CAPSTONE PROJECT

TRAVEL PLANNER AGENT

Presented By:
1. Sumit Shrikantrao Aherwadkar-PICT, Pune-E & TC

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OUTLINE

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- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result
- Conclusion
- Future Scope
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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.

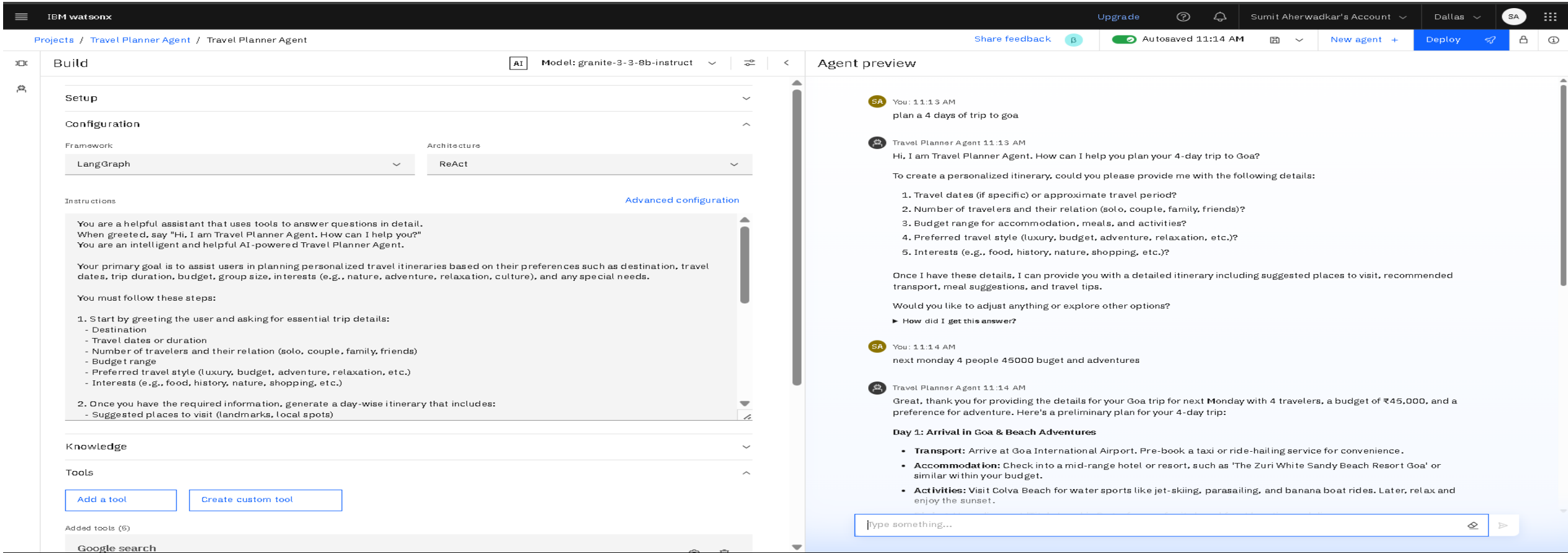
- **Training Process:**
  - Explain how the algorithm is trained using historical data. Highlight any specific considerations or techniques employed, such as cross-validation or hyperparameter tuning.
- **Prediction Process:**
  - Detail how the trained algorithm makes predictions for future bike counts. Discuss any real-time data inputs considered during the prediction phase.

