

COM - 480 COURSE

TASTING
Viz Project



1. Introduction

The project Tasting Viz started with a simple question: What can I cook with the ingredients I already have at home ? We wanted to create a website to answer this question, but also help users learn more about global cuisines and how ingredients can be combined to create new flavour. We want users to discover a whole new world of possibility and make cooking more fun and accessible. This will be done through clean, engaging, and interactive visualizations.

Our goal was to build a website that is both practical and interesting. A platform where users can discover where their ingredient is most used in, the best combination for the ingredient, find recipes based on these ingredients, find similar recipes from preferred one and learn what the culinary habits of the world is.

The final result is an interactive web application that offers exploratory visualizations with an intuitive, engaging and user-friendly design based on a large dataset of ingredients and recipes.

2. From Concept to Final Result

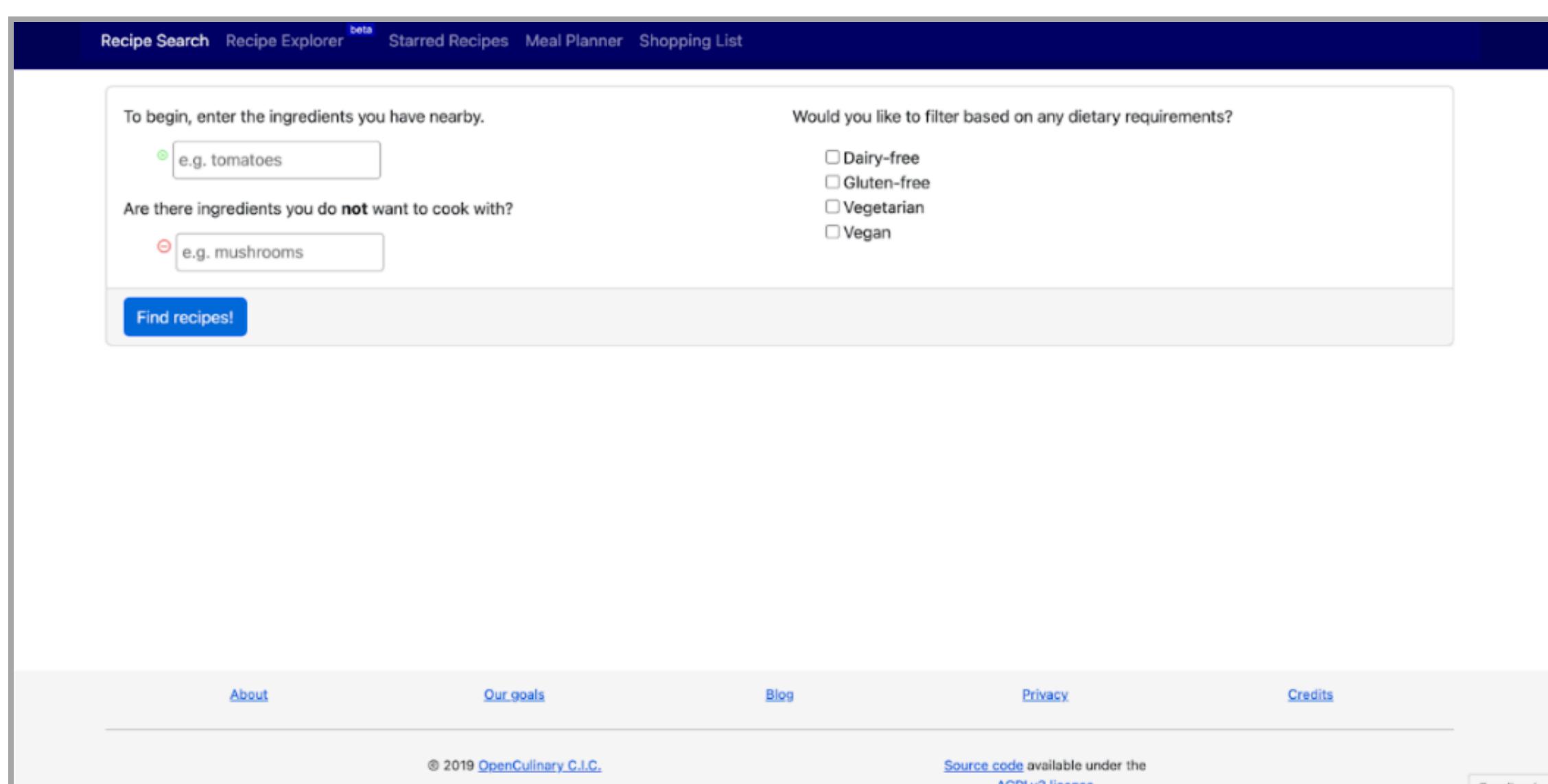
2.1 Choosing Dataset

We started by searching for a dataset on food that contains recipes and ingredients. We found multiple but the most interesting was the one we are working with, CulinaryDB. We thought about adding more dataset but CulinaryDB was already quite big and having too much data could be too computational costly. The CulinaryDB dataset includes thousands of recipes across 22 world regions.

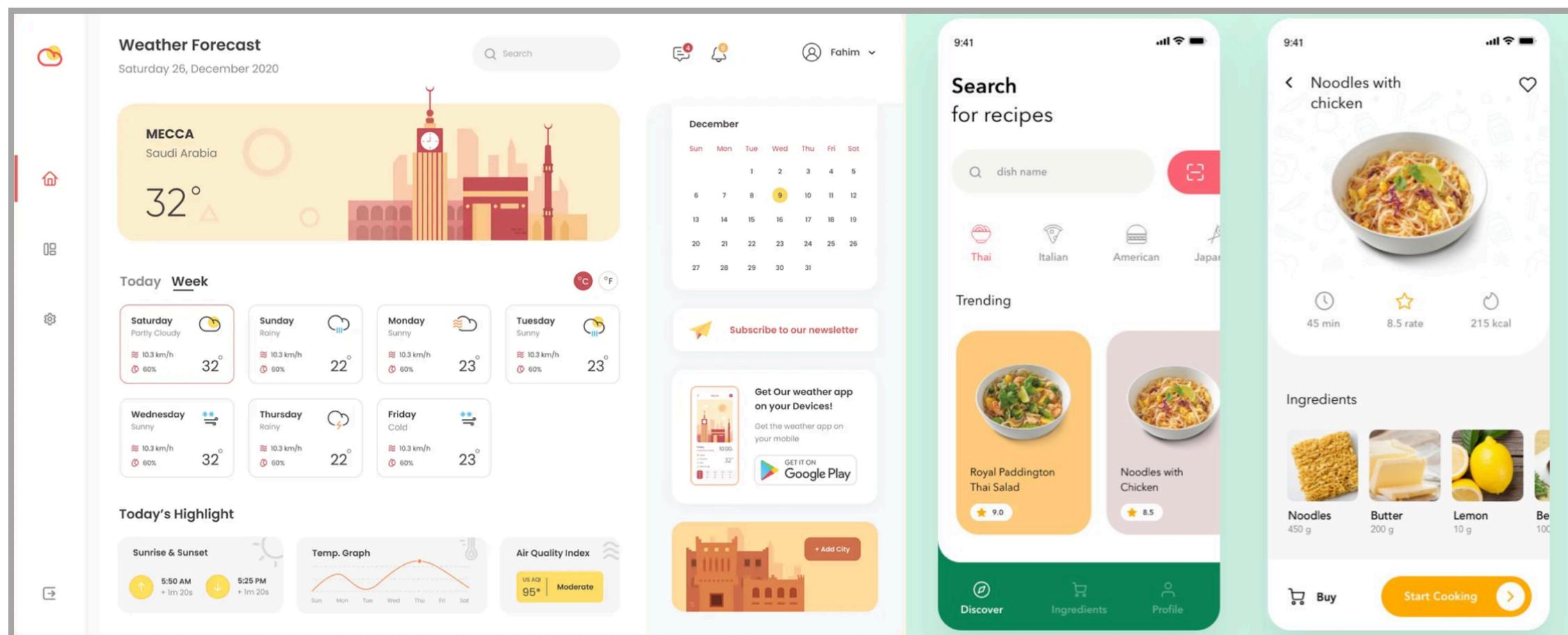
2.2 Early Planning

In Milestone 1, we explored the data and made a plan with our core ideas: ingredient discovery, recipe recommendations, and cultural cuisine insights.

