

P05 Writeup

Flavors of India: Meera Ramesh, Samhita Raman, Vaishnavi Vinodkhanna, Neha Kulshreshtha

Improvements statement

Information Retrieval Component

For our information retrieval component, we use Jaccard similarity between the user query and recipe ingredient list as well as Cosine similarity between the user query and recipe description. In our first prototype, we had one user query for recipe name. We used this query performed Jaccard similarity between the user query and recipe names from our database. We then ranked these recipes based on the Jaccard similarity, and returned the top 9 to our users. In our second prototype, we extended inputs to allow users to input ingredients, time and dietary restrictions. In this prototype, we performed Jaccard similarity between the user's ingredient query, subsequently filtering results based on users time and dietary needs. In our final prototype, we elevated our project by further extending our inputs to allow users to provide additional keywords regarding their dish preferences. We use this keywords query to perform TF-IDF cosine similarity with the recipe descriptions. We then create a weighting between the Jaccard similarity for recipe ingredients, TF-IDF cosine similarity, and popularity(discussed below).

Text Mining: Rocchio's

In our previous prototypes, we did not incorporate a text-mining component into our project. For our final milestone, we incorporated a text mining component using Rocchio's Algorithm. We will use our information retrieval methods as well as social components, described in this write up. We will return the top 9 recipes to the user, and show the user a prompt for user feedback, where they are able to like/dislike recipes that the IR system provides them. We will use the Rocchio's algorithm to provide users with refined results based on their feedback.

Social Component

In our previous prototypes, we did not incorporate a social component. For the final prototype, we generated the URL for each recipe in order to web-scrape the number of reviews for each recipe and are using how many users made that recipe that as a “popularity” metric. We use this metric, along with other similarity measures detailed previously, to determine which recipes to display to users. We set a weighting to this popularity metric to ensure an appropriate incorporation of popularity into our IR system.

Class concepts

In this project, we use several concepts that we learned in class to elevate the strength of our IR system. Specifically, we used TF-IDF Cosine similarity, Rocchio’s Method, and Jaccard Similarity. As stated previously, we computed TF-IDF cosine similarity between a user query(keywords) and recipe description. Similarly, we computed Jaccard similarity between a user query(ingredients) and recipe ingredients. Lastly, we incorporated Rocchio’s Algorithm when providing users with refined recipes as a response to user feedback.

Qualitative evaluation

Example Input 1

P03 outputs:

Flavors of India

Ambur Style Brinjal Curry Recipe



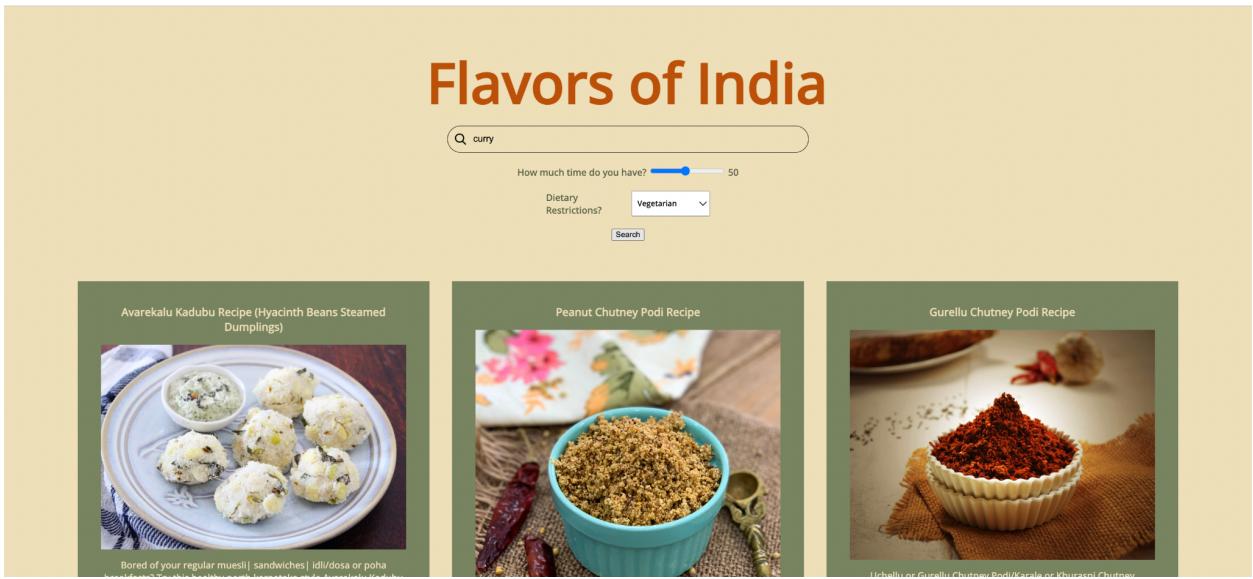
Mavinakayi Menasinakai Curry Recipe – Raw Mango Coconut Curry



