

## AI Restaurant Recommender (LLM + Google Maps)

Jiaying Du (jd4234), Minghao Li (ml5190), Siyuan Kong (sk5501), Zekai Su (zs2704)

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# 1. Problem Statement

People struggle to decide where to eat, especially when traveling or exploring unfamiliar areas. Traditional map apps present long lists of restaurants without context, leading to decision fatigue and uncertainty. Our product aims to remove this friction by offering a concise, grounded, and intelligent recommendation experience that helps users choose confidently and quickly.

## Key Problems

- Too many restaurant options → **choice overload**
- Lack of contextual insights (e.g., signature dishes)
- Difficulty forming decisions under time pressure or unfamiliar surroundings

# 2. Usage Scenario

Imagine a user just arriving in New York after a long day. They open a map app and see hundreds of pins. Instead, our tool asks for only three inputs (location, cuisine, and radius) and instantly returns a clear Top-5 list with dish suggestions. The user can make a decision in seconds rather than minutes.

## When Users Benefit Most

- Traveling in a new city
- Hungry and tired, wanting a fast decision
- Looking for a specific cuisine nearby
- Wanting to know not only *where* to go, but *what to order*

# 3. Product Evolution: From Local LLM Prototype to Real-Time AI + Maps

Our first prototype relied on a local LLM (Gemma 12B) combined with a static NYC restaurant dataset. It could produce location-aware recommendations, but lacked the ability to generate useful contextual insight—especially dish suggestions.

The final design shifts from merely retrieving restaurants to **interpreting restaurants**. By integrating Google Maps APIs with **GPT-5-mini**, the system becomes an actual *dining assistant* rather than a filtered restaurant list.

## Evolution Summary

- **Local LLM + dataset:** Static, location-limited, no meaningful dish insight
- **Final system:** Real-time geospatial data + GPT-5-mini → accurate restaurants + rich AI recommendations

## 4. Approach

The final approach treats AI not as an add-on but as the **central intelligence layer** of the product. Google Maps provides trustworthy restaurant data; GPT-5-mini transforms that data into human-friendly recommendations that guide decision-making.

### What AI Does

- Reads each restaurant's name, cuisine type, and city context
- Generates **signature dishes** with concise, vivid descriptions
- Avoids hallucinations by grounding output in real restaurant metadata
- Provides a restaurant "preview" without users needing to open reviews or separate apps

### Design Principles

- AI is used to **explain**, not invent
- Output must be **short, actionable, and helpful**
- Recommendations should reduce cognitive load—not increase it

## 5. System Architecture (High-Level Overview)

### Frontend

- Simple 3-input form
- Results page showing Top 5 + AI-generated dish highlights

### Backend Pipeline

1. Geocode address → lat/lng/city
2. Search restaurants via Places API
3. Sort & select Top 5
4. **GPT-5-mini generates signature dish recommendations**
5. Render into concise, user-friendly result cards

**Outcome:** Real restaurants → real data → **AI-created insight layer that enriches decisions**

## 6. Key Lessons Learned

Building both the local-LLM prototype and the final API-integrated product revealed important insights about decision-making, data grounding, and AI usability. The shift from static data to dynamic geospatial intelligence significantly improved accuracy and user value.

### What We Learned

- Limiting choices improves clarity and user satisfaction
- LLMs perform best when grounded in structured, up-to-date data
- Static datasets restrict scalability and freshness
- Combining Maps APIs with LLMs creates a unique hybrid advantage
- Token and latency constraints shape real-world product decisions