We also provided a few pictures of what we wanted our main search bar to look like:



With a theme like this:



We decided to keep the general orange color theme from the left design and combine it with the modern aesthetic of the right. The final result is a UI that merges warmth with a contemporary feel, as shown on our website: [link](#)

2.3 From Prototype To Final Result

For Milestone 2, we built the basic skeleton of the website, giving us an initial glimpse of its potential look and functionality. While it was exciting to see the first version, we quickly identified several flaws that needed addressing. To improve user experience, we added more real-time interactions, such as a second search bar, making the interface simpler and more intuitive.

Secondly, we initially considered using a circular 3D world map for visualization. While it seemed visually appealing, we quickly realized it had several drawbacks. Primarily, it wouldn't be very user-friendly and could potentially confuse users, making navigation and interaction more difficult than necessary.

The rest of our visualizations remained unchanged, though we slightly reorganized the sections to better accommodate the functions of the search bars.

3. Main Features and Design

3.1 Search Bars

Our website has two search bars with different purposes:

The first search bar lets you enter two or more ingredients to explore matching recipes in the visualization. The second search bar is designed for searching a single ingredient at a time. Both search bars query our recipe database and display relevant results based on the input.

3.2 Recipe Recommendation Gallery

The recipe recommendation gallery is tied to the first search bar. For efficiency and convenience, we preprocessed our initial dataset beforehand by generating a JSON file with primary information: name of the recipe, the cuisine, and its aliased ingredients. If the user types in ingredients separated by commas, the search system splits and normalizes those inputs, then filters the list of recipes by making sure all searched ingredients are included in the recipe gallery.

Then, we created a compact gallery that displays recommended recipes based on the user's search. Three randomly selected recipes are shown at a time. Moreover, a "Regenerate" button lets users refresh the gallery to see a different set of top-rated recipes from the same search.

Our original dataset did not include recipe images. To create a more visually appealing user experience we integrated the Unsplash API to fetch relevant pictures for each recipe. After all, we first eat with our eyes.

Initially, using full recipe titles for Unsplash searches sometimes led to challenges. More specifically, many recipes had unique or metaphorical names like “Heavenly Halibut”, which would return images of heaven or clouds, instead of the fish Halibut.

To minimize these non-food image matches, we implemented the `Compromise.js` as our Unsplash query preprocessing step. This tool analyzes recipe titles, tokenizes them, and isolates the nouns. By using only these core nouns for the Unsplash image search, we significantly enhanced the relevance of the retrieved images.

However, this approach did have some limitations. Several images have abstract or uniquely descriptive names, like “Snow Balls in a Jar”, which is an American dish made primarily of flour, pecans, and sugar. A more advanced natural language processing (NLP) method would be needed to address this. In the future, we could improve accuracy by detecting such ambiguous titles and replacing them with a short list of key ingredients when querying the image API.

The screenshot shows the TastingVis website's interface. At the top, there is a navigation bar with links: Home, Food Map, Ingredient Pairings, Find Recipes, Global Food, About Us, and Contact Us. The 'Find Recipes' link is highlighted in orange. Below the navigation bar, the page title 'Find Great Recipes' is displayed in a large, bold, orange font. A subtitle 'Discover new recipes based on your favorites or explore variations from different cuisines.' follows. Three recipe cards are shown in a grid:

- Babaci's Potato Pierogi**
Cuisine: Eastern Europe
Ingredients: butter, cheese cottage, cheese cream, egg, flour, milk, potato, salt
- Spinach Gnocchi With Fontina Cheese**
Cuisine: Italy
Ingredients: butter, cheese, egg, flour, nutmeg, potato, spinach
- Ham And Cheese Breakfast Quiche**
Cuisine: British Isles
Ingredients: butter, cheese, cream, egg, ham, potato

A small orange 'Regenerate' button is located at the bottom center of the card area.