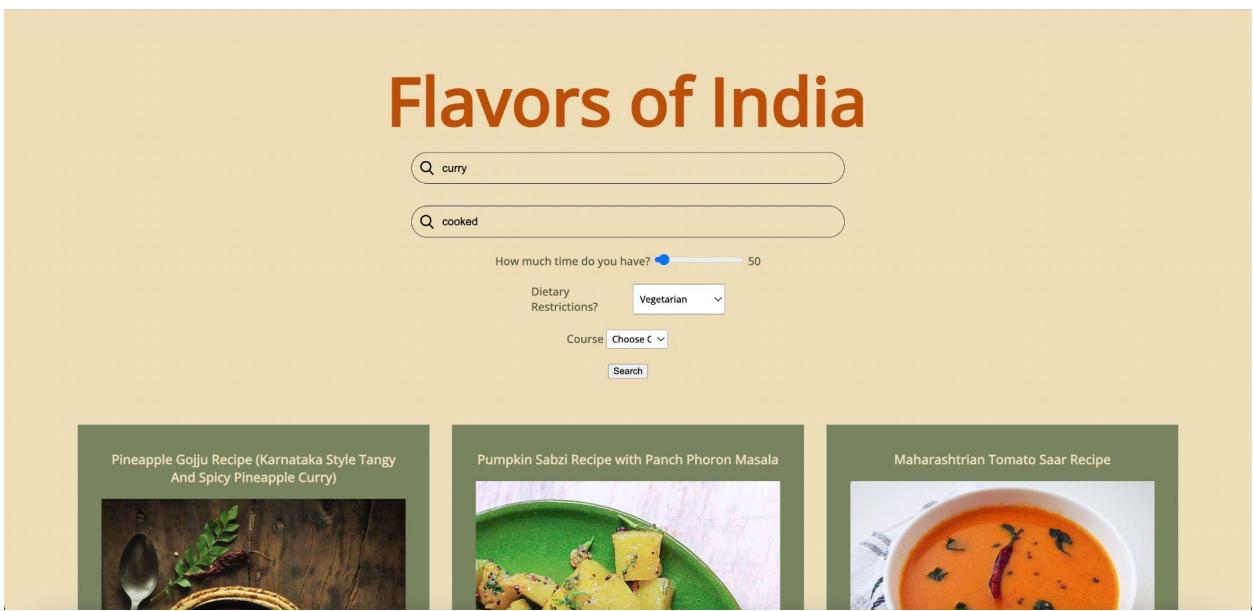
Konkani Style Mooga Ghushi Recipe–Sprouted Whole Green Gram In Tangy Coconut Gravy



P04 outputs:



P05 outputs:



Our P05 output is the most comprehensive as we are now taking keywords into account. We return 3 outputs, 2 of which are actual curries, and the last result uses curry leaves in the ingredients. We get better results compared to P04 as explained above.

Example Input 2

P03 inputs

Flavors of India

thayir

Doddapatre Tambli Recipe (Karpooravalli Thayir Pachadi)



Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Cabbage And Carrot Thoran Recipe



P04 inputs

Flavors of India

thayir

How much time do you have? 50

Dietary
Restrictions?

Non-Vegetarian

Search

Punjabi Style Boondi Kadhi Recipe



Punjabi Style Boondi Kadhi Recipe is a popular kadhi in Rajasthan and Punjab. Methi seeds are rich in Iron and lentils are rich in proteins. It is a soothing side dish that is apt to have during hot days.

Aloo Raswala Sabzi Recipe



Chichinda Ki Sabzi Recipe -Uttar Pradesh Style Snake Gourd Stir Fry



Chichinda Ki Sabzi Recipe (Uttar Pradesh Style Snake Gourd Stir Fry) is an easy and quick to make during weeknights and can also be packed for lunch boxes. The snake gourds are cooked in minimal spices and roasted chickpea flour that imparts a nutty flavour.

P05 inputs

Flavors of India

thayir, yogurt, curd

Input Keywords

How much time do you have? 205

Dietary Restrictions?

Course

Dahi Methi Puri Recipe - Fenugreek Leaves Puri With Yogurt

Doddapatre Tambli Recipe (Karpooravalli Thayir Pachadi)

Bathua Raita Recipe

Now that we can enter multiple inputs, our results all use yogurt, which is the English translation of “thayir”. As compared to outputs from earlier prototypes, our outputs all have thayir as an ingredient and in fact searches for any of the 3 ingredients that the user enters. You can see that our P04 outputs did not even include thayir in the ingredients for any of the returned recipes.

Example Input 3

P03 inputs

Flavors of India

coconut

Mavinakayi Menasinakai Curry Recipe - Raw Mango Coconut Curry

Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy

Cabbage And Carrot Thoran Recipe

P04 inputs

Flavors of India

coconut

How much time do you have? 50

Dietary Restrictions? Vegetarian

[Search](#)



Karnataka Style Hrudigale Tambittu Recipe - Gram Flour Ladoo

Karnataka Style Hrudigale Tambittu Recipe is a traditional dessert from Karnataka. The dessert is made by preparing a soft dough with gram flour, jaggery, and coconut flakes and then shaping into ladoos and serving. The sweetness from the jaggery and the nuttiness from the gram flour is rightly paired and balanced with flakes of grated coconut.



Whole Wheat Flour Puttu Recipe

Vavatta Whole Wheat Flour Puttu Recipe is a twist to Puttu recipe which is unique to Kerala. It is one of the staple dish prepared for breakfast in many households on day to day basis. Puttu is a steamed rice or wheat flour cake which is usually served with various side dishes. There are many variations to this dish; some prepare it with Ragi that makes it very nutritious & diabetic friendly dish. Usually 'puttu' is prepared with rice powder. This 5 ingredient wheat flour puttu turns out super tasty and can be prepared in less than 30 minutes. How doesn't that sound interesting enough to try the recipe? Go ahead give it a try.



Konkani Style Valli Bendii Recipe-Malabar Spinach Curry

Konkani Style Valli Bendii Recipe-Malabar Spinach Curry | a simple authentic curry made from Malabar Spinach leaves. The leaves are cleaned, washed and then pressure cooked with dry red chillies and tamarind paste. In Konkani | "Valli" refers to the Spinach that is used in the curry| the leaf is rich in lot of nutrients. It reduces cholesterol and is highly fibrous. It is good for digestion also.

