

# Project Proposal

## The Ultimate Solution to What to Eat/Cook

### Project Summary

For people who tend to cook at home to address their meals, it is sometimes difficult to decide what to eat, and the combinations of food for each dish. Therefore, our objective is to create a website that can give people some choices for their next meal based on their preferences for already stored ingredients and spices. Additionally, we also provide the cost for each meal, estimated time for cooking and the calories intake.

To be more specific, we will store different ingredients of different kinds such as meat, vegetables and fruits, as well as various types of spices, even from different cultural preferences. For each time the user gives any types of ingredients or spices they wish to have for the next meal, possible cuisines will be posted on a website ordered by calories and the rate for the cuisines.

### Description of the Application

\*Clearly state the purpose of your application. Describe the problem you aim to solve or the need you plan to fulfill. Detail the specific goals and objectives of your application.\*

#### Purpose and Problems need to be solved:

Our purpose for this project is to give users some choices for their next meal based on the ingredients and spices they wish to intake. In daily life, many people alternate what they will choose for a cuisine when they are cooking at home with various ingredients stored. Sometimes, people wish to copy their made dishes but they forget the combination of ingredients and spices used before. Additionally, even if the user has decided what to eat, they will hesitate in case that the calories intake are so high that could lead to obesity. To solve this tough problem, our application will store existing ingredients and spices. Based on the input user entered, our application will recommend potential cuisines for the user.

## Goals:

- 1) Three types of data: There will be three datasets stored in our application, ingredients including meats and vegetables, spices such as pepper and salt and cuisines incorporating combinations of ingredients and spices, plus the estimated time(initially set to 0) for cooking, rate for this combination and calories.
- 2) Initial data storing: Our application will store some popular and useful ingredients and spices for cooking when a user first uses this application. The ingredients and spices dataset will be downloaded and analyzed from machine learning datasets. Additionally, some combinations of ingredients and spices for specific cuisines will also be stored in our application so that our application is friendly for novice cooks.
- 3) Data Modification: The initial data of ingredients and spices will be limited and insufficient for many users. Therefore, users will be able to modify the existing dataset by adding, deleting some ingredients, spices and combinations of them.
- 4) Cuisine recommendation: Our application reads an input of user typed ingredients and spices and outputs a list of combinations for cuisines. For a single input, the similarity between input and every cuisine will be checked and the output set of cuisines will be of similarity greater than a specific number. As the result is based on similarity matching, there are two cases to consider: a) The cardinality of input is less than the cuisine currently checked: Our application will calculate the Jaccard similarity between items in user typed data and items in that cuisine stored in our databases. b) The cardinality of input is greater or equal to the cuisine currently checked: If the user enters  $n$  items, but the checked cuisine has  $k$  items( $k < n$ ), then our application will consider all combinations of  $k$  items inside  $n$  items and calculate the cosine similarity between each combination and currently checked cuisine. Then the mean of cosine similarities will be measured and that will be the final similarity.
- 5) User preference ordering: After calculating the similarities, output will be ordered by similarities in descending order. Users can order the result by rate, calories and time spent based on the preference.

## Creative Component

\*Identify a technically challenging feature that will enhance your application's functionality. Describe what this feature is, why it's cool, and how you plan to implement it.\*

We are not just going to store the ingredients data: Food name, price, etc. We are going to utilize the data we stored for more features like list all possible recipe after user tell us all the ingredients that he/she currently possess. Also, we could do a lot of visualization with the data, like the calories intake by the user, and etc. If time permitted, we will also work on some basic caching on the popular recipes to speed up searching speed, and reduce database's workload.

Based on the above plan, listing all possible recipes could be accomplished by using the SQL queries(along with recipe dependencies checker). We plan to use Recharts library to visualize

the data on frontend. Caching feature can be accomplished with different libraries, east one like Caffeine or hard one like Redis.

## Usefulness

\*Explain the utility of your application. Detail the basic and advanced functions it will offer to users. Answer the following questions:\*

- \*Are there existing similar applications? If so, list them and explain how your application differs.\*
- \*What can users do with your application? Include both simple and complex features.\*

As stated in the title, our project's goal is to solve the problem when people have ingredients in their refrigerator but has no idea what to cook and eat. Our project could provide a list of options for users on cuisines that they can make with their own ingredients (and possibly some cuisines that they could make with some additional ingredients that they don't have yet). In addition, these recipes should contain detailed cooking procedure or (even better) video tutorial so users can easily follow and make the meal. Also, user are allowed to upload their own recipes if they could provide the needed ingredients and cooking instructions.

The origin of this project comes from our real life problem, where some of us are willing to cook, but not so familiar with cooking and highly rely on YouTube cooking tutorials, therefore we know little about the cuisine that we could make out from what we have. However, it is too time consuming to search for a fitting recipe, because it is highly possible that the recipe online contains some ingredients that we don't have. And as far as we know, there is not yet a popular app or website that achieve similar purpose. So our project provides the most convenient solution on recipe searching.

<https://www.airtable.com/universe/expHZcS7kWEyq5gUH/recipe-database?explore=true>

This is what we just found which kinda looks like what we would do, but our projet would start from ingredients to search recipes.

## Realness

\*Discuss the data sources you will use for your project. Include details such as:\*

- \*The origin of the data\*
- \*The format of the data (CSV, XLS, TXT, etc.)\*
- \*The size of the data (cardinality and degree)\*
- \*The type of information captured by the data\*
- \*Explain why at least two different data sources are necessary for your project.\*

We would like to include two data sources for our database.

