



# Voyager AI

<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 user-message-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 → Search → 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 AI 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.
- **AI 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 → search → 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.