P05 inputs

Flavors of India

coconut

tangy

How much time do you have? 485

Dietary Restrictions? Non-Vegetarian

Course: Lunch

[Search](#)



Pineapple Goju Recipe (Karnataka Style Tangy And Spicy Pineapple Curry)



Moongachi Usali (Goan Style Sprouted Green Gram Stir Fry)



Shahjahani Khichdi Recipe - Spiced Green Moong Dal Khichdi

For P05, we entered “coconut” as an ingredient and “tangy” as a keyword. This gave us 3 more meaningful results as compared to the past prototypes since each recipe uses coconut as an ingredient and in fact the first output has “tangy” and “coconut” in the recipe title.

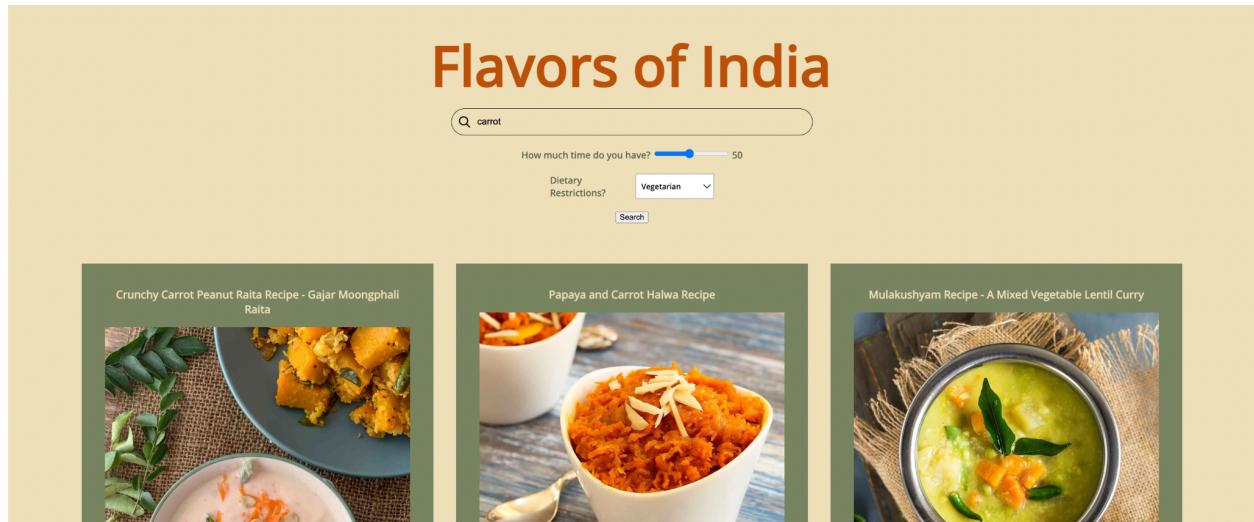
Example input 4

P03 inputs

Flavors of India

carrot

P04 inputs



P05 inputs



Our P05 outputs are different from those of earlier prototypes as we are now taking into account popularity of recipes. The third result, "spicy baby potatoes" is one of the most popular recipes in the dataset and so it is intuitive that we returned this result here. It is interesting to see that the returned outputs are more savory dishes than compared to the returned outputs from P03 and P04 which included desserts. But since these are less popular, they didn't get returned here.

Example Input 5

P03 inputs

Flavors of India

Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Cabbage And Carrot Thoran Recipe



Mavinakayi Menasinakai Curry Recipe - Raw Mango Coconut Curry



P04 inputs

Flavors of India

How much time do you have? 50

Dietary
Restrictions?

Non-Vegetarian ▾

Search

Restaurant Style Chicken 555 Recipe



Chicken Wings With Bhuna Masala Recipe



Easy Creamy Chicken Curry Recipe



P05 inputs



Here we chose “lunch” as the course for our “chicken” ingredient. Based on the prep time, we get different outputs which are more popular in our database and can be made within the prep time allotted by the user. In this way, it is an improvement from our prior prototypes.

Known issues

In completing this project, one issue that we ran into was generating URLs for the recipes. Unfortunately, our database did not have the recipe URLs present. So, we manually searched up recipes to find URLs. We then observed a pattern in the URLs, and used this pattern to generate the URLs. However, since these URLs are generated, this lead to some URLs being broken.

<https://cornell-4300-23sp.hotcrp.com/paper/21/main>

Since our first prototype, we have expanded our algorithm to take into account the ingredients the user has on hand. As opposed to cosine similarity, which we used previously, we implemented Jaccard similarity to compare the users ingredient query with the list of ingredients in the database. To ensure that recipes with longer ingredient lists are not favored, we divide by the norms in our implementation. Additionally, we have expanded user input to include dietary restrictions and desired amount of preparation time. This retrieves more specific recipe based on the user's personal needs. In order to retrieve more accurate results, we also performed additional data-cleaning. This included taking out extraneous words from the ingredient list, such as "chopped" or "to taste". We also narrowed the preparation time to range between 10 minutes and 95 minutes, removing extraneous times that were either extremely low or high.

On the front-end side, we have implemented a slider for the user to input desired prep time, as well as a dropdown for dietary needs. We also aligned images and included a neutral, ethnic color scheme to suit the site's purpose.

One piece of feedback we received was to incorporate more user inputs into our search engine. We addressed this by allowing users to input preparation time and dietary needs. Another piece of feedback was to include social feedback into our search engine. We found this element to be tricky to incorporate, given that our database does not include user reviews. Going forward, we plan to use web-scraping as a technique to incorporate user preferences for certain recipes.

Another idea for social feedback we gained from HotCRP reviews was to have users rate the helpfulness of the recommendation to develop a ranking system for displaying output data. In this case, more helpful recommendations would be displayed first over recipes that are less helpful. This is an idea we are looking to implement in future prototypes.

Additionally, list any external sources that you might have used so far (code/ideas from other 4300 projects, code from web repositories).

