

Restaurant Recommendation based on Yelp Reviews - Web App

1. Application Details and Intended Users

This web app provides **restaurant recommendations for a given dish and cuisine by analyzing Yelp restaurant reviews**. The core idea is to assist users in choosing restaurants based on how positively a dish is reviewed, within a specific cuisine. The system processes **sentiment of reviews** enabling better recommendation when compared to other metrics like rating and popularity.

The **intended users** include:

- Food enthusiasts and **travelers** seeking the best places to try a specific dish.
- **Locals** exploring new restaurants in their city.
- **Business owners** analyze sentiment patterns for competitive benchmarking.

The app **supports** both **novice and experienced users**, requiring only a few inputs— cuisine type dish list and dish name—to generate recommendations based on mined Yelp restaurant reviews.

2. User Interface Design

The app features a user interface built using Flask and standard HTML/CSS. **Upon visiting the homepage, the user is prompted to select the cuisine and a dish for which recommendations can be found.** Following are the **details of the home page**

- The user is prompted to select a **cuisine** from a dropdown.
- To select a dish, the user is asked to upload a dish list file (a simple .txt file with one dish name per line).

Note: The reason for requesting this file to be uploaded is illustrated at the end of this report.

Sample dish file:

Sample American dish list

<https://drive.google.com/file/d/12ajcPYmlwdEOwpA3fFZ3we80BiT5XUrw/view?usp=sharing>

Sample Indian dish list

https://drive.google.com/file/d/1KqCKZeXtOnMDAArZUpkBcm3m_GvdB1Dz/view?usp=drive_link

- The user can either upload a **custom dish list file** or **enable a check box to use a default Indian dish list file**.
- **If the default dish list file is used, the corresponding cuisine like Indian / Asian Fusion has to be selected to retrieve relevant recommendations.**
- After uploading, the user will be able to select a dish from the drop down and can click the **“Get Recommendations using Yelp review”** button, **to find the recommended restaurants for the selected dish and selected cuisine.**
- The **backend**(python code) then **retrieves the top 50 restaurants** based on **sentiment analysis of Yelp restaurant reviews**. The reviews that belong to the selected cuisine and have a mention of the dish names are filtered for sentiment analysis and then the restaurants are ranked based on the number of positive reviews. The business ids are matched with the business ids in the business metadata file to retrieve the location of the ranked restaurants.

After processing, a separate page shows the **top 50 recommended restaurants** for the selected dish and cuisine, along with their city names and review counts. In short the interface includes:

- Dropdowns for cuisine and dishes.
- Custom file upload or default file upload for dishes w.r.t selected cuisine.
- Pop-up alert for successful uploading of the dish list file.
- Background image and styling for better visual appeal.
- Feedback when no dish or review is available.

3. System Architecture

Data Sources: Following three data files are hosted locally in EC2 t2.medium

- Yelp academic review dataset (Preprocessed and Sampled -300000 reviews).
- Yelp academic business dataset
- Cuisine business id mapping data

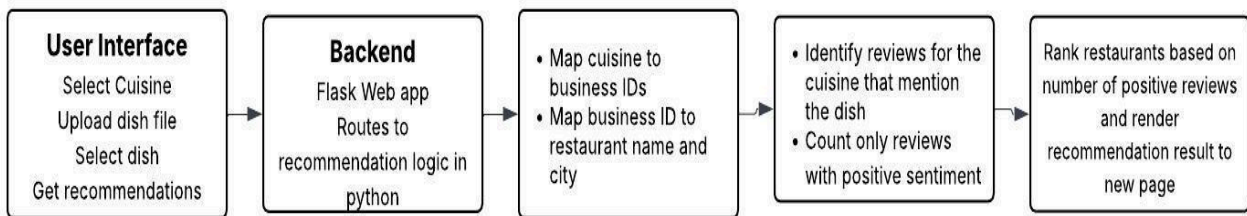
Frontend: HTML/CSS with JavaScript

Backend: Flask Python library, with routes to handle home page display, dish file uploads, dish list loading to drop down, and restaurant recommendation.

Sentiment Analysis: The sampled reviews are filtered based on selected cuisine and dish and sentiment analysis is performed on the reviews using VADER

Deployment: AWS EC2 instance with t2.medium, exposed using HTTP on port 5000.

4. Workflow



5. Web app URL

http://35.174.136.210:5000/restaurant_recommendation

Note:

- The URL has only HTTP and NOT HTTPS.
- If the browser automatically redirects to HTTPS, please select “continue to site.” in chrome
- If still the URL doesn’t work please clear the cookies.
- If it doesn’t work in any of the browsers after clearing the cookies, please try in safari

6. User Dish File Upload Requirement

In this web application, the user is asked to upload a dish list file (a simple .txt file with one dish name per line). This functionality was included for the following reasons:

1. Customizability & Flexibility:

The application supports over 30 cuisines, but not all have standardized or well-known dish lists available in the dataset. By allowing users to upload a dish list, the system supports a broader set of cuisines, including rare ones that may not have dish dictionaries.

2. Simulating a Realistic Scenario

While end-users in the real world may not have a dish list handy, this feature is a scenario where a business owner provides domain specific knowledge which the system uses to tailor its output.

To avoid burdening regular users, the app interface includes a **checkbox ("Use Default Indian Dish List")**, which bypasses the need for regular users to have a dish list handy, and try the recommendations for Indian cuisine and Indian dish list.

7. Conclusion

While recommendation systems are common, this application uniquely allows users to upload their own dish lists to generate personalized sentiment-based restaurant rankings for specific cuisines and selected dishes from their dish list, using Yelp reviews. This approach is **less common** in traditional recommender systems, which often rely on rating/popularity.