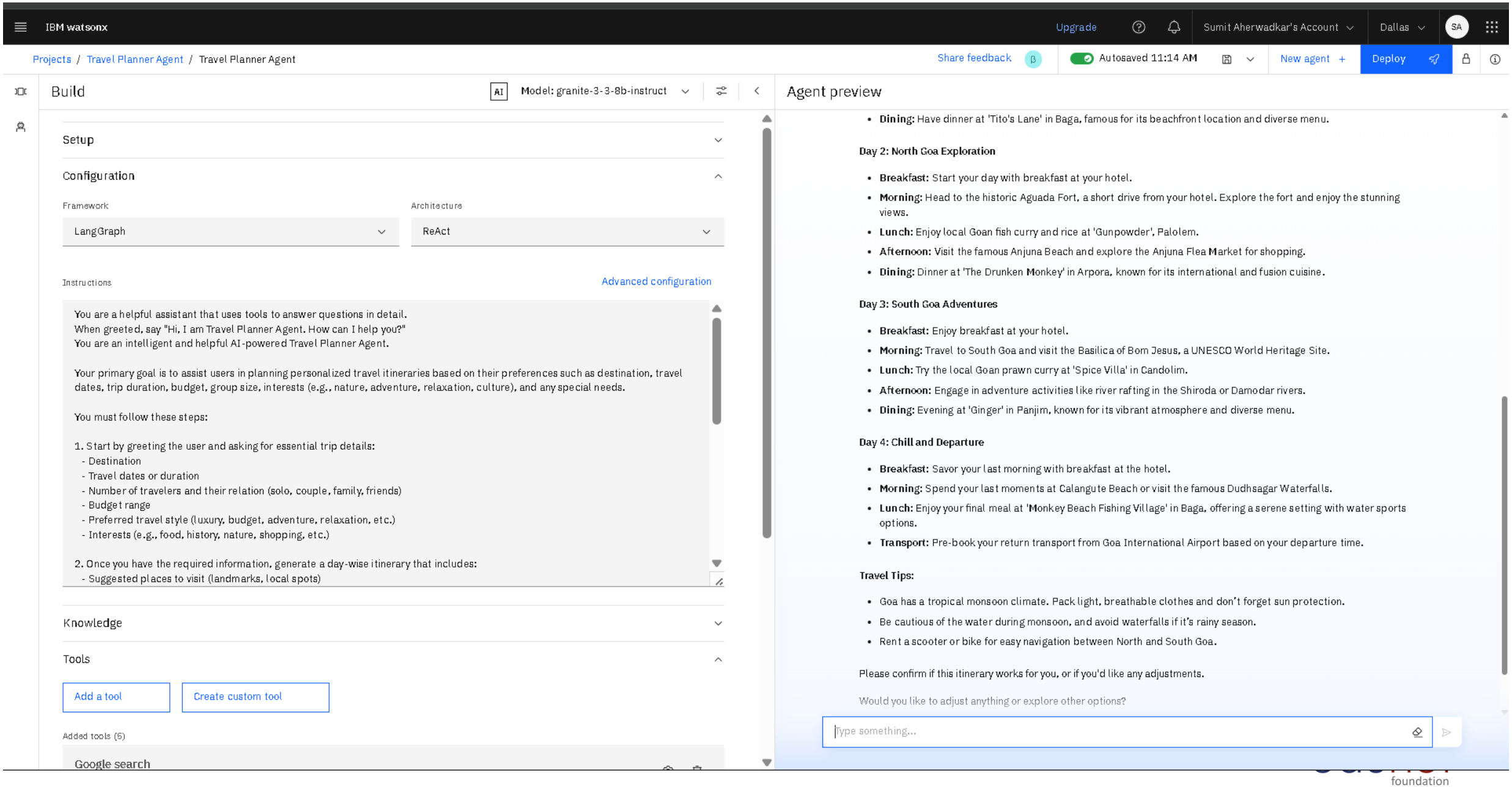
ALGORITHM & DEPLOYMENT

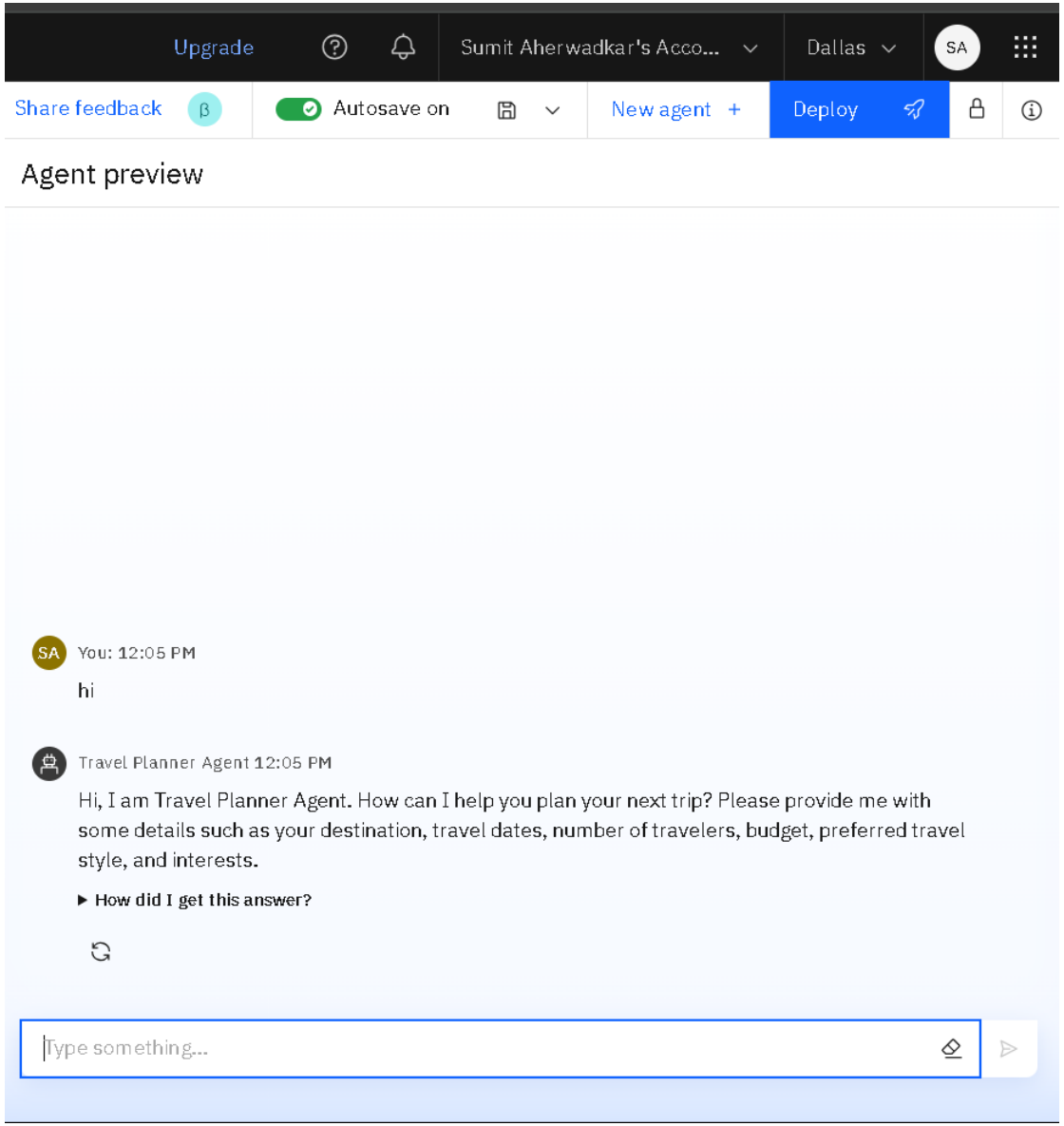
- Training Process:
- The LLM used is **pre-trained** and **not fine-tuned** specifically for this task. Instead of training, the system relies on:
- **Prompt engineering** to guide the model's responses
- **LangGraph orchestration** to structure reasoning and tool invocation
- **Tool selection logic** 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.