Show how the new prototype works on the 5 examples inputs you included in P03. For each input, provide a screenshot of the outputs of your new prototype alongside the old screenshot of the outputs you provided in P03, for comparison. With each example, write a brief (1-2 sentence) description discussing how the new outputs constitute an improvement and what new features you believe lead to that improvement (e.g., new similarity measure). It's fine not all your examples show improvement since last prototype, but if none of the examples show improvements then discuss why that is the case.

Input: curry

P03 outputs:

Flavors of India

Q curry

Ambur Style Brinjal Curry Recipe



Marinakayi Menasinakai Curry Recipe – Raw Mango Coconut Curry



Konkani Style Mooga Ghushi Recipe–Sprouted Whole Green Gram In Tangy Coconut Gravy



P04 outputs:

Flavors of India

Q curry

How much time do you have? 50

Dietary
Restrictions?

Vegetarian

Search

Avarekalu Kadubu Recipe (Hyacinth Beans Steamed Dumplings)



Peanut Chutney Podi Recipe



Gurellu Chutney Podi Recipe



As seen above, we get 3 new results for “curry” which are “Avarekalu Kadubu”, “Peanut Chutney Podi”, and “Gurellu Chutney”. These are all different results from what we got in P03, because we are now looking for Jaccard similarity between the input and the list of ingredients rather than the input and the recipe name. Curry is not an ingredient, rather, it is a dish, so the results are not necessarily that helpful to the user as the query itself is not efficient.

Input: thayir

P03 outputs:

Flavors of India

Q thayir

Doddapatre Tambli Recipe (Karpooravalli Thayir Pachadi)



Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Cabbage And Carrot Thoran Recipe



P04 outputs:

Flavors of India

Q thayir

How much time do you have? 50

Dietary Restrictions?

Punjabi Style Boondi Kadhi Recipe

Punjabi Style Boondi Kadhi Recipe is a popular kadhi in Rajasthan and Punjab. Methi seeds are rich in iron and lentils are rich in proteins. It is a soothing side dish that is apt to have during hot days.

Aloo Raswala Sabzi Recipe

Aloo Raswala Sabzi Recipe is a traditional Indian dish from the state of Bihar. It consists of potatoes, chickpea flour, and various spices.

Chichinda Ki Sabzi Recipe -Uttar Pradesh Style Snake Gourd Stir Fry

Chichinda Ki Sabzi Recipe (Uttar Pradesh Style Snake Gourd Stir Fry) is an easy and quick to make during weeknights and can also be packed for lunch boxes. The snake gourds are cooked in minimal spices and roasted chickpea flour that imparts a nutty flavour.

As seen above, we get 3 new results for “thayir” which are “Punjabi Style Boondi Kadhi”, “Aloo Raswala Sabzi”, and “Chichinda Ki Sabzi Recipe-Uttar Pradesh Style Snake Gourd Stir Fry”. These are all different results from what we got in P03, because we are now looking for Jaccard similarity between the input and the list of ingredients rather than the input and the recipe name. Thayir translates to “yogurt” but in a cultural context it is more of a dish than an ingredient, so the results are not necessarily that helpful to the user as the query itself is not efficient.

Input: coconut

P03 outputs:

Flavors of India

Mavinakayi Menasinakai Curry Recipe - Raw Mango Coconut Curry



Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Cabbage And Carrot Thoran Recipe



P04 outputs:

Flavors of India

How much time do you have? 50

Dietary Restrictions?

Karnataka Style Hungadale Tambittu Recipe - Gram Flour Ladoo



Vattai Whole Wheat Flour Puttu Recipe



Konkani Style Vall Bendu Recipe-Malabar Spinach Curry



Karnataka Style Hungadale Tambittu Recipe is a traditional dessert from Karnataka. The dessert is mainly prepared during the festival time as an offering to God. The ladoo is made with simple ingredients and mixed together to form a soft and chewy texture which is then shaped into ladoos and served. The sweetness from the jaggery and the nuttiness from the gram flour is rightly paired and balanced with flakes of grated coconut.

Vattai Whole Wheat Flour Puttu Recipe is a twist to Puttu recipe which is unique to Kerala. It is one of the staple dish prepared for breakfast in many households as a day to day basic. Being a healthy and nutritious oil free dish it is on the list of healthy breakfast dishes. There are many variations to this dish; some prepare with ragi that makes it very nutritious & diabetes friendly dish. Some puttu is prepared with rice powder. This Vattai Puttu Recipe follows the traditional oil free preparation and can be made in less than 30 minutes. Now doesn't that sound interesting enough to try this recipe? Go ahead give it a try.

Konkani Style Vall Bendu Recipe Malabar Spinach Curry is a simple authentic curry made from Malabar spinach or in other words called as vine spinach is cooked in ground fresh coconut, dry red chillies and tamarind paste. In Konkani "Vall" refers to the Spinach that is used in the curry | the leaf is rich in lot of nutrients, it reduces cholesterol and is highly fibrous. It is good for digestion also.

The outputs generated by P03 for the query “coconut” are adequate as all 3 recipes contain coconut, as indicated by the titles of the recipes generated. However, it need not be the case that all recipes that contain coconut have “coconut” as a part of their title. So, the outputs generated by P04 represent a more diverse set of recipes that contain coconut but may not necessarily state coconut in the title.

Input: carrot

P03 outputs:

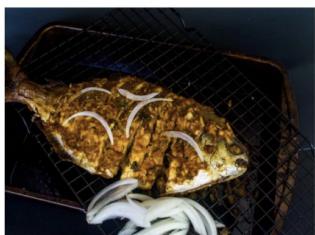
Flavors of India

carrot

Doddapatre Tambli Recipe (Karpooravalli Thayir Pachadi)



Fish Tandoori Recipe



P04 outputs:

Flavors of India

carrot

How much time do you have? 50

Dietary
Restrictions?

