Datatouille

Process Book

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Motivation

The love for good food and the pursuit of exceptional culinary experiences with people you love are universal passions. However, finding the perfect Michelin-starred restaurant that meets all personal preferences can be a daunting task. Our motivation stems from the desire to make this search seamless and enjoyable for gourmet enthusiasts around the world.

Utilizing the **Michelin Guide Restaurants** dataset, which includes 6,794 restaurants awarded either **Michelin stars** or **Bib Gourmand** recognition all around the world, we aimed to visualize Michelin-starred restaurants' distribution by showcasing their locations and key details through an interactive map, integrating additional details from the **Google Places API** to ensure users they can find restaurants that match their preferences and budget.

Related Work and Innovation

Currently, the most significant website for users searching for Michelin Restaurants is the **Guide Michelin**, which enables filtering based on star ratings, price, and cuisine preferences of the user.

ViaMichelin also allows users to view Michelin restaurants on a map. However, this site primarily focuses on route planning services independent of the Michelin-rated restaurants and offers only basic filtering options based on star ratings and price.

Our third inspiration is **The Fork**, a platform where users can search for any restaurant, view menus, and filter according to various features. However, it does not include all Michelin Restaurants and is limited to European countries.

Our approach stands out in its originality with advanced filtering options beyond just star rating and prices. Additionally, our website features a user-friendly interface that allows users to see restaurant distribution through an interactive map or a heatmap. For those interested in broader trends, we offer a statistics page with general data, as well as country-specific statistics accessible by clicking on a country or searching for it.

By addressing the existing gaps in current platforms, **our visualization** aims to become a valuable resource for food enthusiasts seeking personalized dining experiences based on their specific preferences and selected destinations.

Dataset

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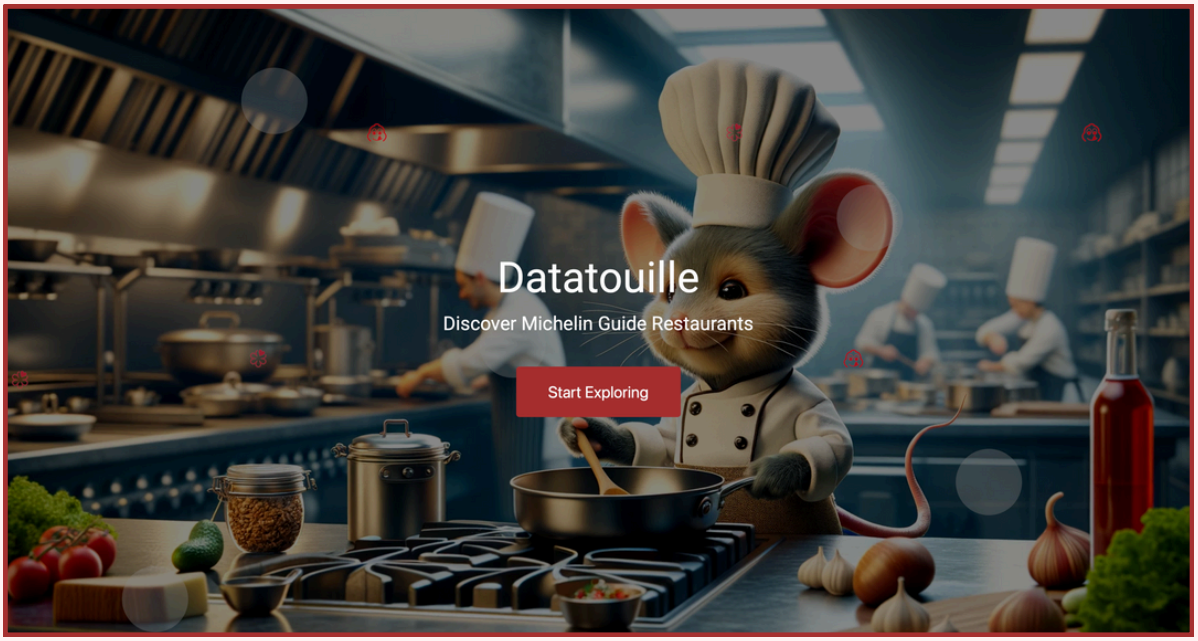
The Michelin Guide Restaurants dataset is a curated CSV file, using **Go Colly**, containing detailed information on **6,794 Michelin-starred restaurants** spread across **44 countries** and **2,635 cities**. Each row in the dataset represents a unique restaurant mentioned by the Michelin Guide, highlighting the diverse and high-quality dining options recognized by this prestigious institution. The dataset provides key details such as the restaurant's **name**, **address**, **price range**, **cuisine type**, **facilities**, and **award**, making it a valuable resource for culinary research and analysis.

