# Project Initialization and Planning Phase

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| Date | 21 July 2025 |
| Student Name | Shreyas Dilip Patil |
| Project Title | Restaurant Recommendation System |
| Maximum Marks | 3 Marks |

**Project Proposal (Proposed Solution):**

This project proposes the development of a recommendation engine that utilizes user behavior data, location, and cuisine preferences to suggest suitable restaurants. It integrates collaborative filtering and content-based methods, enhanced with user sentiment analysis from reviews. This solution is aimed at improving dining experiences and helping businesses better target customer needs.

| **Project Overview** | |
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| Objective | To build an intelligent restaurant recommendation system that delivers personalized suggestions by analyzing user ratings, preferences, and review sentiments using machine learning techniques. |

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| Scope | The project includes data collection from public datasets (e.g., Yelp, Zomato), preprocessing, feature engineering, and model training using collaborative and content-based filtering. Sentiment analysis will be applied to enhance prediction quality. A basic web interface will allow users to input preferences and view suggestions. The system is limited to English-language reviews and urban restaurants. |
| **Problem Statement** | |
| Description | With an overwhelming number of dining options, users often struggle to find restaurants that match their taste and expectations. Current recommendation systems are either too generic or ignore key factors like sentiment or contextual cues. |
| Impact | A personalized recommendation engine can improve user satisfaction, increase customer retention for restaurants, and minimize decision fatigue by offering tailored choices. |



| Resource Type | Description | Specification/Allocation |
|---|---|---|
| **Hardware** | | |
| Computing Resources | CPU/GPU specifications, number of cores | 1 x NVIDIA RTX 3060 GPUs |

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|---|---|---|
| Memory | RAM specifications | 16 GB RAM |
| Storage | Disk space for data, models, and logs | 500 GB SSD |

| **Proposed Solution** | |
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| Approach | This project uses collaborative filtering, content-based filtering, and sentiment analysis of review texts. TF-IDF and NLP techniques will be employed to extract sentiment and context from user reviews. Model performance will be evaluated using precision, recall, and RMSE. |
| Key Features | Personalized recommendations based on preferences, Sentiment-enhanced filtering, Web-based interface using Flask and visual insights using Matplotlib and Seaborn |

**Resource Requirements**

| **Software** | | |
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| Frameworks | Python frameworks | Python |
| Libraries | Additional libraries | scikit-learn, pandas, numpy, nltk, Flask, matplotlib, seaborn, plotly |
| Development Environment | IDE, version control | Jupyter Notebook, Git |

| **Data** | | |
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| Data | Source, size, format | Yelp, Zomato open datasets |