Vegetarian

Search

Crunchy Carrot Peanut Raita Recipe - Gajar Moongphali Raita



Papaya and Carrot Halwa Recipe



Mulakushyam Recipe - A Mixed Vegetable Lentil Curry



There is a significant improvement in the results returned for “carrot” query in P04 rather than P03 since all the results have carrot in the list of ingredients. In P03, we were returning any recipes that had “carrot” in the name, which were very limited so our results were not necessarily significant.

Input: chicken

P03: output

Flavors of India

chicken

Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Cabbage And Carrot Thoran Recipe



Mavinakayi Menasinakai Curry Recipe - Raw Mango Coconut Curry



P04 outputs:

Flavors of India

chicken

How much time do you have? 50

Dietary
Restrictions?

Non-Vegetarian

Search

Restaurant Style Chicken 555 Recipe



Chicken Wings With Bhuna Masala Recipe



Easy Creamy Chicken Curry Recipe



There is a significant improvement in the results returned for “chicken” query in P04 rather than P03 since all the results have carrot in the list of ingredients. In P03, we were returning any recipes that had “chicken” in the name, which were very limited so our results were not necessarily significant, as you can see most of the recipes were barely related to chicken.

Group Name: Flavors of India

Members: Samhita Raman, Vaishnavi Vinodhkanna, Meera Ramesh, Neha Kulshreshtha

[App Link](#)

Description of the Baseline Method

We used Jaccard similarity to compare the user input of the ingredients they currently have, with the ingredients in dishes. We then return the top 5 dishes of highest Jaccard similarity. We do not use any machine learning techniques nor special data manipulation. Our dataset is very straightforward with corresponding ingredients, prep time, etc for each recipe so we did not need to perform any special data processing.

Input-Output Examples

Good Examples

Flavors of India

Ambur Style Brinjal Curry Recipe



Mavinakayi Menasinakai Curry Recipe – Raw Mango Coconut Curry



Konkani Style Mooga Ghushi Recipe—Sprouted Whole Green Gram In Tangy Coconut Gravy



This example works well because the user has entered “curry” and we get 3 results for curry: “Ambur Style Brinjal Curry”, “Mavinakayi Menasinakai Curry Recipe — Raw Mango Coconut Curry”, and “Konkani Style Mooga Ghushi Recipe — Sprouted Whole Green Gram in Tangy Coconut Gravy”.

Group Name: Flavors of India

Members: Samhita Raman, Vaishnavi Vinodhkanna, Meera Ramesh, Neha Kulshreshtha

Flavors of India

thayir

Doddapatre Tamboli Recipe (Karpooravalli Thayir Pachadi)



Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Cabbage And Carrot Thoran Recipe



The user inputs “thayir” here, which is the Tamil word for curry. All 3 of the returned recipes use this ingredient, so this was a successful query.

Flavors of India

coconut

Mavinakayi Menasinakai Curry Recipe - Raw Mango Coconut Curry



Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Cabbage And Carrot Thoran Recipe



The user wants to query for recipes that have “coconut” as an ingredient, and this is a good example because all 3 results contain coconut.

Bad Examples

Group Name: Flavors of India

Members: Samhita Raman, Vaishnavi Vinodhkanna, Meera Ramesh, Neha Kulshreshtha

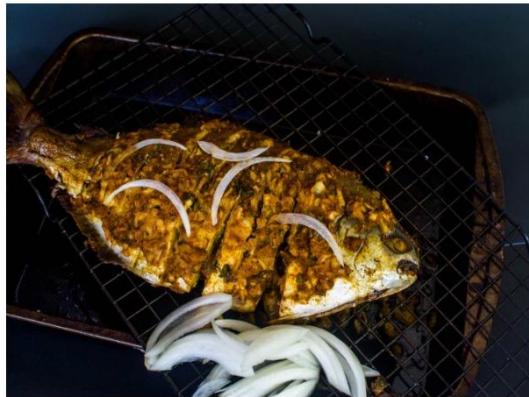
Flavors of India

 carrot

Doddapatre Tambli Recipe (Karpooravalli Thayir Pachadi)



Fish Tandoori Recipe



This is a bad example because the user has entered “carrot” but the returned recipes, namely, “Doddapatre Tambli Recipe” and “Fish Tandoori Recipe” contain “carrot”.

Group Name: Flavors of India

Members: Samhita Raman, Vaishnavi Vinodhkanna, Meera Ramesh, Neha Kulshreshtha

Flavors of India

chicken

Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Cabbage And Carrot Thoran Recipe



Mavinakayi Menasinakai Curry Recipe - Raw Mango Coconut Curry



This is a bad example because none of the recipes in our dataset have “chicken” as an ingredient, so our query should be returning an empty set of recipes, not arbitrary results.



Flavors of India

Initial Prototype

Meera, Samhita, Vaishnavi, Neha

Functionality + Purpose

Functionality

- Provide personalized Indian dish recommendations to user
- User input: Ingredients on hand, Time they are willing to spend

Purpose

- Enable individuals to learn more about the cultural diversity of food in India



Live Demo

[Opp Link](#)

Flavors of India

curry

Ambur Style Brinjal Curry Recipe



Mavinakayi Menasinakai Curry Recipe - Raw Mango Coconut Curry



Konkani Style Mooga Ghushi Recipe-Sprouted Whole Green Gram In Tangy Coconut Gravy



Improvements

01

Extend Inputs

- Include ingredients and prep time
- Add diet preferences

02

“None” Output

- Output “No results found” if no recipes match input

03

Improve Frontend

- Improve alignment
- Better user design
- Allow images to link to recipe

Group Name: Flavors of India

Members: Samhita Raman, Vaishnavi Vinodhkanna, Meera Ramesh, Neha Kulshreshtha

***Our updated abstract is for a newly proposed project.**

Our search engine will provide personalized Indian dish recommendations to the user. The engine will allow users to enter the staple ingredients they have on hand, as well as the amount of preparation and cook time they are willing to dedicate. Given this information, our engine will analyze our dataset and suggest a recipe for an Indian dish. The larger goal of our project is to enable individuals to learn more about the cultural diversity of India. In order to achieve this, the engine will provide a map that displays the region of India from which the dish originates, an image of the dish, and a brief description of its history.

