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# **CAPSTONE PROJECT**

## **TRAVEL PLANNER AGENT**

**Presented By:**

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# OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result
- Conclusion
- Future Scope
- References

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# PROBLEM STATEMENT

**Example:** Travel planning involves complex decision-making across multiple variables like destination, budget, weather, duration, and interests. Users often struggle to find and organize relevant information in real-time. The challenge is to create a system that can personalize travel plans dynamically, manage updates, and reduce manual research time.

# PROPOSED SOLUTION

- The system predicts hourly bike demand using machine learning to ensure stable availability in urban areas.
- **Data Collection:**
  - Collects destination, travel dates, budget, group size, and interests via natural language.
- **Data Preprocessing:**
  - Uses an LLM (like IBM Granite) with ReAct to understand preferences and generate day-wise itineraries.
- **Machine Learning Algorithm:**
  - Integrates Google Search to fetch live info on weather, hotels, places to visit, and transport options.
- **Deployment:**
  - Adjusts plans based on budget or preference changes during the conversation.
- **Evaluation:**
  - Runs on IBM watsonx.ai using Agent Lab (LangGraph), with optional expansion to custom tools or external APIs.

# SYSTEM APPROACH

- System Requirements:** IBM Cloud Lite account, internet access, watsonx.ai lab
- Agent Architecture:** LLM-based reasoning with dynamic search
- User Interaction:** Chat-based Q&A session to gather preferences
- External Tools:** Google Search tool for dynamic info retrieval
- Optional Tools:** WeatherFetcher, HotelRecommender, TransportPlanner
- Platform:** IBM watsonx.ai Agent Lab
- Framework:** LangGraph (ReAct architecture)
- Model:** LLaMA-3-70B-Instruct or IBM Granite (LLM)
- Tool:** Google Search tool for real-time data
- Languages:** Python (for tool development, if used), JSON (tool schema)
- Optional Integration:** Weather APIs, Booking APIs, Maps APIs

# ALGORITHM & DEPLOYMENT

- In the Algorithm section, describe the machine learning algorithm chosen for predicting bike counts. Here's an example structure for this section:
- **Algorithm Selection:**
  - The system uses the **ReAct (Reasoning + Acting)** framework in combination with a **pre-trained Large Language Model (LLM)** such as **LLaMA-3-70B-Instruct** or **IBM Granite**. ReAct enables the agent to reason through user input and decide when to take actions (e.g., perform a web search). This setup is ideal for conversational, decision-based tasks like itinerary generation, where dynamic and contextual understanding is essential.
- **Data Input:**
  - The input to the system is **natural language queries** from the user, which typically include:
    - Destination (e.g., Goa, Manali)
    - Duration (e.g., 3-day, 5-day trip)
    - Budget (e.g., ₹20,000)
    - Travel type (solo, family, couple)
    - Interests (e.g., food, adventure, relaxation)
  - These inputs are extracted and structured internally by the LLM for planning and decision-making.
- **Training Process:**
  - Explain how the algorithm is trained using historical data. Highlight any specific considerations or techniques employed, such as cross-validation or hyperparameter tuning.
- **Prediction Process:**
  - Detail how the trained algorithm makes predictions for future bike counts. Discuss any real-time data inputs considered during the prediction phase.

# ALGORITHM & DEPLOYMENT

- Training Process:
  - The LLM used is **pre-trained** and **not fine-tuned** specifically for this task. Instead of training, the system relies on:
  - **Prompt engineering** to guide the model's responses
  - **LangGraph orchestration** to structure reasoning and tool invocation
  - **Tool selection logic** defined within the Agent Lab interface
  - This no-training approach enables quick deployment and flexible general-purpose performance without needing large datasets or training infrastructure.
- Prediction Process:
  - Upon receiving user input, the agent:
  - **Parses** the message to understand preferences and constraints
  - **Performs web searches** (via the Google Search tool) to fetch real-time weather, hotel, or location info
  - **Generates a personalized day-wise itinerary** using the LLM's reasoning capabilities
  - **Responds conversationally**, summarizing trip details and asking for confirmation or adjustments
  - All this is executed in a **cloud-based environment (IBM watsonx.ai Agent Lab)** with no local installation required.

# RESULT

Present the results of the machine learning model in terms of its accuracy and effectiveness in predicting bike counts. Include visualizations and comparisons between predicted and actual counts to highlight the model's performance.

The screenshot displays the IBM Watsonx interface for the Travel Planner Agent. The top navigation bar includes the IBM Watsonx logo, a menu icon, and user account information (Sumit Aherwadkar's Account, Dallas, SA). The main interface is divided into two primary sections: 'Build' and 'Agent preview'.

