

# Project Proposal

Title: Restaurant Cuisine finder using large language model

Proposal number: 1

# EXECUTIVE SUMMARY

## Problem Statement

Imagine you are traveling in another city or country, unfamiliar with the local dining scene, and hunger pangs strike. While satisfying your appetite is a priority, you also have specific preferences. You desire delicious food that aligns with your budget, without sacrificing quality of service.

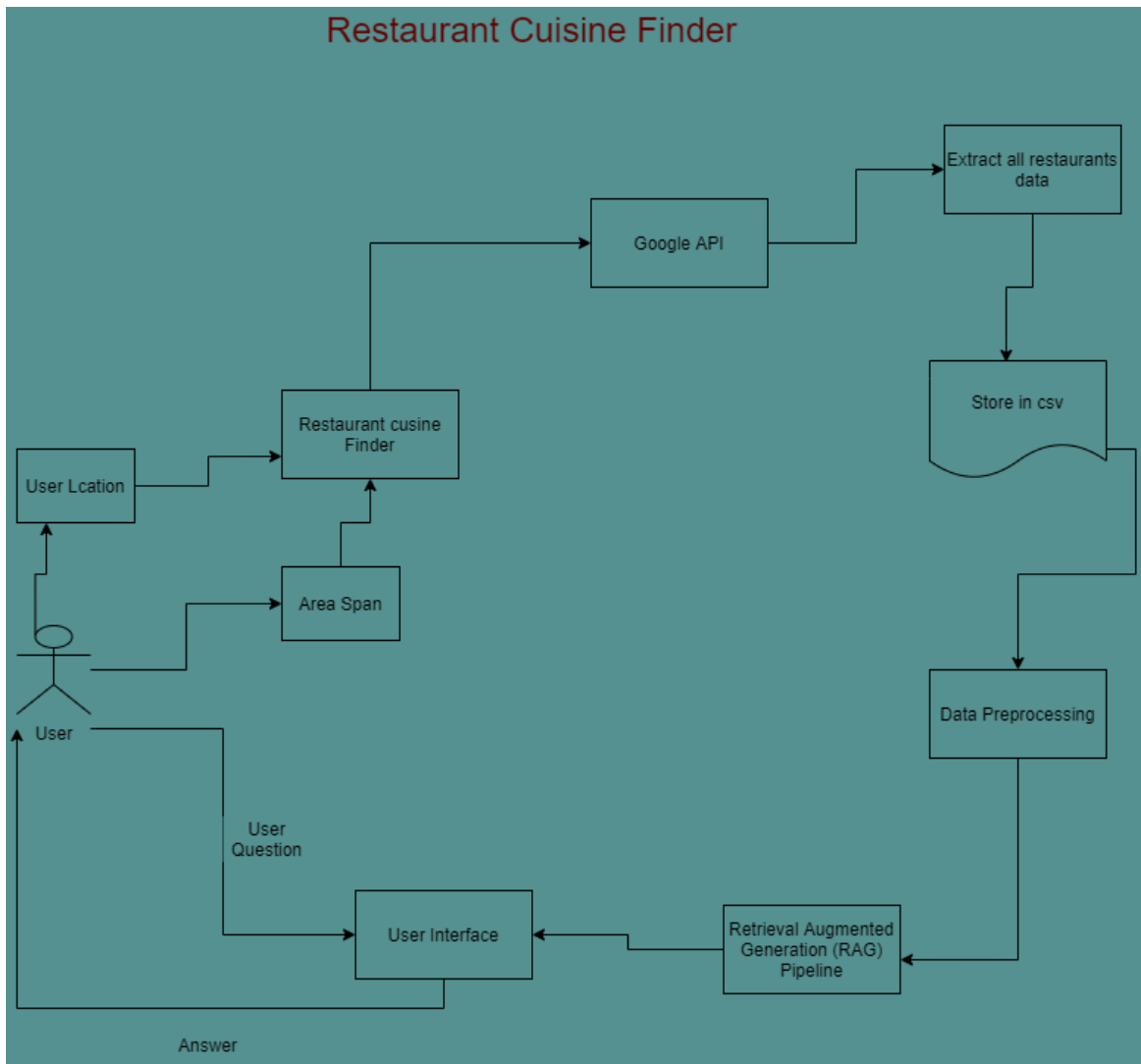
## Proposed Solution

This project aims to bridge this gap by developing a web application that leverages the power of conversational chatbots. Through a user-friendly interface, the application will empower users to discover restaurants that meet their specific needs. By seamlessly integrating user preferences for cuisine type, price range, and customer ratings, the chatbot will guide users towards a satisfying dining experience.