Geographically, a significant concentration of Michelin-starred restaurants is found in Europe and Asia, with **France** and **Japan** leading the count. This suggests a **strong culinary tradition** and a high density of quality dining establishments in these regions. Another interesting finding is the distribution of price ranges, with many restaurants falling into higher price categories, which is consistent with the high standards and **exclusive nature** of Michelin-starred dining.

Start Page

As part of our data visualization project, we have created an engaging **start page** to welcome users. This page features an animated image designed using **DALL-E**, inspired by the movie Ratatouille. Our aim is to provide an inviting introduction before users delve into the visualizations we have prepared.

Upon clicking **Start Exploring**, users will be directed to the main page of our website, where they can access and interact with our comprehensive visualizations of Michelin Guide restaurants.



Main View

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On the homepage, as shown in the **Figure 1**, users encounter an interactive map pinpointing Michelin restaurants worldwide. **Color-coded dots** represent the award status of each restaurant, offering a visual guide to the distribution of Michelin Awards. **Filters Panel** allows users to filter the map view by various criteria such as country, city, continent, and Michelin award categories. Additional filters for cuisine type, price range, and facilities further refine the search. When specific filters such as **Japan**, **Tokyo**, **1 Star**, **Air Conditioning** and **Vibrant** color theme are applied, the map displays a focused cluster of restaurants meeting those conditions.