**Build Section:**

- Model:** granite-3-3-8b-instruct
- Framework:** LangGraph
- Architecture:** ReAct
- Instructions:**
  - You are a helpful assistant that uses tools to answer questions in detail. When greeted, say "Hi, I am Travel Planner Agent. How can I help you?" You are an intelligent and helpful AI-powered Travel Planner Agent.
  - Your primary goal is to assist users in planning personalized travel itineraries based on their preferences such as destination, travel dates, trip duration, budget, group size, interests (e.g., nature, adventure, relaxation, culture), and any special needs.
  - You must follow these steps:
    - Start by greeting the user and asking for essential trip details:
      - Destination
      - Travel dates or duration
      - Number of travelers and their relation (solo, couple, family, friends)
      - Budget range
      - Preferred travel style (luxury, budget, adventure, relaxation, etc.)
      - Interests (e.g., food, history, nature, shopping, etc.)
    - Once you have the required information, generate a day-wise itinerary that includes:
      - Suggested places to visit (landmarks, local spots)

- Knowledge:**
- Tools:**
- Add a tool
- Create custom tool
- Added tools (5):**
- Google search

**Agent preview Section:**

- SA You: 11:13 AM**  
plan a 4 days of trip to goa
- Travel Planner Agent 11:13 AM**  
Hi, I am Travel Planner Agent. How can I help you plan your 4-day trip to Goa?  
To create a personalized itinerary, could you please provide me with the following details:
  - Travel dates (if specific) or approximate travel period?
  - Number of travelers and their relation (solo, couple, family, friends)?
  - Budget range for accommodation, meals, and activities?
  - Preferred travel style (luxury, budget, adventure, relaxation, etc.)?
  - Interests (e.g., food, history, nature, shopping, etc.)?Once I have these details, I can provide you with a detailed itinerary including suggested places to visit, recommended transport, meal suggestions, and travel tips.  
Would you like to adjust anything or explore other options?  
▶ How did I get this answer?
- SA You: 11:14 AM**  
next monday 4 people 45000 buget and adventures
- Travel Planner Agent 11:14 AM**  
Great, thank you for providing the details for your Goa trip for next Monday with 4 travelers, a budget of ₹45,000, and a preference for adventure. Here's a preliminary plan for your 4-day trip:  
**Day 1: Arrival in Goa & Beach Adventures**
  - Transport:** Arrive at Goa International Airport. Pre-book a taxi or ride-hailing service for convenience.
  - Accommodation:** Check into a mid-range hotel or resort, such as 'The Zuri White Sandy Beach Resort Goa' or similar within your budget.
  - Activities:** Visit Colva Beach for water sports like jet-skiing, parasailing, and banana boat rides. Later, relax and enjoy the sunset.

The interface also includes a search bar at the bottom with the placeholder text "type something..." and a "Deploy" button in the top right corner.



IBM watsonx

Upgrade ⓘ 🔔

Sumit Aherwadkar's Account ▾ Dallas ▾ SA ⋮

Projects / Travel Planner Agent / Travel Planner Agent

Share feedback ⓘ Autosaved 11:14 AM 📄 ▾ New agent + Deploy 🔗 🔒 ⓘ

Build

AI Model: granite-3-3-8b-instruct 🔧 ⏪

Setup ▾

Configuration ▴

Framework

LangGraph ▾

Architecture

ReAct ▾

Instructions

Advanced configuration

You are a helpful assistant that uses tools to answer questions in detail.  
When greeted, say "Hi, I am Travel Planner Agent. How can I help you?"  
You are an intelligent and helpful AI-powered Travel Planner Agent.

Your primary goal is to assist users in planning personalized travel itineraries based on their preferences such as destination, travel dates, trip duration, budget, group size, interests (e.g., nature, adventure, relaxation, culture), and any special needs.

You must follow these steps:

- Start by greeting the user and asking for essential trip details:
  - Destination
  - Travel dates or duration
  - Number of travelers and their relation (solo, couple, family, friends)
  - Budget range
  - Preferred travel style (luxury, budget, adventure, relaxation, etc.)
  - Interests (e.g., food, history, nature, shopping, etc.)
- Once you have the required information, generate a day-wise itinerary that includes:
  - Suggested places to visit (landmarks, local spots)

Knowledge ▾

Tools ▴

Add a tool

Create custom tool

Added tools (5)

Google search

Agent preview

- Dining:** Have dinner at 'Tito's Lane' in Baga, famous for its beachfront location and diverse menu.