## Flowchart

A visual representation of the application's entire process is provided in the following flowchart.

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## Use Case

This web application is designed to cater to a broad user base, encompassing both local residents and international travelers. It aims to serve as a comprehensive resource for discovering restaurants that cater to diverse needs and preferences.

**Local Residents:** The application will be valuable for locals seeking to explore new culinary experiences within their city or neighborhood. It can assist them in planning special occasions, such as birthday dinners, by offering tailored recommendations based on desired cuisine type, price range, and ambience (e.g., suitable for a rainy day setting).

**Foreign Travelers:** For travelers unfamiliar with the local dining landscape, the application provides a user-friendly tool to navigate restaurant options. Users can leverage the application to research and discover establishments offering specific cuisines, price points, and customer-rated experiences.

## Scope and Objective

- Development of a Streamlit-based or react web application
- Get area span from user .
- Get all restaurants in that span.

- Integrate open source (preferred) or closed source LLM.
- User asks questions about various restaurants and cuisine. (Example show me all chinese restaurants with 5 star ratings but with average prices as well.)
- Users get immediate replies.

## Engineering Design

- Frontend: Utilizes Streamlit or React for a user-friendly interface where users can input questions about restaurants.
- Backend: Integrates open source or closed source LLM for processing and analyzing the input data to generate output as per user question
- Data Handling: Get all restaurant data such as name, cuisine type, ratings, reviews and price as well from the area span selected by the user and save in a csv file. (Example 5 miles from the current location).

## Software requirements

Software requirements deal with defining resource requirements and prerequisites that need to be installed on a computer to provide the functioning of an application. The minimal software requirements are as follows,

- Python
- Visual Studio Code
- Windows/ Linux

## Front-end Part

- Streamlit / React

## Back-end Part

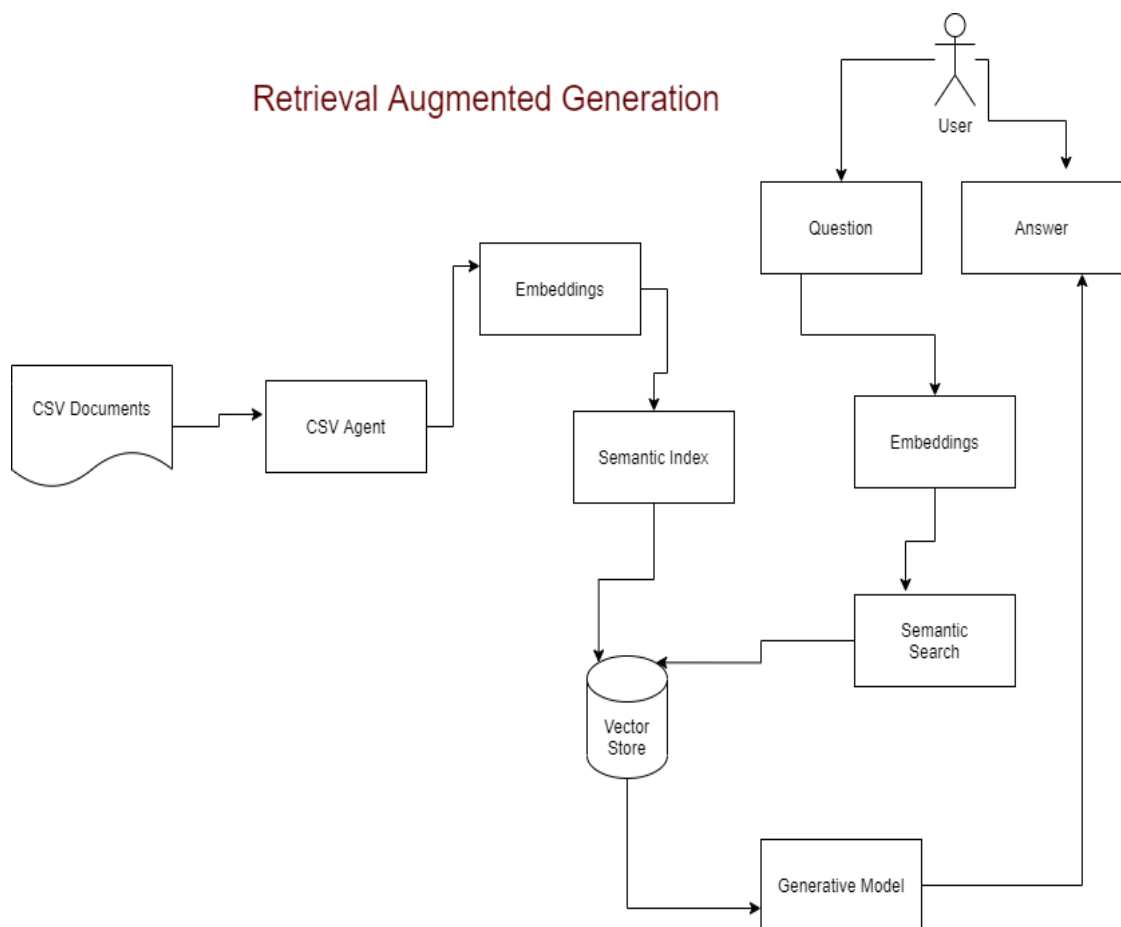
- Python
- Fast API
- LLM
- Langchain
- Vector Store

