served by the prepared dish. By default, this value will be 1.
 - **Visibility:** You can set the visibility public or private from the drop-down list. If you select private, the recipe will only be visible to you. If you select public, the recipe will be visible to other users.
- **Add Image:** You can also add an image for your recipe by choosing a file on your system. The image format must be jpg.
- **Save recipe:** You can click on 'Save recipe' button to save the recipe after completing all the steps outlined above.
- **Back button:** Clicking on this button will take you back to the Contribute page and will show you all your contributed recipes.

2. Filter recipes

You can filter your contributed recipes on the 'Contribute' page according to below filters.

- **Switch for filter by selected ingredients:** Turning on this switch will filter all the recipes according to the ingredients you have selected on the 'Contribute' page.
- **Switch for filter by selected meal type:** Turning on this switch will filter all the recipes according to the meal type you have selected on the 'Contribute' page.

3. Change visibility

You can change the visibility for a particular recipe from public to private or vice-versa by clicking on the 'visibility' icon located on the recipe card. Clicking on this button again, will again change the visibility of the recipe.

4. Update recipe

You can update the details of a recipe by clicking on the 'edit' icon located on the recipe card. Clicking this icon will take you the recipe page where you can edit any details. Click on 'Save Recipe' to save the new details or click on 'Back' button if you no longer wish to save the new details.

5. Delete recipe

You can delete a recipe by clicking on the trash icon located on the recipe card.

Section 5: Contact details

For further queries| or feedback, please contact on:

+61-452581776 (M)

meal.match@gmail.com

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