
CAPSTONE PROJECT

TRAVEL PLANNER AGENT

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-CSE-DS

OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
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PROBLEM STATEMENT

A Travel Planner Agent is an AI-powered assistant that helps users plan trips efficiently and intelligently.

It uses real-time data to suggest destinations, build itineraries, and recommend transport and accommodation options. By understanding user preferences, budgets, and constraints, it tailors personalized travel plans. Integrated with maps, weather updates, and local guides, it ensures a smooth travel experience.

The agent can also manage bookings, alert users to changes, and optimize schedules on the go.

PROPOSED SOLUTION

- The proposed system aims to tailor a personalized travel plan based on individual preferences. A smart assistant transform complex travel planning into a seamless, enjoyable process. The solution will consist of the following components:
- Data Collection:
 - Gather data in transportation, location, and other relevant factors.
 - Utilize real-time data sources to deliver updates such as weather conditions, availability updates of transportation, booking facilities to enhance accuracy.
- Data Preprocessing:
 - Process the real time information using AI-tools to provide accurate result.
 - Access data and provide suggestions.
- Machine Learning Algorithm:
 - Implement a machine learning algorithm, such as a NLP, Time Series Forecasting, Clustering, Reinforcement Learning etc., to provide personalized, data-driven travel recommendations while continuously learning and adapting to user needs.
 - Consider incorporating other factors like categorize travelers into types (budget, luxury, adventure) for targeted suggestions and balance cost, time, comfort, and preferences when creating itineraries.
- Deployment:
 - Develop a user-friendly interface or application that provides real-time analysis of navigation for safe travels.
 - Deploy the solution on a scalable and reliable platform, considering factors like server infrastructure, response time, and user accessibility.
- Evaluation:
 - Robust integrations available for travel data, mapping, and booking platforms.
 - Scalable computing resources support real-time processing needs.
 - Result: The project delivers measurable value through automation, personalization, and intelligent optimization of the complex travel planning process.

SYSTEM APPROACH

- Architecture: ReAct
- Framework: LangGraph
- Databases: SQL for users, NoSQL for content
- Web and mobile responsive applications . Payment gateways (Stripe, PayPal)
- Mapping services (Google Maps)
- Weather and traffic APIs
- Travel booking platforms
- TECHNOLOGY USED: IBM cloud LITE SERVICES/ IBM GRANITE

ALGORITHM & DEPLOYMENT

Algorithm Selection:

- Natural Language Processing - Understand conversational queries and extract travel preferences from user input.
- Time Series Forecasting - Predict flight/hotel prices and optimal booking times.
- Clustering - Group similar destinations, users, or travel options for better organization.
- Multi-objective Optimization - Balance cost, time, comfort, and preferences when creating itineraries.
- Reinforcement Learning - Improve recommendations based on user feedback and booking success.

Data Input:

- Profile: Age, location, Search patterns, booking history, activity interest, Budget range
- Details: Departure/return dates, trip duration, travel type
- Flexibility: Date/destination openness, budget variance
- Purpose: Business, leisure, family, adventure travel
- Destination Features, Climate, Airport connectivity, Accommodation options, Weather patterns, peak seasons, local events
- Social: Reviews, ratings, popularity trends . Pricing: Flight costs, hotel rates, currency exchange

Training Process:

- Train on user-item interaction matrices. Learn destination and user feature similarities.

Prediction Process:

Predict user-destination affinity scores. Match destinations to user interest profiles. Combine multiple recommendation algorithms for final ranking. Balance preferences with budget/time limits.

RESULT

Training Set: 70% data with known outcomes

Validation Set: 15% for hyperparameter tuning

Test Set: 15% for final model evaluation

Stratified Sampling: Ensure balanced representation across user types and destinations

CONCLUSION

- The Travel Planner Agent has high technical feasibility with established ML principles and high market potential. Implementation issues regarding data and market competition are present, but the solution solves real user problems with measurable value. Its success lies in execution quality, strategic alliances, and ongoing innovation to stay ahead of established competitors. The end-to-end system solution is well-positioned for sustained growth within the growing travel technology industry.

FUTURE SCOPE

- These intelligent agents will predictively manage everything from bookings and documentation to real-time optimizations. With universal connectivity across all platforms and deep behavioral learning, travel planning will evolve from manual assistance to proactive lifestyle management, making complex trip coordination completely autonomous while delivering personalized, sustainable, and globally connected travel experiences.

