

## Voyager Al

https://github.com/Manahil-Aamir/AI-Travel-Agent

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Voyager AI is an innovative, voice-enabled travel assistant designed to revolutionize how users plan and book their trips. Integrating cutting-edge AI, robust search capabilities, and intuitive user interfaces, Voyager AI provides a seamless, conversational experience for flights, hotels, restaurants, and even shopping. This presentation offers a technical deep dive into the architecture and key features of each module.

# Voice-Enabled Travel Assistant: Core Technology



### Streamlit UI & Controls

Interactive web interface with voice/text chat, sidebar instructions, and UI controls for accessibility.



### Groq API with LLaMA3-8B

Powers intelligent conversations and natural language understanding for dynamic user interaction.



### Speech Recognition & TTS

Captures user voice (speech\_recognition) and reads responses aloud (pyttsx4) for hands-free operation.



### Neo4j Graph Database

Logs conversations as a connected graph of usermessage-response for contextual memory.



### Session State & Rerun

Maintains conversation context (st.session\_state) and ensures real-time reactivity (st.experimental\_rerun) in voice mode.



### **Robust Error Handling**

Ensures system stability with graceful fallbacks for speech, API, and database-related issues.



### **External API Integrations**

Seamlessly connects with various third-party travel APIs for real-time flight, hotel, and restaurant data.



### Data Caching & Optimization

Employs efficient caching strategies to improve response times and minimize redundant API calls for enhanced user experience.

## Flight Search Engine: Architecture

The Flight Search Engine leverages a multi-API approach to provide real-time flight options. Streamlit powers the intuitive UI, while external APIs handle location resolution and flight data retrieval. Neo4j logs all search activities for analytical insights.

- **UI & Interaction:** Streamlit for user inputs (cities, dates, passengers).
- Location Resolution: LocationIQ geocodes cities; REST Countries API as a fallback.
- AeroDataBox API: Maps locations to IATA airport codes and provides airport information.
- **Flight Data:** Kiwi Flights API (via RapidAPI) retrieves optimized round-trip options with filters.
- Data Logging: Neo4j stores User → Search → From/To Airports as graph nodes.
- Data Formatting: Custom formatter
  (format\_kiwi\_location) generates API-specific query
  strings.
- Display & Feedback: Dynamic display logic for itineraries, enhanced with Streamlit's st.error and st.info for user feedback.



### Hotel Search Engine: Technical Details

### Streamlit UI Integration

Frontend for hotel searches: destination, dates, guest count input.

#### **Booking.com API**

Fetches geo-filtered hotel listings via RapidAPI, ensuring diverse options.

#### OpenStreetMap Nominatim

Geocodes user-input destinations into precise latitude/longitude coordinates.

### Neo4j Graph Database

Logs User  $\rightarrow$  Search  $\rightarrow$  City interactions with metadata (dates, guests).

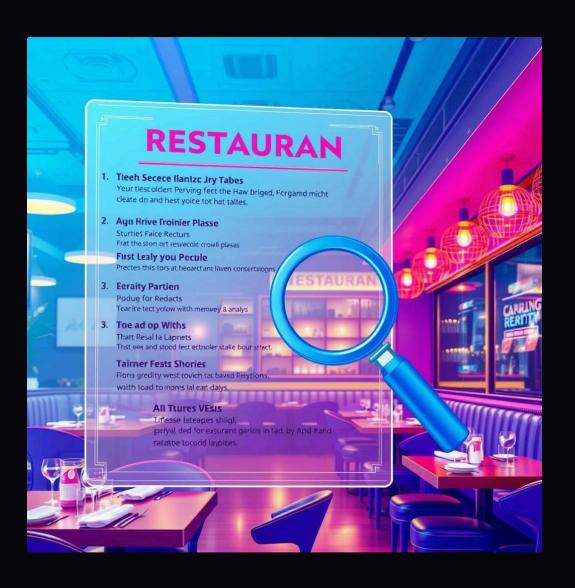
#### **Custom CSS & Data Extraction**

Enhances UI with card-like displays; parses prices, ratings, photos, and addresses from API results.

### **Booking Simulation & Validation**

Simulates booking via session state; includes form validation for dates with clear error messaging.

### Restaurant Finder & Menu Al Assistant



- **Streamlit UI:** Enables restaurant search by city/cuisine with interactive detail viewing.
- Yelp API: Fetches restaurant data (name, rating, photos, categories, address, website) for comprehensive listings.
- Neo4j Graph Database: Logs user interactions (e.g., "viewed") for graph-based tracking and personalization.
- Al Menu Analysis: Utilizes Groq LLaMA3-70B to summarize menus into highlights and popular dishes.
- Menu Scraping Logic: Attempts direct URL scraping, with DuckDuckGo as a fallback for menu pages.
- HTML Processing: Uses html2text + BeautifulSoup to convert raw HTML into readable content for LLM input.
- Interactivity & Layout: st.session\_state manages menu toggles; modern card layout for restaurant info.
- **Fallback Safety:** Robust error handling for failed API calls, scraping issues, and missing data.

### Voice-Enabled Travel Shopping Assistant

1 Streamlit UI & Voice Input

Intuitive product search across eBay and AliExpress with integrated voice and text support.

2 Speech-to-Text & Text-to-Speech

Facilitates natural voice commands (e.g., "buy backpack," "show my cart") and audio responses.

**3** Product Aggregation

RapidAPI integrates eBay and AliExpress, filtering products by user country and keywords.

4 Neo4j GraphDB Logging

Tracks user searches (user  $\rightarrow$  search  $\rightarrow$  product category) and identifies popular items.

5 Persistent Cart System

Manages item additions/removals, totals, checkout stages, and session-based storage.

6 Modern UI Cards & Checkout

Features visually appealing product cards with add-to-cart buttons; guides users through a comprehensive checkout workflow.

**7** Recommendation Engine

Personalizes search terms based on user interaction patterns and graph analysis in Neo4j.