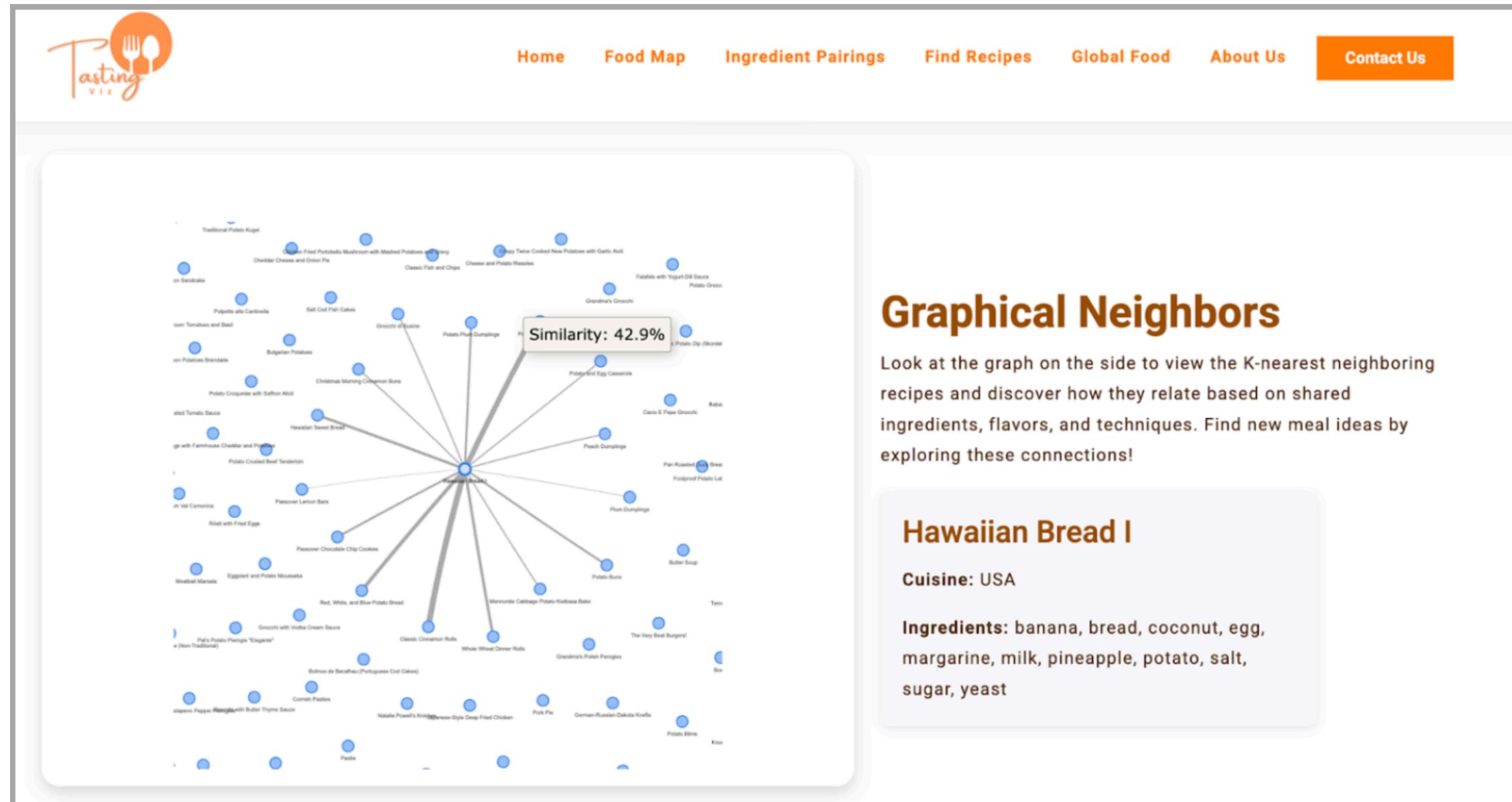
Note: we are using the free Unsplash API plan so we have a daily API call limit.