Dataset: <https://www.kaggle.com/datasets/campusx/5000-indian-cuisines-datasetwith-images>

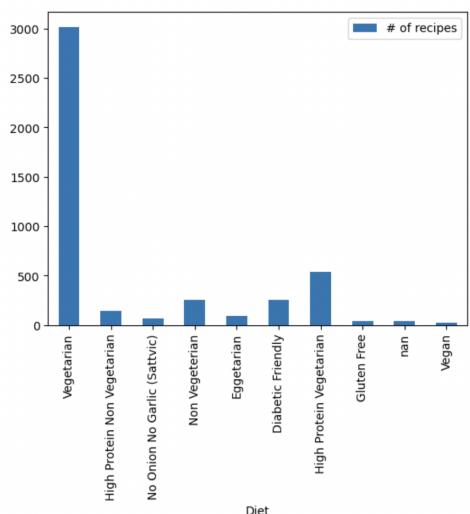
In our TA meeting, a big point of discussion was the feasibility of our initial project idea, which was to recommend outfit ideas based on a user's mood and activities for the day. We discussed what types of data we need, as well as what types of data is available. We needed data that mapped mood to articles of clothing, as well as activities to clothing. Initially, we thought of looking at review data and relating that to mood. However, dataset exploration revealed that most data available to us was reviews on the quality of a product, not what it was used for/mood. Therefore, we decided to pivot to a project with more accessible data to improve feasibility.

To evaluate our application, we will compare the output of our system to "good" and "bad" outputs as outlined in question 5. Moreover, we will confirm that the provided ingredients are present in the retrieved result, as well as the approximate preparation time. Existing systems include Yummly* and RecipeBowl**, both of which take in a user's preferences and provide recipe recommendations. Our system is unique because it not only provides recipes, but also some information about the cultural background of the dish, allowing users to feel more connected to the food they are making. Moreover, our project is specific to Indian food, allowing users to learn more about the diversity within Indian cuisine itself.

* <https://www.yummly.com/>

**<https://ai.sony/publications/RecipeBowl:-A-Cooking-Recommender-for-Ingredients-and-Recipes-using-Set-Transformer/>

The dataset that we plan on using is entitled "5000 Indian Cuisines Dataset(with images)," which we found on Kaggle. Our dataset contains information about Indian dishes, with each record containing a brief description of the dish, the cuisine, the course, diet, prep-time, ingredients, as well as the recipe. Our dataset has ~5000 Dishes (specifically 4,467) from across various regions of India. Our ideal information retrieval flow is as follows: the user types in a query



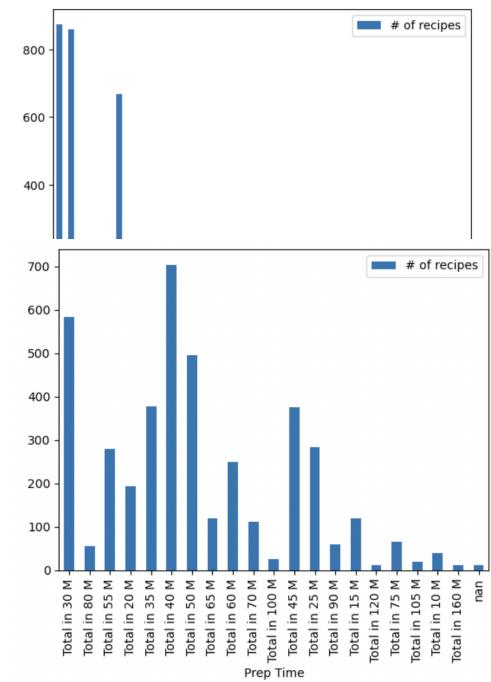
containing ingredients that they have, as well as the amount of time they are willing to spend cooking. We will then use this query to retrieve relevant recipes from our database.

To gain a better understanding of this database, we performed preliminary analysis on the distribution of the dishes based on various fields. To start off, we take a look at the distribution of dishes based on diet. Using pandas, we created a bar graph containing the number of dishes that align themselves with certain diets(to the right). We see that a large number of dishes support a vegetarian diet, with a substantial number of dishes also supporting a non-vegetarian diet.

Along the same lines, we also take a look at the distribution of dishes based on cuisine to better understand the number of dishes coming from various regions of India. From the bar graph(to the left), we see that the regional makeup of our database is quite diverse, with over dishes from over 35 regions of India being represented.

Lastly, we analyze the distribution of dishes based on preparation time. We see that a majority of dishes are prepared in under 40 minutes, and relatively few dishes take over 70 minutes to prepare.

Below is a screenshot containing a few records from our database. It is feasible to use given our use case as it contains the necessary information(including ingredients, prep time, and diet) to provide the user with recipes to dishes that align with their needs. Additionally, given that the database is so large and diverse, the user will be able to learn about new ethnic dishes and experiment while using ingredients that they have at home and spending as much time as they desire.