## Module Description

- **Data Acquisition:** This module leverages the power of the Google Maps API to systematically gather comprehensive data on restaurants within a designated location. The user specifies a surrounding area radius, and the application retrieves information on various restaurants in that vicinity. This data collection process facilitates the creation of a rich database of restaurants, empowering users to explore and discover dining options tailored to their preferences.
- **Data Processing Module:** This module incorporates a comprehensive suite of data preprocessing techniques to ensure the quality and usability of the data. These techniques include the elimination of missing values, data cleaning to rectify inconsistencies or errors, and normalization to establish a consistent scale for the data. By employing these methods,

the module prepares the data for further analysis, enhancing its reliability and facilitating the extraction of meaningful insights.

- **Generative Model Selection and RAG Pipeline:** This module delves into the exploration and application of various large language models (LLMs). Our investigation will encompass both open-source and closed-source options, allowing for a comprehensive understanding of their capabilities. Furthermore, we will implement the Retrieval-Augmented Generation (RAG) technique. By leveraging RAG, the module will enable interaction with our restaurant data stored in a CSV file. This integration empowers the system to not only process the data but also generate human-like text responses informed by the restaurant information. Here is the Flow diagram for a RAG technique.



- **User Interface:** This module focuses on the development of a user interface (UI) that prioritizes both user experience and accessibility. The UI will be constructed using either Streamlit or React, offering a choice of frameworks tailored to different development needs. The interface will be designed to foster a conversational style of interaction, simplifying user navigation and facilitating intuitive exploration of the application's functionalities. This emphasis on a clear and user-friendly UI ensures a seamless experience for all users.
- **User Authentication:** This module will implement a robust user authentication and authorization system to safeguard user data and ensure a secure user experience. The system will leverage Google Face and email for user registration, providing a convenient and familiar signup process

for customers. This integrated approach offers a strong layer of security by combining facial recognition with email verification. Furthermore, granular authorization mechanisms will be established to control user access to specific features and functionalities within the application. This comprehensive approach ensures both user convenience and data security.

- **Payment Gateway Integration:** This module will establish a secure and reliable payment infrastructure by integrating Stripe as the payment gateway. Stripe's robust platform will facilitate seamless and secure financial transactions within the application. Additionally, a tiered service structure will be implemented, offering a variety of subscription packages tailored to user needs. These packages, potentially including free, standard, and premium options, will provide users with a flexible and cost-effective way to access the application's functionalities. This combination of a secure payment gateway and diverse service packages caters to a wider audience and fosters a sustainable business model for the application.
- **Testing and Refinements:** This module prioritizes rigorous application testing to ensure its functionality, performance, and overall user experience meet the established standards. A comprehensive testing strategy will be employed, encompassing various scenarios and user interactions.