Day 2: North Goa Exploration

- Breakfast:** Start your day with breakfast at your hotel.
- Morning:** Head to the historic Aguada Fort, a short drive from your hotel. Explore the fort and enjoy the stunning views.
- Lunch:** Enjoy local Goan fish curry and rice at 'Gunpowder', Palolem.
- Afternoon:** Visit the famous Anjuna Beach and explore the Anjuna Flea Market for shopping.
- Dining:** Dinner at 'The Drunken Monkey' in Arpora, known for its international and fusion cuisine.

Day 3: South Goa Adventures

- Breakfast:** Enjoy breakfast at your hotel.
- Morning:** Travel to South Goa and visit the Basilica of Bom Jesus, a UNESCO World Heritage Site.
- Lunch:** Try the local Goan prawn curry at 'Spice Villa' in Candolim.
- Afternoon:** Engage in adventure activities like river rafting in the Shiroda or Damodar rivers.
- Dining:** Evening at 'Ginger' in Panjim, known for its vibrant atmosphere and diverse menu.

Day 4: Chill and Departure

- Breakfast:** Savor your last morning with breakfast at the hotel.
- Morning:** Spend your last moments at Calangute Beach or visit the famous Dudhsagar Waterfalls.
- Lunch:** Enjoy your final meal at 'Monkey Beach Fishing Village' in Baga, offering a serene setting with water sports options.
- Transport:** Pre-book your return transport from Goa International Airport based on your departure time.

Travel Tips:

- Goa has a tropical monsoon climate. Pack light, breathable clothes and don't forget sun protection.
- Be cautious of the water during monsoon, and avoid waterfalls if it's rainy season.
- Rent a scooter or bike for easy navigation between North and South Goa.

Please confirm if this itinerary works for you, or if you'd like any adjustments.

Would you like to adjust anything or explore other options?

type something...

🗑️ ➡️

foundation

## Agent preview

SA You: 12:05 PM

hi

👤 Travel Planner Agent 12:05 PM

Hi, I am Travel Planner Agent. How can I help you plan your next trip? Please provide me with some details such as your destination, travel dates, number of travelers, budget, preferred travel style, and interests.

▶ How did I get this answer?



|Type something...



## Agent preview

hi

👤 Travel Planner Agent 12:06 PM

Hi, I am Travel Planner Agent. How can I help you plan your next trip? Please provide me with some details such as your destination, travel dates, number of travelers, budget, preferred travel style, and interests.

▶ How did I get this answer?

SA You: 12:06 PM

Suggest an itinerary for a weekend trip to Jaipur focused on historical sites.

👤 Travel Planner Agent 12:06 PM

Great choice! Here's a suggested itinerary for your weekend trip to Jaipur, focusing on historical sites:

### Day 1: Arrival and City Exploration

- **Morning:**
  - Arrive in Jaipur. Suggested transport: Direct flights or trains to Jaipur International Airport or Jaipur Railway Station.
  - Check-in at a budget-friendly hotel, such as the Red Fox Jaipur or Red Rose Hotel (both within the ₹5,000-₹10,000 range).
  - Enjoy a local breakfast at the hotel or at a nearby cafe, like The Brunch Club or Nahar's Coffee House.
- **Afternoon:**
  - Visit the iconic Hawa Mahal (Palace of Winds) – ideal time: 1 PM - 3 PM.
  - Explore City Palace, which houses several museums, including the Armoury and the Manak Chowk.
  - Meal suggestion: Lunch at Rajmahal Restaurant inside City Palace or at Babu Bazaar's Rajasthani Thali.
- **Evening:**
  - Stroll through the bustling Johari Bazaar for shopping and experiencing local culture.
  - Dinner at Banjara Hills, known for its Rajasthani cuisine.

### Day 2: Historical Wonders

- **Morning:**
  - Visit Amer Fort, a UNESCO World Heritage Site, best explored between 9 AM - 11 AM.

Type something...



Share feedback

Autosaved 12:06 PM

New agent

Deploy

Agent preview

- Stroll through the bustling Johari Bazaar for shopping and experiencing local culture.
- Dinner at Banjara Hills, known for its Rajasthani cuisine.

Day 2: Historical Wonders

- Morning:**
  - Visit Amer Fort, a UNESCO World Heritage Site, best explored between 9 AM - 11 AM.
  - Enjoy the view of Mehrangarh Fort from afar and explore the Jaswant Thada, a beautiful marble cenotaph.
  - Meal suggestion: A light breakfast at the fort premises or at a nearby cafe.
- Afternoon:**
  - Head to Jantar Mantar, the world's largest sundial, open from 9 AM to 5 PM.
  - Visit Albert Hall Museum, one of the oldest museums in India, open from 10 AM to 5 PM.
  - Meal suggestion: Lunch at Spice Court inside Albert Hall Museum or at nearby restaurants like Bikanerwala.
- Evening:**
  - Experience the local culture with a visit to Chokhi Dhani, an ethnic Rajasthani village-themed restaurant and cultural center.
  - Enjoy a traditional dance performance, puppet show, and local cuisine.
  - Overnight stay in Jaipur.