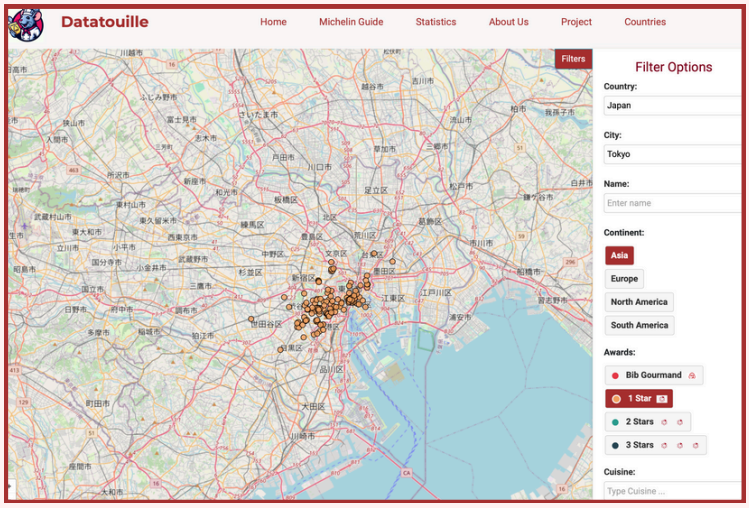

Figure 1

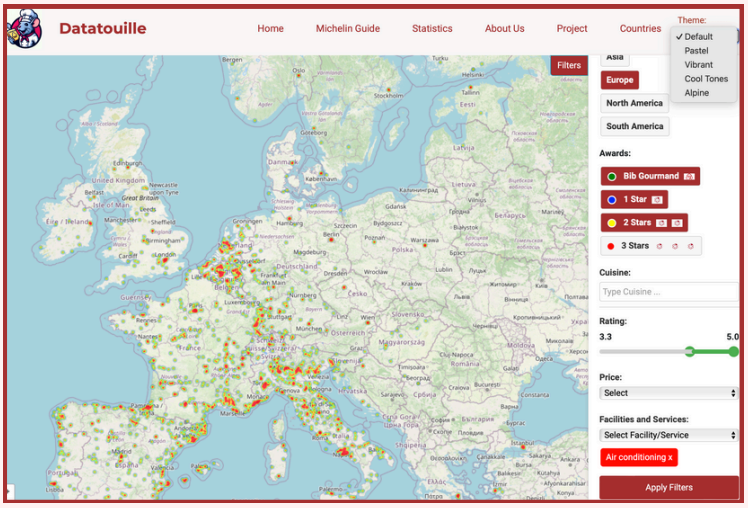

Figure 2

Enhancements

We have implemented several new features during milestone 3 to enhance user experience:

- **Google Ratings Integration**: Using the **Google Places API**, we have retrieved and displayed Google ratings for restaurants, providing users with additional insights and as a filter option.

- **Heatmap Visualization**: A **heatmap**, as shown in **Figure 2**, has been added as an extra visualization on the homepage. When users zoom out, the heatmap replaces the dots representation of the restaurants and highlights the