### Future Scope

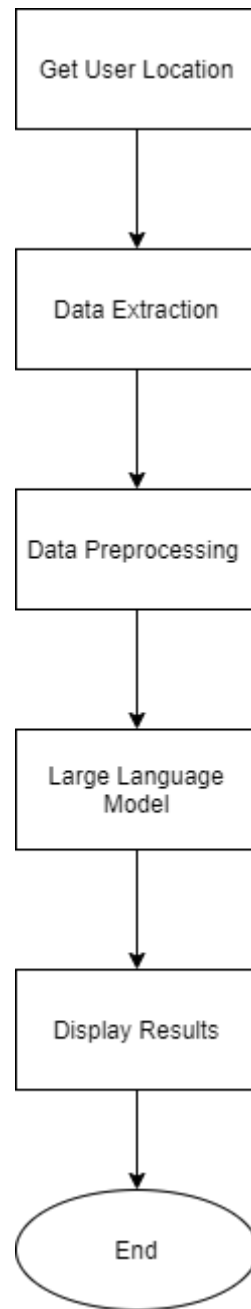
- **Integration with Multiple Languages:** Expand the application's capabilities to process input data and response in multiple languages, broadening its usability and accessibility for a global audience.
- **Enhanced Personalization:** Develop a more personalized feedback system that takes into account the user's preferences, dietary preferences to provide even more tailored recommendations.
- **Social Media Integrations:** The application can be further enhanced by integrating social media platforms such as Twitter, Facebook, Instagram, and Pinterest. This integration would enable the retrieval of valuable data pertaining to various cuisines and user preferences. Additionally, the system will facilitate user feedback mechanisms, empowering users to contribute their own insights and experiences. This user-generated data will serve as a valuable resource for future improvements, allowing the application to evolve and better cater to the evolving needs of its users.
- **Multi-model Support:** For enhanced user recommendations, the application can explore the integration of multi-modal models capable of processing both text and image data. This integration could potentially facilitate the retrieval of restaurant menus based on user preferences, whether specified through text or images of specific cuisines. This approach would provide a more comprehensive understanding of user intent and enable the system to deliver more personalized recommendations.

- **Development of a Mobile Application:** To broaden accessibility, a mobile application version of the tool can be developed. This would empower users to conveniently search for restaurants and cuisines while on the move. The mobile app would retain the core functionalities of the existing tool, allowing users to receive personalized recommendations based on their preferences.
- **Restaurants integration for booking:** The application's functionality can be extended to include restaurant booking integration. This would enable users to seamlessly interact with restaurant websites directly through the application, facilitating reservation creation and saving them valuable time in the process.
- **Restaurant Map Directions:** The application's functionality can be further enhanced by integrating a map-based navigation feature. This feature would seamlessly display the location of chosen restaurants on a user-friendly map, allowing users to effortlessly navigate their way to their desired dining destination. This integration would significantly enhance user convenience, eliminating the need for external navigation tools and ensuring a smooth and stress-free journey to the chosen restaurant.

These future enhancements aim to make the restaurant cuisine finder application not to just search for restaurants but it will empower users to express their specific dining preferences, allowing the application to deliver highly personalized recommendations. This enhanced user experience will cater to individual needs and preferences, ensuring a more satisfying and efficient restaurant discovery process.

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## Data Flow Diagram



## Conclusion

The Restaurant Cuisine Finder application empowers users to embark on a delightful culinary exploration, transforming the search for the perfect meal into a joyous adventure. Designed with a user-friendly and conversational interface, it caters seamlessly to both local and foreign users. This comprehensive platform transcends simple restaurant listings, acting as a gateway to diverse culinary experiences. Users can explore a vast array of cuisines, leveraging the application's intuitive search functionalities to discover hidden gems or revisit old favorites. Beyond exploration, the Restaurant Cuisine Finder empowers users to make informed decisions. Detailed information on each restaurant, including user ratings and price comparisons, allows for a thoughtful selection process tailored to individual preferences and budgets. This commitment to user-centric design ensures a truly engaging experience, bridging the gap between users and their culinary aspirations.



## Proposed weekly schedule

### Week 1

Describe the project, analyze the requirements and data acquisition pipeline.

### Week 2

Data preprocessing and cleaning to make it ready for LLM integrations.

### Week 3

Explore various LLMs and develop a RAG pipeline.

### Week 4

User interface design in streamlit or react.

### Week 5

User Authentication and login page design.

### Week 6

Payment gateway integration using Stripe and package subscription development.

### Week 7

Testing the applications

### Week 8

Demonstrate the final application and provide feedback.

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