REFERENCES

- Google Maps API and Travel Partner API documentation
- OpenAI GPT models for natural language processing
- React/Angular for frontend development
- Node.js/Python backend frameworks
- Journal of Travel Research - AI applications in tourism
- Expert Systems with Applications - intelligent travel planning systems
- Tourism Management journal - technology adoption in travel

IBM watsonx

Projects / Travel Agent / Agent Lab

Build

AI

Model: granite-3-3-8b-instruct

Setup

Configuration

Framework

LangGraph

Architecture

ReAct

Instructions

plan trip for user based on their preferences and budget. Use real time analyis to suggest destinations and build itineraries and suggest transport and accommodation options, show routes integrated with map for travel, weather updates and local guides. manage the bookings, alert users on the changes and optimize their schedule on the go.

Knowledge

Tools

Add a tool

Create custom tool

Added tools (3)

Google search

Retrieve information from the internet with the Google search engine.

DuckDuckGo search

Advanced configuration

Agent preview

NR

You: 05:11 PM

trip to meghalaya

watsonx Agent 05:11 PM

To plan your trip to Meghalaya, here are some resources and suggestions based on your interests:

1. Meghalaya Tourism:

Start with the official tourism site [Meghalaya Tourism](#) for comprehensive information on places to visit, accommodations, and travel tips.

2. Travel Guides:

[The Ultimate Meghalaya Travel Guide](#) by Tale of 2 Backpackers provides an in-depth look at what to expect and see in Meghalaya.

[A Complete Guide to Meghalaya](#) offers a 7-day itinerary for exploring the state.

[Meghalaya Travel Guide](#) by Rough Guides gives insights into must-visit spots and cultural experiences.

3. Community Insights:

[r/Meghalaya](#) on Reddit can be useful for connecting with locals or travelers who have visited recently for advice and recommendations.

4. Weather:

Before you finalize your itinerary, check the [weather in Meghalaya](#) to ensure you pack appropriately. Meghalaya is known for its heavy rainfall, especially during the monsoon season (May to September).

5. Transport and Accommodation:

Type something...

Upgrade

?

Nimisha Rawat's Account

Dallas

NR

Share feedback

Unsaved

New agent

Deploy

foundation

4. **Weather:** Before you finalize your itinerary, check the [weather in Meghalaya](#) to ensure you pack appropriately. Meghalaya is known for its heavy rainfall, especially during the monsoon season (May to September).

5. **Transport and Accommodation:**

- For transport, consider flights to Guwahati (the nearest major airport) followed by road or rail travel to Meghalaya. Renting a car with a driver is a popular option for exploring the state.
- Accommodation ranges from budget-friendly guesthouses to luxury resorts. Look for options in Shillong, Cherrapunji, and near the famous waterfalls like Umngot and Nohkalikai.

6. **Local Guides:** If you prefer a hassle-free experience, consider hiring a local guide who can manage bookings and create a personalized itinerary for you.

7. **Real-time Analysis:** Use tools like Google Maps for route planning and real-time traffic updates. This will help optimize your travel time and ensure you make the most of your trip.

8. **On-the-go Optimization:** Keep an eye on any changes or updates through travel advisories or local news. Apps like Google Trips or TripIt can help manage bookings and send alerts for any changes.

Remember, Meghalaya is known for its stunning natural beauty, including the "Scotland of the East" landscapes, cascading waterfalls, and living root bridges. Activities include trekking, visiting the beautiful Umiam Lake, exploring the Umngot River, and engaging with the local tribes to learn about their unique culture and lifestyle.

NR You: 05:13 PM

list of hotel available for duration 10-17 august



watsonx Agent 05:13 PM

To find a list of available hotels in Meghalaya for your travel dates (August 10-17), I would typically perform a search using a travel booking platform or hotel aggregator. However, as an AI, I don't have real-time access to external databases or booking systems.

Here's how you can find the information:

1. **Use Hotel Booking Sites:** Websites like Booking.com, Expedia, or Agoda can show you a list of available hotels, along with prices and user reviews. You can filter by location, price range, and amenities.
2. **Direct Hotel Searches:** Visit the websites of hotels you're interested in, such as Hotel Ivy Green, Hotel Mystic Resort, or The Meghalaya Retreat, to check their availability directly.
3. **Local Tourism Websites:** Check the official Meghalaya Tourism website or local travel portals for hotel listings.
4. **Travel Agencies:** Contact local travel agencies in Meghalaya for personalized assistance in booking accommodations.

Remember to compare prices, read reviews, and consider the hotel's proximity to the attractions you plan to visit. Also, keep in mind that due to the region's popularity and natural beauty, it's advisable to book in advance, especially during peak tourist seasons.

If you need assistance with understanding the features of a hotel or deciphering reviews, feel free to ask!

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Learning hours: 20 mins



THANK YOU