distribution of restaurants, offering a clear overview of their locations. The filters applied to the main map are also integrated into the heatmap, allowing for a seamless and informative user experience.

- **Color Theme Options**: We introduced color theme options, allowing users to select from **five** different color palettes to display the restaurants. For some options, the map themes and colors also change accordingly, providing a customizable and visually appealing experience.

Statistics Page

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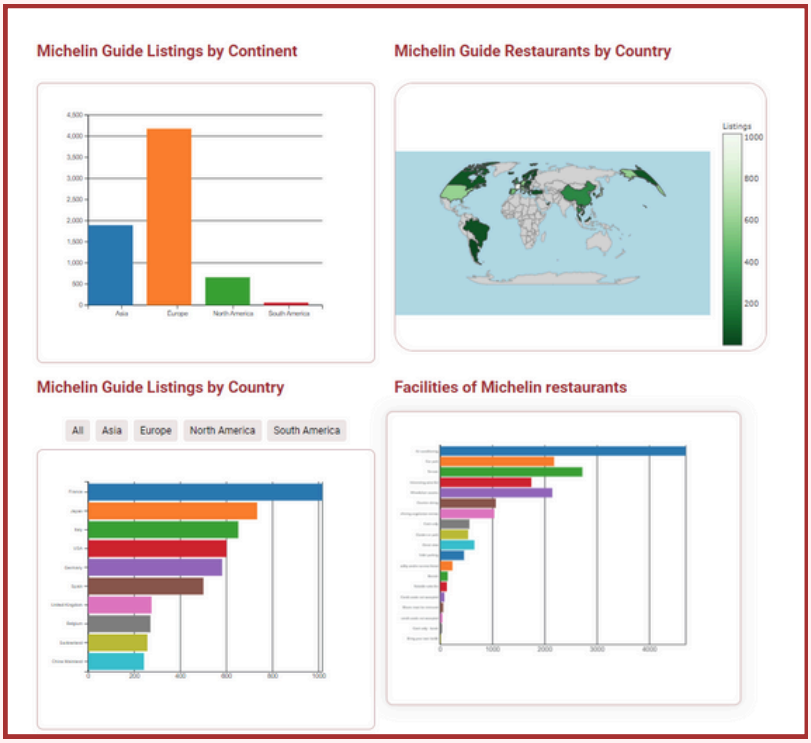
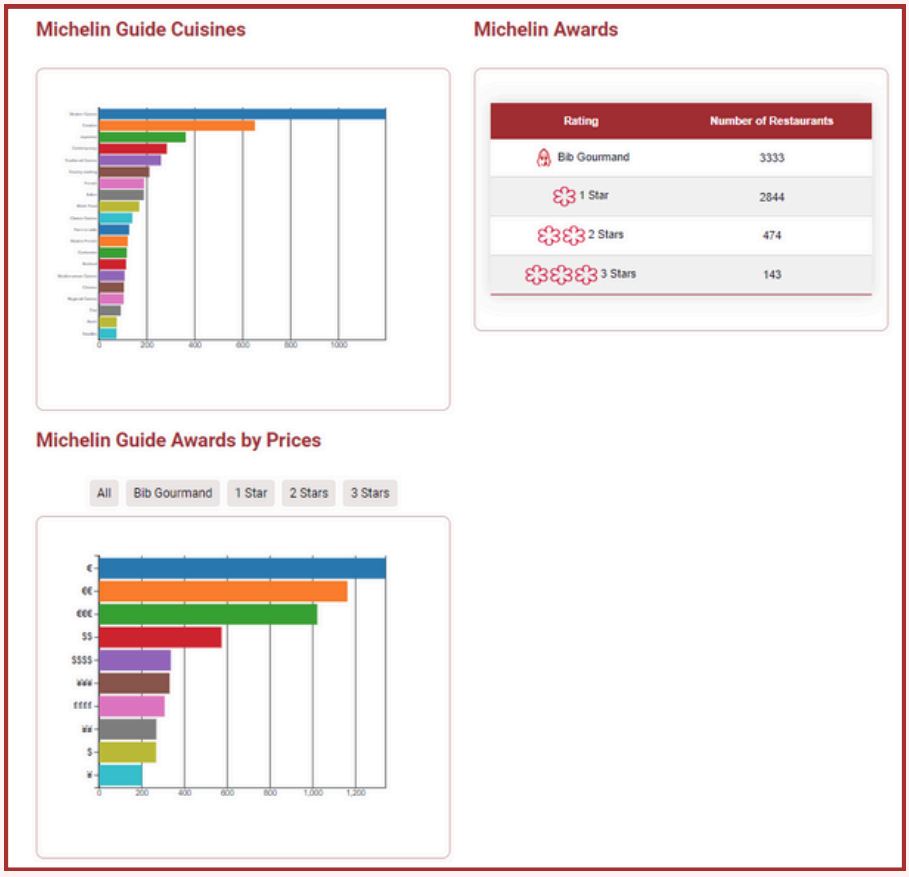