Arbi Shimla Mirch Sabzi Recipe - Colocasia Capsicum Sabzi	https://www.arc hanaskitchen.co m/images/archan askitchen/1-Author/sibyl-archanaskitchen.com/Shimla_Mirc...	Arbi Shimla Mirch Sabzi Recipe is a variation to the aloo capsicum dry sabzi that is made often at o...	North Indian Recipes	Main Course	No Onion No Garlic (Sattvic)	Total in 55 M	300 grams Colocasia root (Arbi) 1 Green Bell Pepper (Capsicum) , di...	To begin making the Arbi Shimla Mirch Sabzi Recipe, first we will cook the arbi in a pressure cooker...	1
Ambur Style Brinjal Curry Recipe	https://www.arc hanaskitchen.co m/images/archan askitchen/1-Author/happytripeexplains-gmail.com/Brinjal...	Brinjal Curry is prepared in different ways in different regions. Here, we have followed the style w...	Indian	Lunch	Vegetarian	Total in 20 M	5 Brinjal (Baingan / Eggplant) 1 Onion 2 Tomatoes 1 ...	To begin making the Ambur Style Brinjal Curry Recipe, add oil in a heavy bottomed pan and wait till ...	1
Mavinakayi Menasinkai Curry Recipe - Raw Mango Coconut Curry	https://www.arc hanaskitchen.co m/images/archan askitchen/8-Archanas-Kitchen-Recipes/2019/Raw_Mango_Coc...	Mangalorean Mavinakayi Menasinkai Curry Recipe- Raw Mango Coconut Curry made with roasted and ground...	Mangalorean	Side Dish	Vegetarian	Total in 35 M	1 cup Mango (Raw) , diced 2 tablespoons Jaggery ...	To begin making Mangalorean Mavinakayi Menasinkai Curry Recipe cut the peeled raw mango into bite s...	1
Cabbage And Carrot Thoran Recipe	https://www.arc hanaskitchen.co m/images/archan	Cabbage and Carrot Thoran Recipe is a	Kerala Recipes	Lunch	Vegetarian	Total in 40 M	3 Carrots (Gajar) , grated 1/2	To prepare this easy Cabbage And Carrot	1

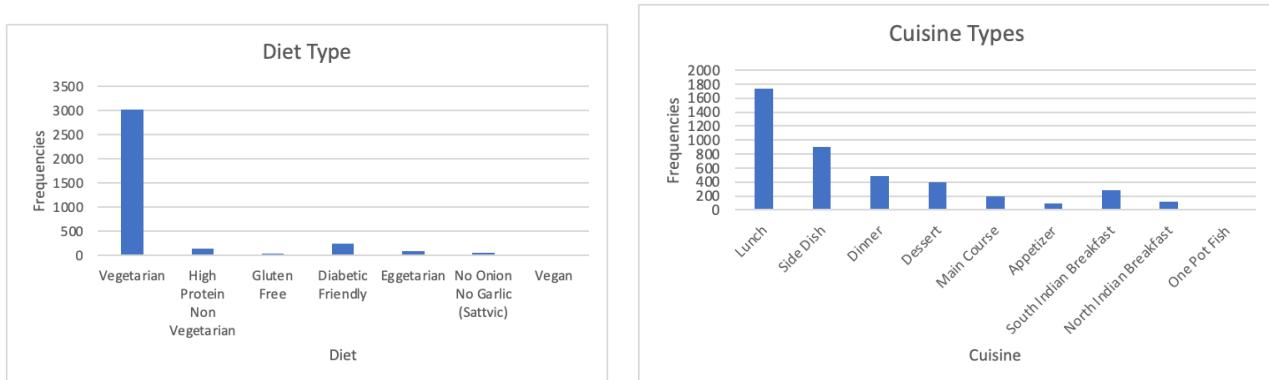
There are currently about 5000 entries in the dataset, about 4,467 entries to be exact. Since this is our final dataset, we plan use all 4,467 entries in our project. Some relevant statistics for 2 important columns are shown below: cuisine types and diet types. From the first graph, you can see that the most common cuisine type is “Lunch”. In the second graph, we see that “Vegetarian” is the most common diet type. As for the other important quantifiable column: “Prep Time”, we can see that about 30% of dishes can be cooked in under 40 minutes, with 70% of dishes taking longer than 40 minutes.

One challenge from a data perspective is that we have to pre-process some of our data. For example, the “Prep time” column has data in the form of a string. For example, instead of the value being “30” for a dish that has a prep time of 30 minutes, it says “Total in 30 M”. We found a solution to this on

<https://www.ablebits.com/office-addins-blog/excel-extract-number-from-string/>. This query extracts the number from any position in the string. Another challenge may be translating everything to English. For example, several recipes names are written in the native language, and so we will have to process those.

The scope of our dataset is feasible to work with since there aren’t too many entries nor columns. It should not be too difficult to query our database since the data has mostly been pre-processed for us into the proper columns.

We are not using any supervised ML approaches nor are we collecting more data.



As stated in the abstract, we will have users select ingredients they have on hand from a list of basic ingredients. They will also enter a value for the time they are willing to dedicate. The engine will provide a dish name, along with a link to a recipe. It will also display a map labeling the region from which the dish originates, and an image of the dish. Below, we have provided three examples.

Case 1

Inputs

Ingredients	“chillies”, “mushrooms”, “rice”
Time	30

“Good” Outputs

Dish Name	“Chettinad Style Pepper Mushroom Recipe”
Region	Chettinad
Time	35
Link	https://www.archanaskitchen.com/chettinad-style-pepper-mushroom-recipe
Image	https://www.archanaskitchen.com/images/archanaskitchen/1-Author/Nithya_Anantham/Chettinad_Style_Pepper_Mushroom_Recipe.jpg

Dish Name	Coorg Style Kaad Manga Curry Recipe -Sweet & Spicy Mango Curry
Region	Coorg
Time	30
Link	https://myculinarysaga.com/coorg-mango-curry-kaad-mange-curry/
Image	https://i0.wp.com/myculinarysaga.com/wp-content/uploads/2017/09/IMG_8559.jpg?w=2400&ssl=1