3.3 Graphical Neighbours

To help users explore related recipes, we built an interactive KNN graph based on ingredient similarity. For example, if a user enjoys a dish like parmesan chicken pasta, they can click on its corresponding node in the graph to reveal its most similar recipes. These neighboring nodes are connected by weighted edges, where the thickness reflects the percentage of ingredient overlap. Clicking on any node reveals detailed information about the recipe in the sidebar.

Recipe similarity is computed using the Jaccard similarity index, which compares the overlap between sets of aliased ingredients. Only pairs of recipes that surpass a certain similarity threshold are connected by an edge, keeping the graph meaningful and uncluttered. But of course, if the user enters only a single ingredient into the search bar, the resulting graph can become quite dense since there are so many more possibilities.

We used the vis.js library to generate the graph due to its ease of integration and built-in features like interactive layouts, zooming, panning, and node-hover interactions.



3.4 Ingredients Across Countries

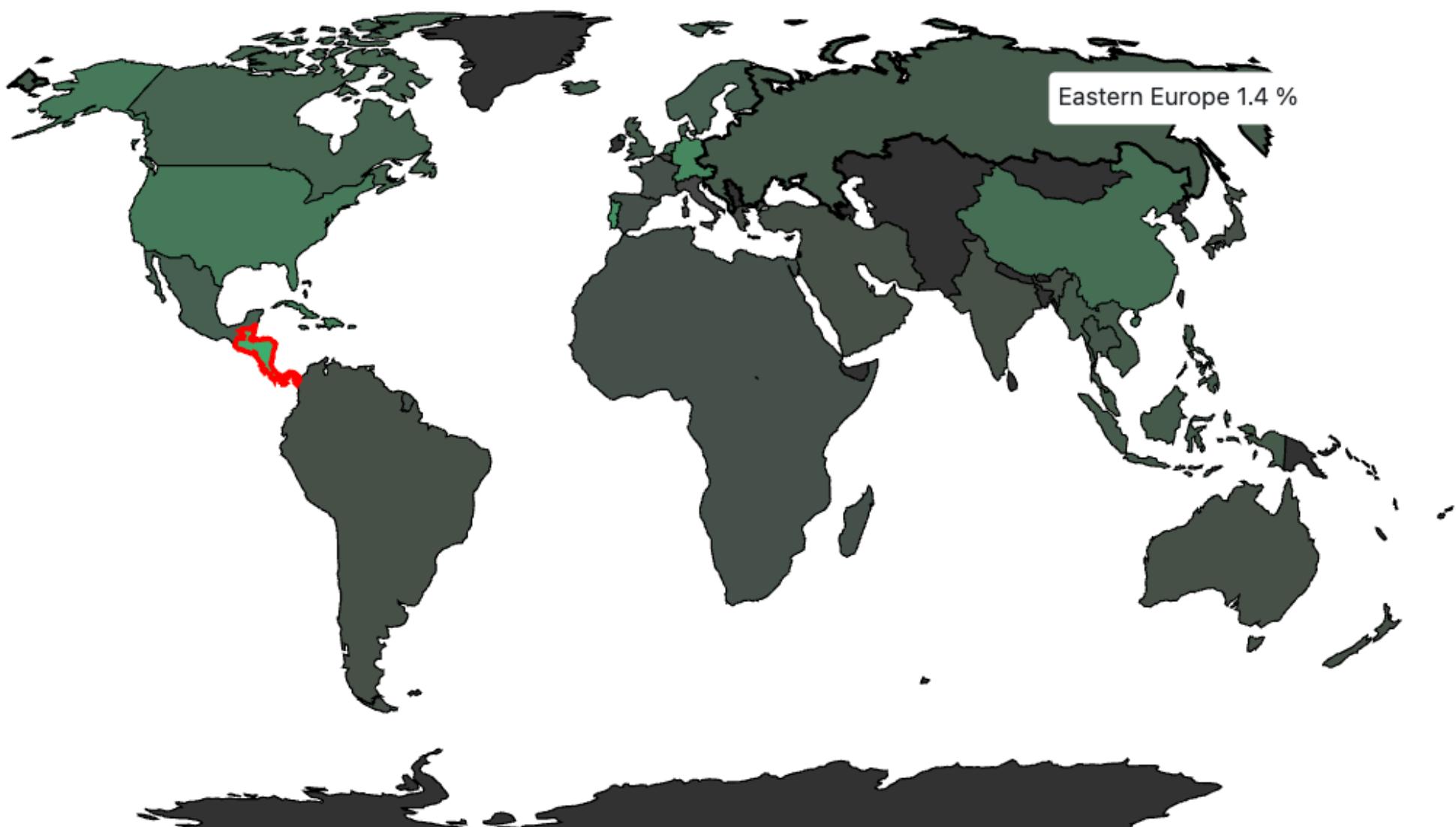
In this section, we built an interactive 2D world map that highlights countries based on the searched ingredient. When users type an ingredient like "tomato" and select a suggestion, the corresponding countries light up in varying hues. The more frequently the ingredient appears in local recipes, the more intensely the regions glow. We used D3.js, with regions grouped by cuisine and colored according to ingredient frequency using interpolated RGB values, all powered by external JSON and GeoJSON data.