While developing the main view, we initially implemented another page to show overall statistics about the **Michelin Guide** data worldwide in a **dynamically engaging** manner.

For this purpose, we used the visualizations obtained during the exploratory data analysis phase. We displayed the total number of Michelin Guide restaurants, allowing users to filter by countries and continents through buttons, and also visualized them on a map. It can be observed that the continent with the most Michelin Guide restaurant listings is **Europe** followed by **Asia**, while the country with the most appearances in the Michelin Guide is **France** followed by **Japan**.

We also used bar charts to visualize the total number facilities and cuisines in the michelin guide. Another bar chart is added to display the price range where the user can filter them with respect to the award type.

Here the price range shown has the corresponding currencies that are listed in Michelin Guide page for each country. Finally, a table of the total counts of award types is displayed. Following a modern approach of **hovering and filtering**, the statistics page provides an overall **comprehensive view** of the michelin guide dataset as shown right.



Country Statistics View

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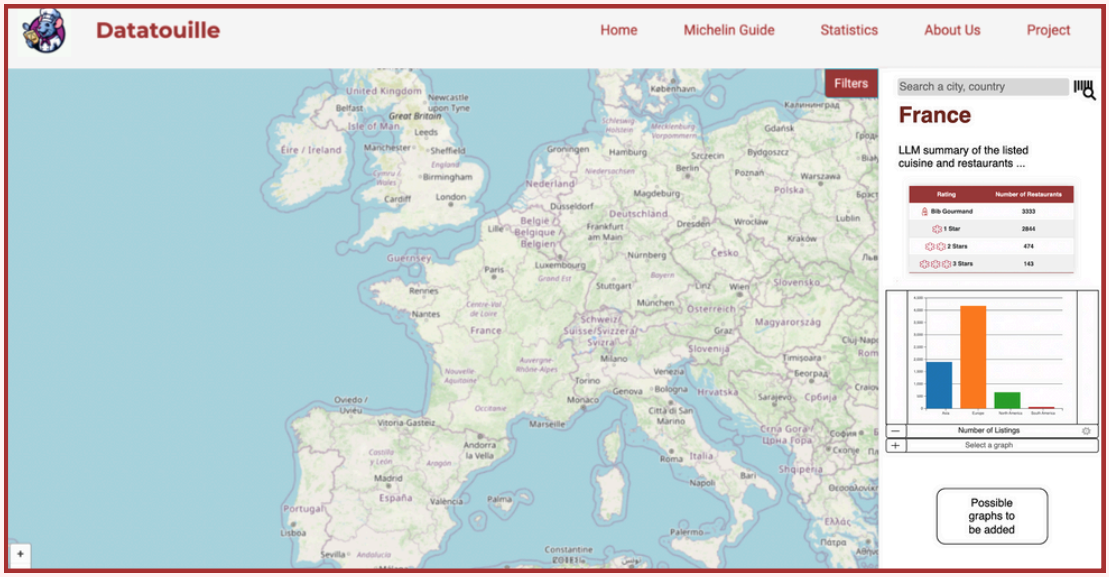
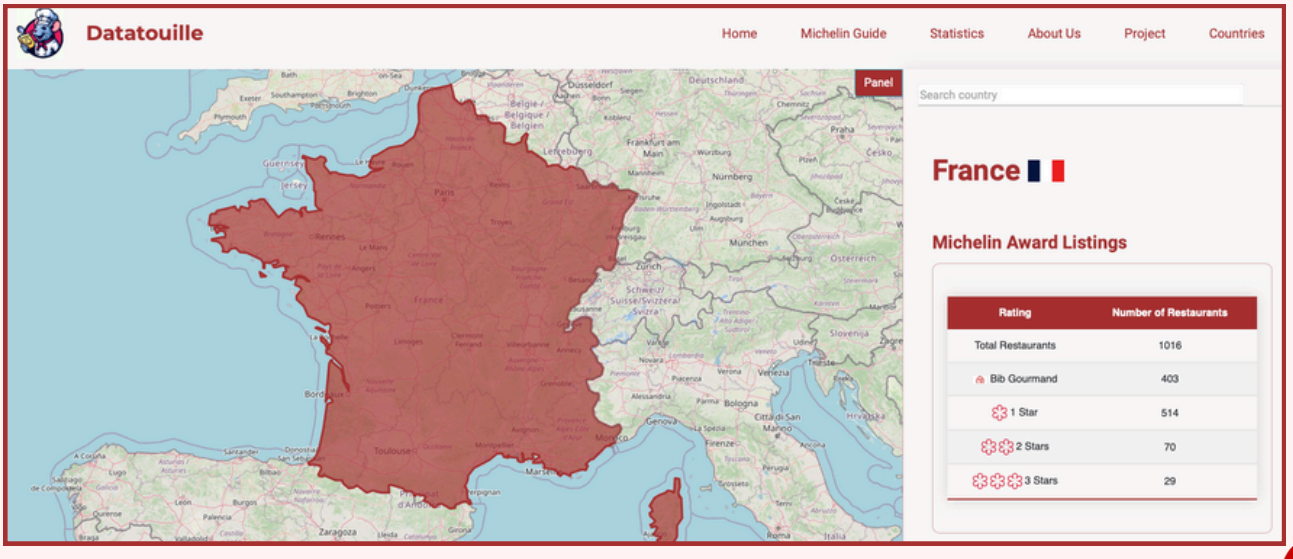


After implementing the comprehensive descriptive statistics page, we decided to add an additional view incorporating all the existing **statistical charts** dynamically for each selected country on the map. In the figure above, you can see the first sketch for the country view page. The selected country was planned to appear on the left side of the map while relevant statistics and visualizations was planned to be displayed on the right panel. Additionally, a **search bar** was planned to be provided for looking up countries, making it easier for users to find and select a specific country.