Bad Output

Dish Name	Goan Style Mushroom Vindaloo Recipe
Region	Goa
Time	50
Link	https://www.archanaskitchen.com/goan-style-mushroom-vindaloo-recipe
Image	https://www.archanaskitchen.com/images/archanaskitchen/0-Archanas-Kitchen-Recipes/2016/sept-26/Goan_Style_Mushroom_Vindaloo_Recipe-1.jpg

Case 2

Inputs

Ingredients	“flour”, “oil”, “sugar”
Time	50

“Good” Output

Dish Name	Baked Modak and Karanji/Gujiya Recipe
Region	Indian
Time	45
Link	https://www.archanaskitchen.com/baked-modak-and-karanji-recipe
Image	https://www.archanaskitchen.com/images/archanaskitchen/1-Author/Poja_Nadkarni/Baked_Modak_and_Karanji_1600.jpg

Bad Output

Dish Name	Tamatar Wali Arbi Sabzi Recipe
Region	North Indian
Time	30
Link	https://www.archanaskitchen.com/tamatar-wali-arbi-sabzi-recipe

Image	https://www.archanaskitchen.com/images/archanaskitchen/1-Author/nithya.anantham/Tamatar_Wali_Arbi_Sabzi_Recipe.jpg
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Case 3

Inputs

Ingredients	“onion”, “garlic”
Time	20

“Good” Output

Dish Name	Quick Paneer Masala Recipe - 15 Minute Paneer Gravy
Region	Indian
Time	15
Link	https://www.archanaskitchen.com/quick-honeyed-paneer
Image	https://www.archanaskitchen.com/images/archanaskitchen/0-Archanas-Kitchen-Recipes/2021/Quick_Paneer_Masala_Recipe_Video_2_1600.jpg

Dish Name	Andhra Style Vankaya Kothimeera Karam Koora Recipe
Region	Andhra
Time	30
Link	https://www.archanaskitchen.com/vankaya-kothimeera-karam-recipe-andhra-style-brinjals-cooked-with-spicy-coriander-mix
Image	https://www.archanaskitchen.com/images/archanaskitchen/0-Archanas-Kitchen-Recipes/2017/25-jan/Vankaya_Kothimeera_Karam_Recipe_An_dhra_Style_Brinjals_Cooked_With_Spicy_Coriander_Mix-5.jpg

Bad Output

Dish Name	Andhra Style Davva Aava koora Recipe (Sweet and Spicy Banana Stem
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	Peanut Curry Recipe)
Region	Andhra
Time	45
Link	https://www.archanaskitchen.com/andhra-style-davva-aava-koora-recipe-sweet-and-spicy-banana-stem-peanut-curry-recipe
Image	https://www.archanaskitchen.com/images/archanaskitchen/1-Author/sibyl_sunitha/Andhra_Style_Davva_Aava_koora_Recipe_Sweet_and_Spicy_Banana_Stem_Peanut_Curry_Recipe_.jpg

All of our members agree on the validity of the above inputs and outputs. In Case 1, all of the outputs are “good” in the sense that they involve the input ingredients. However, the last output is bad because the preparation time is much greater than the input available time (50 minutes vs. 30 minutes). An insight from this example is that we must specify a threshold on how much the prep time can deviate from the user’s input. In Case 2, the first output uses the input ingredients, whereas the second output has several ingredients, out of which only one ingredient is in the inputs (oil), making it a “bad” output. An insight from this example is that our model should consider the number of total ingredients and what proportion of those the user has. In Case 3, the “good” outputs have the input ingredients and the approximate input time, while the “bad” output requires much more preparation time.

Team Member Contributions						
	A	B	C	D	E	
1	Week (Dates)	Neha	Samhita	Meera	Vaish	
5						
6	Week 3 (3/27 - 4/3)	Finished up research and met with TA to finalize our information retrieval method for the user query.	Worked on the front end (HTML/CSS) implementation of our project since she has front-end experience	Finished up research and met with TA to finalize our information retrieval method for the user query.	Worked on the front end (HTML/CSS) implementation of our project since she has front-end experience	We all presented our prototype so far in class.
7						
8	Week 4 (4/3 - 4/10)	Implemented several aspects of the front-end such as the buttons, design/layout, fonts, etc.	Worked on implementing our info retrieval methods and creating test inputs and outputs to verify the results of our methods.	Implemented several aspects of the front-end such as the buttons, design/layout, fonts, etc.	Worked on implementing our info retrieval methods and creating test inputs and outputs to verify the results of our methods.	We met with the TA to discuss changes for the second prototype and got technical help.
9						
10	Week 5 (4/10 - 4/17)	Connected the front end to the back end and used our previously created test input/outputs to ensure app is functional.	Connected the front end to the back end and used our previously created test input/outputs to ensure app is functional.	Refined information retrieval methods and conducted more research to determine accuracy of outputs.	Refined information retrieval methods and conducted more research to determine accuracy of outputs.	We all worked on HotCRP/Ed updates and created a functional version of our app.
11						
12	Week 6 (4/17 - 4/24)	Debugged issues on both front-end and back-end	Fixed aesthetic issues on the front end	Fixed aesthetic issues on the front end	Debugged issues on both front-end and back-end	We all reviewed the functionality of the second prototype and provide feedback for the final app. Also met with TA for final changes and polishes.
13						
14	Week 7 (4/24 - 5/1)	Crowd sourced beta testing of our project	Created slides	Crowd sourced beta testing of our project	Created slides	We created slides and submitted our final app/explanation
15						
16	Week 8 (5/1 - 5/8)	Worked on assigned portion of written report and slides	Worked on assigned portion of written report and slides	Worked on assigned portion of written report and slides	Worked on assigned portion of written report and slides	We demo'd our app, presented in class, and worked on our written report.