Explore The Global Influence

Discover how your favorite ingredients shape the culinary world. As you search for ingredients, watch as countries light up, with bolder colors representing regions rich in recipes.

Type an ingredient name below, then double-click a suggestion to explore its global influence!

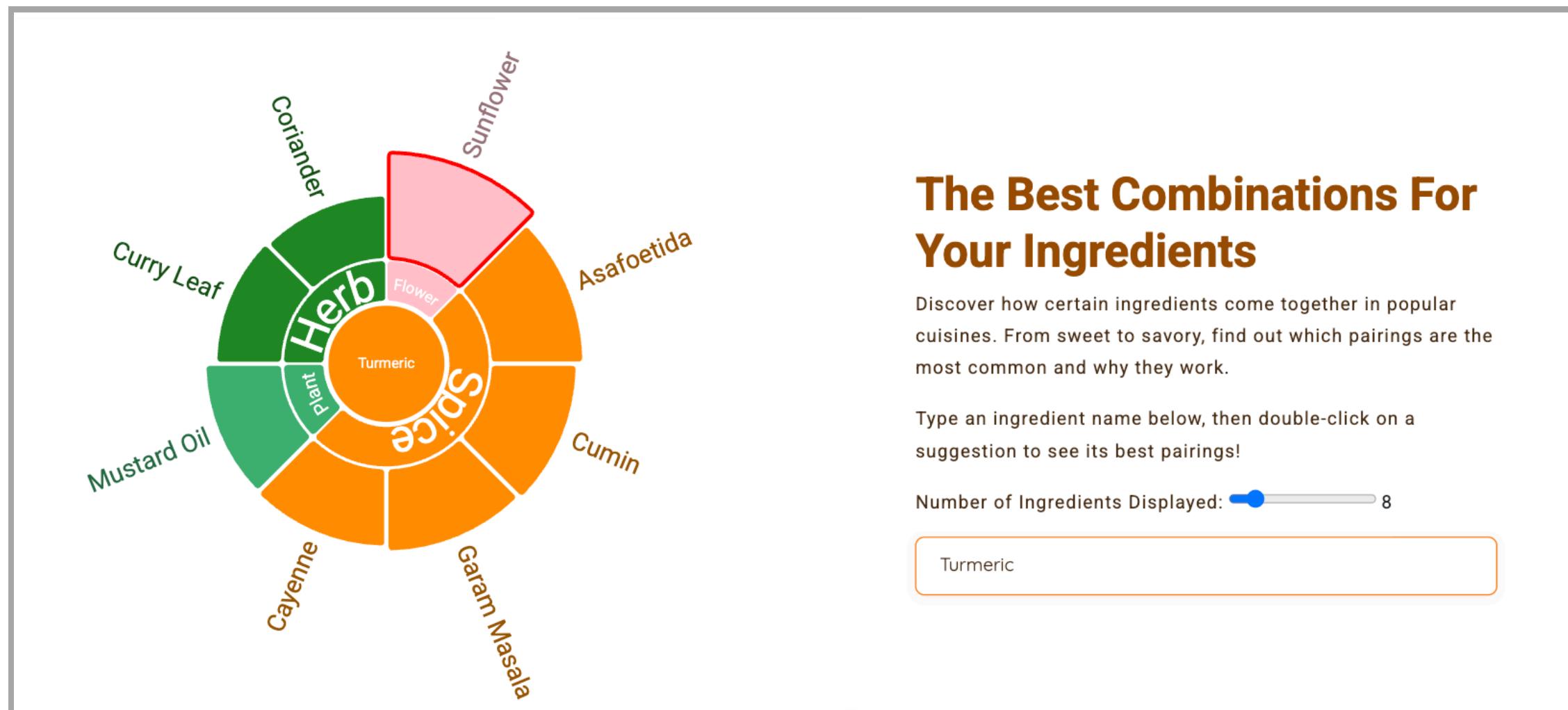
Apple Cider Vinegar



3.5 Ingredient Pairings

Users can type an ingredient name (e.g. sugar) into the search bar and double-click on a suggestion to view its most