Following our initial approach, we have implemented the above mentioned view alongside with a user-friendly interface by integrating an **autocomplete** feature for selecting countries directly on the map or through the filtering panel. When the user clicks on a country on the map the borders and the area of the **country is higlighted.** Then, once the country is selected, the panel automatically appears as a scrollable view displaying various **dynamically updated elements**, including the Michelin Award table, top 10 most popular cuisines and facilities statistics, as well as charts for the most popular price ranges. Below, you can see the final version of the page, demonstrated with an example using France.



Challenges

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Utilizing the **Google Places API** for rating retrieval posed challenges due to its pricing, requiring careful cost management. After retrieving data, we found about 738 restaurants missing **Google ratings**. We had to manually collect these ratings which were mostly from the Asian countries, making the task time-consuming since it necessites a language translation for some restaurants located in China.

Another challenge was the **Heatmap Plugin** we intended to use. It was outdated and required modifications before integration. We had to update the plugin and modify several features to ensure that it could be directly integrated with the Leaflet map. These adjustments enabled smooth transitions between the heatmap and a color-dotted representation of the restaurants.

During the milestone 3, we aimed to use the **Google Navigations API** to recommend routes between selected restaurants based on users' preferences dynamically. However, we realized that the API's usage-based pricing could result in costs exceeding our expectations. Because of our application's dynamic nature, it had the potential to exhaust our free usage credits quickly . After discussing these challenges with our professor during the project hours, we decided not to implement the route recommendation feature due to these financial constraints.

For the country view, since the **zoom level** should have been handled differently for each country in order to fit the country borders in the screen appropriately, a challenge that we have faced was to manually adjust the zooming ratios for most of the countries.

Future Improvements

To enhance our project further, we can add features such as cuisine trips around selected locations. This idea was inspired by the **Touring Club Switzerland**'s road trip guides on their website. By providing **cuisine trip guides**, users can explore selected restaurants on the map and learn more about their culinary journey. This would help users prepare for an enjoyable and informative culinary experience, making our application more engaging and useful.

If we want to deploy this project for commercial use, it would be beneficial to implement recommendations based on available features. Since the current dataset lacks sufficient features to support a robust recommender system, **additional work** is needed to enhance the dataset with new, quality features. This would improve the accuracy and usefulness of our recommendations and make the application even more valuable for users.

Tools

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- **Data Visualization:** We utilized **D3.js**, a powerful JavaScript library, to effectively pin the Michelin Restaurants' locations on a world map to create a visually engaging experience.

- **Website Development:** Our website was built using the **Flask** framework, combined with **HTML**, **CSS**, and **JavaScript** for a seamless user experience. The site is hosted on **GitHub Pages**, ensuring easy access and reliability.

- **Interactive Maps:** To showcase Michelin restaurants, we used Leaflet, an open-source JavaScript library known for its simplicity and performance. By integrating D3.js with Leaflet, as it was also covered in Lecture 8, we created a highly customized and interactive map.
  - **Heatmap Enhancement:** To further enhance our maps, we used the Leaflet Heatmap Layer Plugin which was maintained within the heatmap.jsrepository. It was preferred since it ensures seamless integration and access to the latest updates.

- **Data Exploration:** During the exploratory data analysis phase, we leveraged **Python**, **Pandas**, and **Plotly** to manipulate the data and create interactive graphs.

Peer Assessment

Ilker Gül: Data Analysis, Main Page, Process Book, and Statistics Page

Nazlıcan Turan: Country View page's statistics and filter panel, Process Book, and Statistics Page.

Berke Argın: Country View Page, Data Retrieval, Map Optimization, and Process Book

Every team member played an integral role in shaping the website's goal, aesthetics, and functionality. Through this collaborative effort, we have learned incredible things about data visualization. We are **truly grateful** for the opportunities and knowledge this project has provided us.