First, we need ingredient data which hopefully contains {Name, Type, Price, etc..}. We are not so strict with data format as long as we can parse it. We would like our ingredients set to be big

because it would be the best if our ingredients set could cover all the ingredients that appears in our recipe set which we will introduce later.

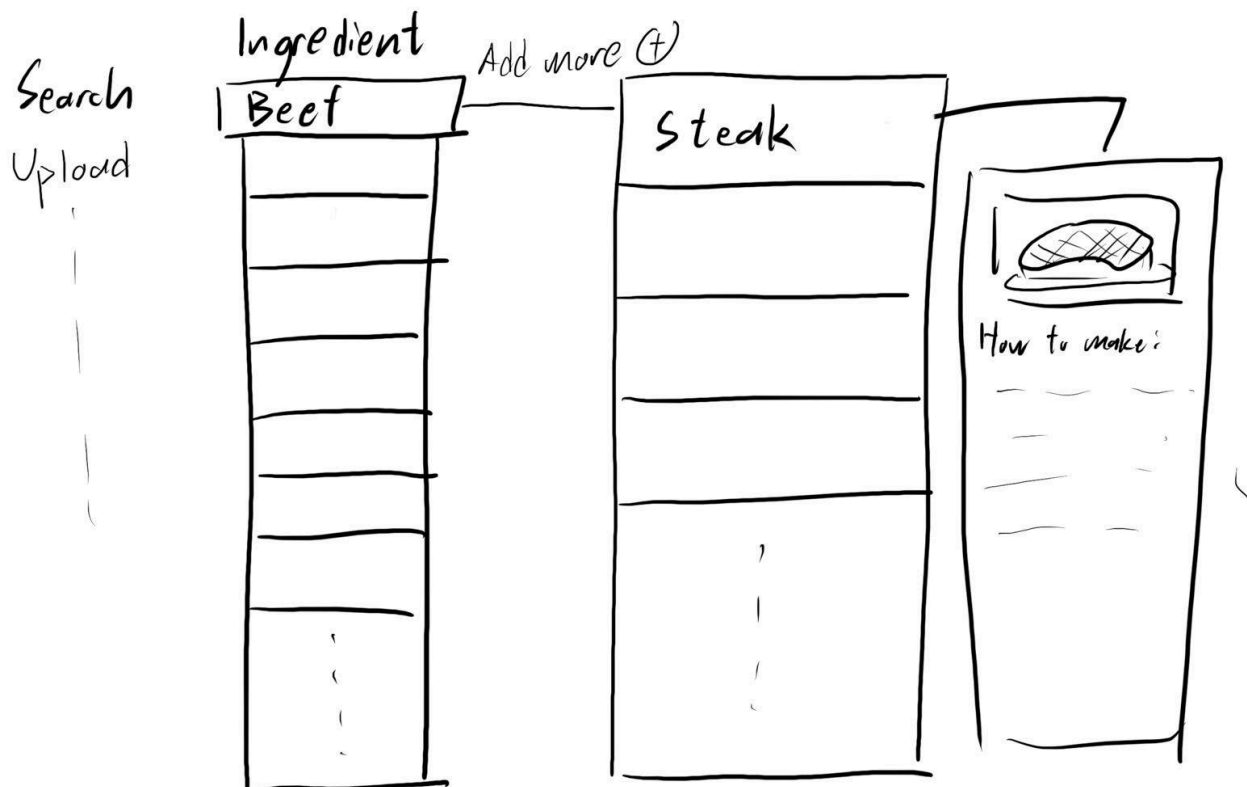
Second, we need recipe data that contains information like {recipe name, ingredients need, difficulty, user rating, calories, description/cooking instructions}. Similarly we can accept any format as long as we are capable to process it. We hope we can have over 10K recipes.

Finally we would like to combine the two dataset to achieve our project's goal.

Here is a potential recipe data which contains over 100K recipes, but the ingredients seem to be too specific.

[https://www.kaggle.com/datasets/shuyangli94/food-com-recipes-and-user-interactions/data?select=PP\\_recipes.csv](https://www.kaggle.com/datasets/shuyangli94/food-com-recipes-and-user-interactions/data?select=PP_recipes.csv)

## Low-Fidelity UI Mockup



Firstly, on the left, user may choose to search recipes or upload(**Create**) recipes. If user chooses the search bar(**Search**), it would appear a list of ingredients (possibly order by alphabetical by default), where user could choose one or more ingredients from the list. Then, after selecting the ingredients that the user wants, the website will display a list of possible recipes for the user. Finally, if user click on the recipe bar, a more detailed page of the recipe will be displayed.

In addition, user will be able to upload their recipes to the website. What they need to do is to choose recorded ingredients from the webdatabase, if there is any ingredients that does not exist in the database, we would allow the user to add this ingredient into our data base. And then, user would need to add their detailed recipe description as well as a picture of it. Then this new cuisine will be uploaded to the database. Users are also allowed to **delete** and **update** the recipes that they created (considering possible mistake, or improvement of the recipes).

## Project Work Distribution

\*List the tasks or subtasks of the project and assign each member of your team to specific roles or responsibilities. Ensure that the distribution is fair and aligns with the skills and interests of each member.\*

Our group plan to use REACT as frontend, and Java SpringBoot as backend.

YuXian will be responsible for UI design & implementation, and database design. XianYu will be responsible for backend logic implementation, and database design. Jinheng will be responsible for frontend visualization, backend login implementation, and database design. QiYang will be responsible for database design, PPT for presentation.