common pairings visualized in the chart. A slider allows them to adjust how many pairings are displayed making it easy to explore both familiar and unexpected combinations.

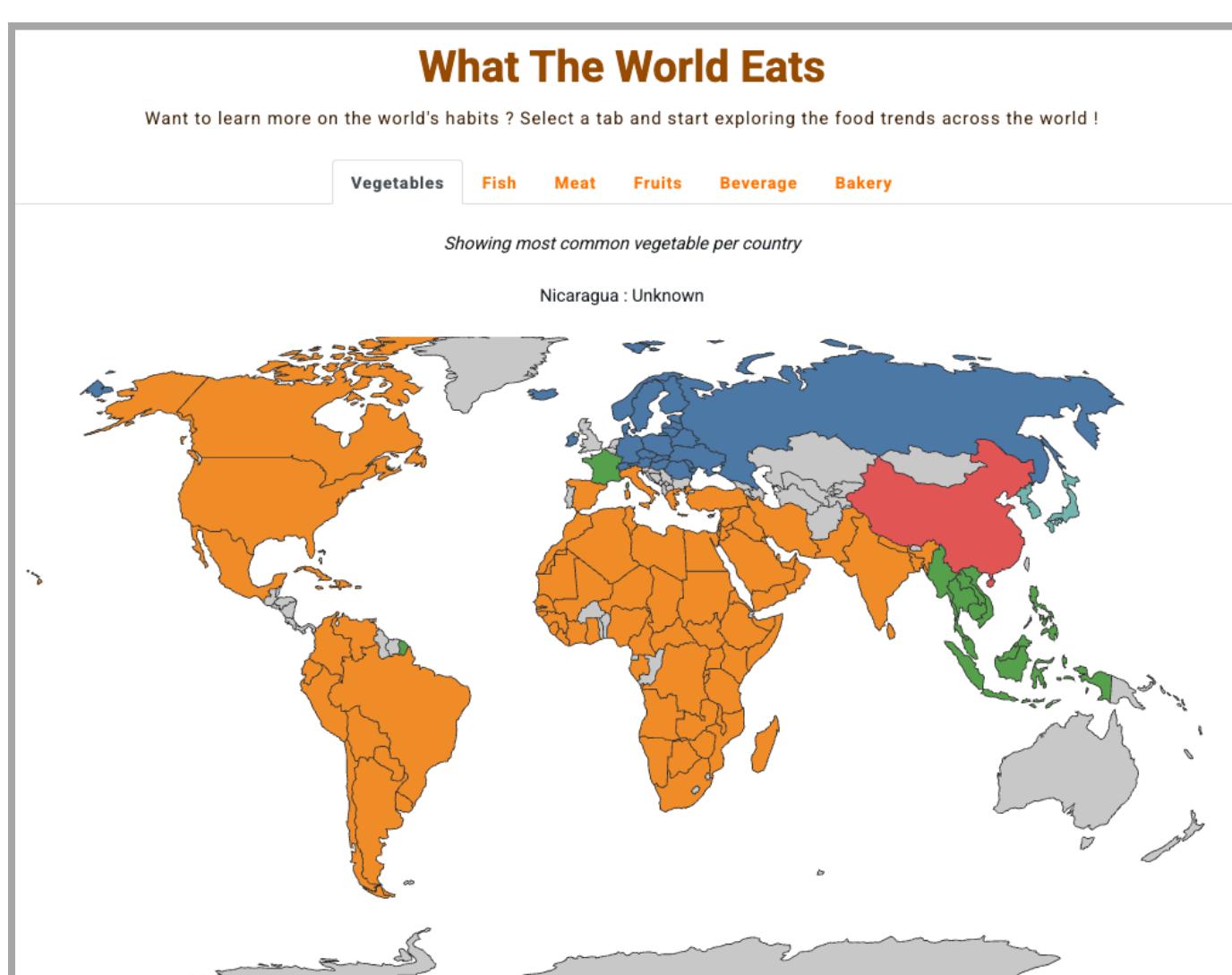
This visualization is powered by a custom JSON file that includes ingredient names, their categories, co-occurrence frequencies, and color mappings. Ingredients are grouped and color coded by type such as dairy, spice, or vegetable to enhance interpretability. The chart was built using D3.js.