Travel Tips:

- Best time to visit Jaipur: Year-round, but avoiding summer (April-June) if you don't like intense heat.
- Local currency: Indian Rupee (INR).
- Language: Hindi is widely spoken; English is understood in tourist areas.
- Tipping: Tipping is appreciated for good service.

Would you like to adjust anything or explore other options?

How did I get this answer?

type something...

Upgrade

Sumit Aherwadkar's Account

Dallas

SA

Share feedback

Autosaved 12:06 PM

New agent

Deploy

Agent preview

Would you like to adjust anything or explore other options?

How did I get this answer?

SA

You: 12:08 PM

Plan a romantic trip to Udaipur in January with lake view hotels

Travel Planner Agent 12:08 PM

Here's a romantic itinerary for your trip to Udaipur in January, focusing on lake view accommodations:

Day 1: Arrival and Lake City Exploration

- Morning:**
  - Arrive in Udaipur. Suggested transport: Direct flights to Maharana Pratap Airport.
  - Check-in at a lake-view hotel, such as The Oberoi Udaivilas (luxury, around ₹40,000/night) or Taj Lake Palace (luxury, around ₹30,000/night).
- Afternoon:**
  - Take a boat ride on Lake Pichola for a picturesque introduction to the city.
  - Visit City Palace, especially the Jagmandir, for stunning views of the lake. Ideal time: 2 PM - 4 PM.
  - Meal suggestion: Lunch at Vinayak Coffee House inside the City Palace or at Lake View Restaurant by the lake.
- Evening:**
  - Enjoy sunset at Lake Pichola and dine at Udaipur's famous romantic restaurant, Juhu Beach, offering a spectacular lake view.
  - Overnight stay in Udaipur.

Day 2: Romantic Getaways and Local Culture

- Morning:**
  - Indulge in a couples spa experience at your hotel or try the Ayurveda spa at Taj Lake Palace.
  - Visit Sajjangarh Lake Palace (Monsoon Palace) for panoramic city views. Ideal time: 9 AM - 11 AM.
  - Meal suggestion: Breakfast at your hotel or at Bagore Ki Haveli, offering traditional Rajasthani breakfast options.

Type something...

Upgrade?🔔

Sumit Aherwadkar's Account ▼

Dallas ▼

SA ⋮

[Share feedback](#) β

🟢 Autosaved 12:09 PM 📄 ▼

New agent +

Deploy 🔗 🔒 📘

Agent preview

options.

- **Afternoon:**
  - Explore the charming streets of Udaipur's old city, with a stop at the Badi Mahal for its intricate mirror work.
  - Meal suggestion: Lunch at The Chetana, known for its traditional Rajasthani thali.
- **Evening:**
  - Attend a traditional Rajasthani dance performance at the City Palace.
  - Dinner at The Moustache, an elegant restaurant offering an exquisite dining experience with live music.
  - Enjoy a leisurely walk along the lake promenade.

**Day 3: Nature and Departure**

- **Morning:**
  - Visit the picturesque gardens of Bagore, best explored between 9 AM - 11 AM.
  - Meal suggestion: Breakfast at your hotel.
- **Afternoon:**
  - Take a short trip to Eklingji Temple, a significant Hindu pilgrimage site, ideal for those interested in local culture and spirituality.
  - Depart for the airport or railway station.

**Travel Tips:**

- Best time to visit Udaipur: January offers pleasant weather with minimum rainfall.
- Local currency: Indian Rupee (INR).
- Language: Hindi is widely spoken; English is understood in tourist areas.
- Tipping: Tipping is appreciated for good service.

Would you like to adjust anything or explore other options?

► How did I get this answer?

🔄

🗨️ ▶️

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# CONCLUSION

- The Travel Planner Agent successfully demonstrates the ability to generate personalized itineraries using AI and real-time data. It simplifies travel planning by integrating multiple services into a conversational interface, improving user convenience, accuracy, and experience.

# FUTURE SCOPE

- Add real-time weather, hotel, and transport APIs as custom tools
- Expand support for multilingual queries
- Introduce booking capabilities for transport and accommodation
- Integrate user account & profile-based personalization
- Deploy as a mobile or web app for broader usability

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# REFERENCES

- LangGraph GitHub Repo
- OpenAI / Meta LLaMA-3 Paper
- OpenWeatherMap API
- Google Search and Travel APIs
- IBM Granite & Watson Assistant docs

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Completion Certificate



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**Completion date:** 23 Jul 2025 (GMT)

**Learning hours:** 20 mins

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