3.6 What the World Eats

In this section we wanted to give more general information on different cuisines, regimes and culinary habits around the world (not linked to any search bar). It's for the people who want to learn new things about our world cuisine. It's a different world map you can switch between by selecting above what you want, each tab showing different statistics around the world. You can see what are the most common food of the chosen type used in the recipes of each country. The possible tabs are : Vegetable, Fish, Meat, Fruits, Beverage and Bakery.

This visualization uses D3.js and a csv file containing the top ingredients for each country. The csv file has been created from our CulinaryDB dataset and can be recreated with new data anytime. When switching a tab one color is assigned per type of food to show, which means all countries with the same color has the same top food ingredients in their recipes.



3.7 Other Sections

We also added a few extra features to our website, including a Meet the Team section that introduces us. Additionally, we included a website motto and social media links. While these elements don't affect core functionality, they add personality and professionalism to the site.

On the other hand, we added a navigation bar at the very top of the website to help users navigate the site with ease. This is a very useful tool.

4. General Visual and Technical Designs

We aimed for a colorful, clear, and modern user interface. Our orange color is deeper than the one used in Milestone 1 because warm colors are known to stimulate appetite according to [human psychology](#). This approach is widely adopted by popular food apps like Just Eat and DoorDash, which use similar warm tones to create an inviting and appetizing atmosphere.

On the technical side, we used HTML, CSS, and JavaScript to manage visualization, interactivity, and layout, while Python was employed for data preprocessing.

5. Future Improvements

Due to time constraints, we were not able to implement some features that would be great additions in the future. These include filters for specific ingredients or dietary preferences like vegan or gluten-free options, improved natural language processing for searching Unsplash images, and displaying full recipe instructions.

It would also be useful to offer ingredient substitutions for when something is missing at home, provide nutritional information for ingredients and recipes, and allow users to mark recipes as favorites for easier access later on.

6. Conclusion

Throughout the development process, we tackled various design and technical challenges to create a user-friendly website that invites users to explore ingredient combinations, discover global food patterns, and find recipe inspiration.

In the end, Tasting Viz had transformed from a data visualization project to an interactive website that brings culinary information to life, combining food culture and technology in an interactive and useful way. In the near future, we have many exciting features that we look forward to unveiling to improve the user experience further.

7. Resources

- [CulinaryDB Dataset](#)
- [GitHub Repository](#)
- [Screencast Video Link](#)
- [Website](#)
- Example prototype images links: [Link 1](#), [Link 2](#), [Link 3](#)

8. Peer Assessment

The work has been divided logically by website sections. Nonetheless, we helped each other when needed and frequently met up to keep cohesion and discuss changes that needed to be made.

Vivien Gallet

- Ingredients Across Countries
- Ingredient Pairings
- Screencast

Dana Shayakhmetova

- Recipe Recommendation Gallery
- Graphical neighbors
- Screencast

Oliver Sorrentino

- Process book
- What the worlds eats
- Screencast