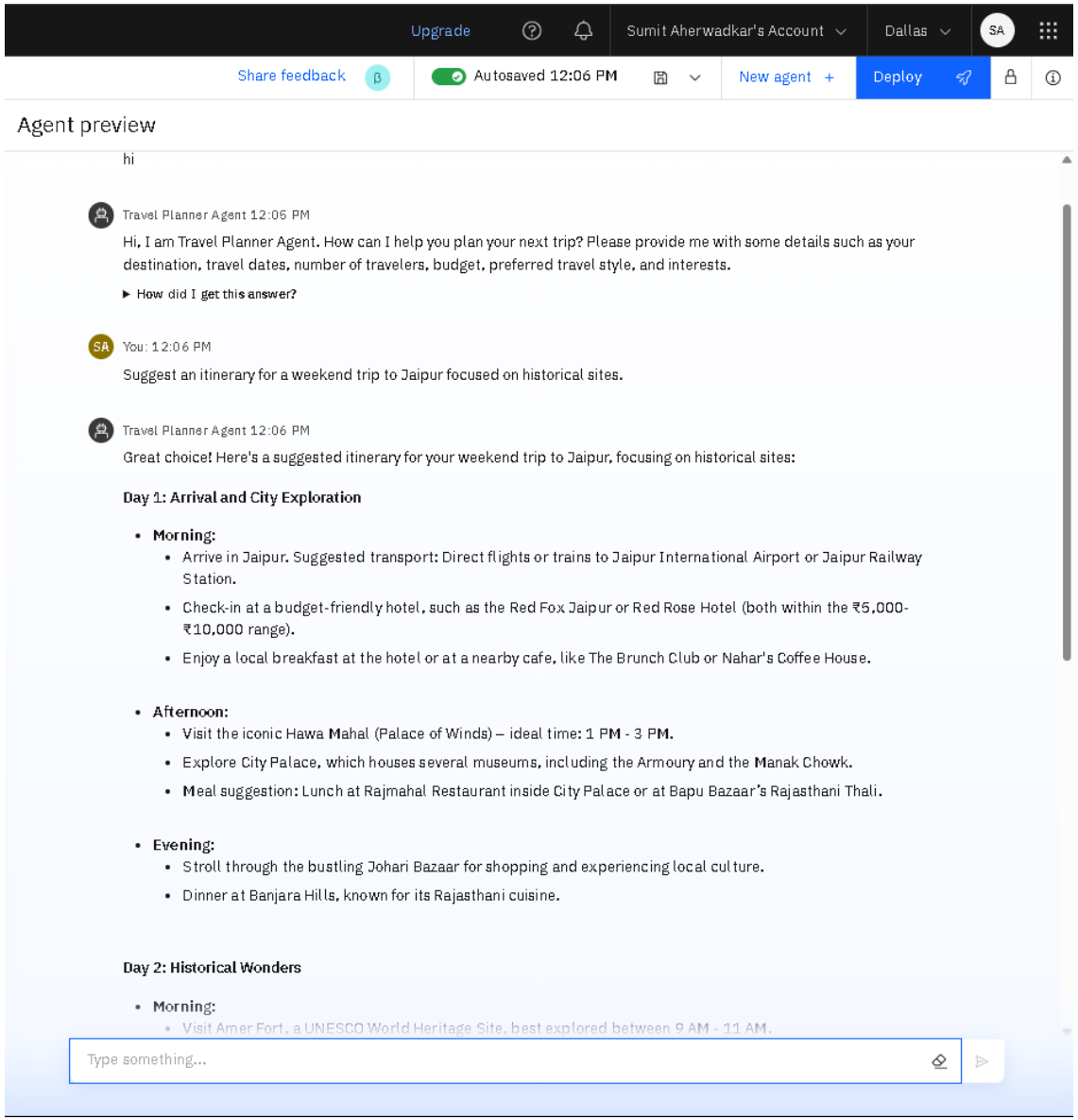
RESULT

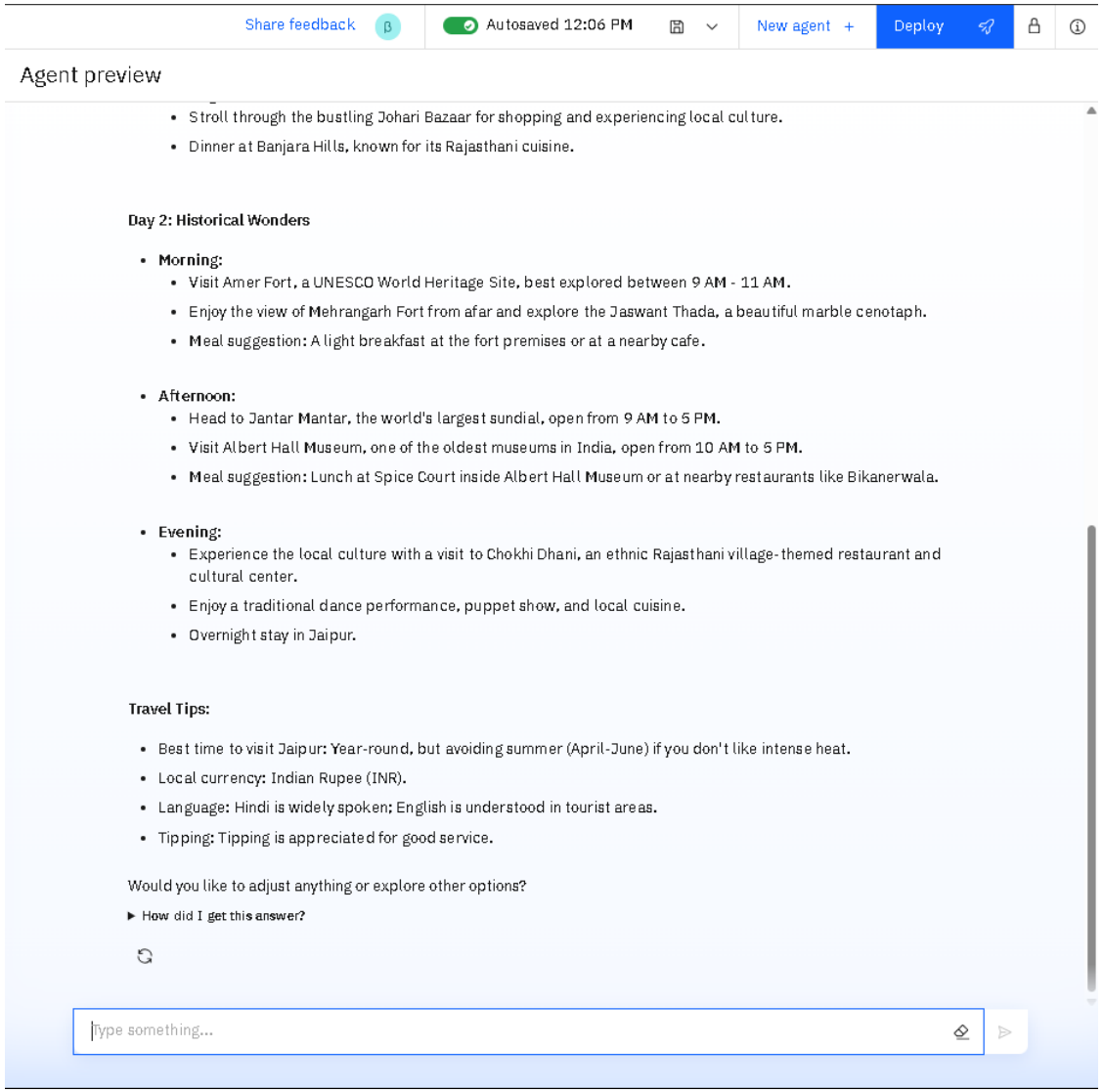
Present the results of the machine learning model in terms of its accuracy and effectiveness in predicting bike counts. Include visualizations and comparisons between predicted and actual counts to highlight the model's performance.

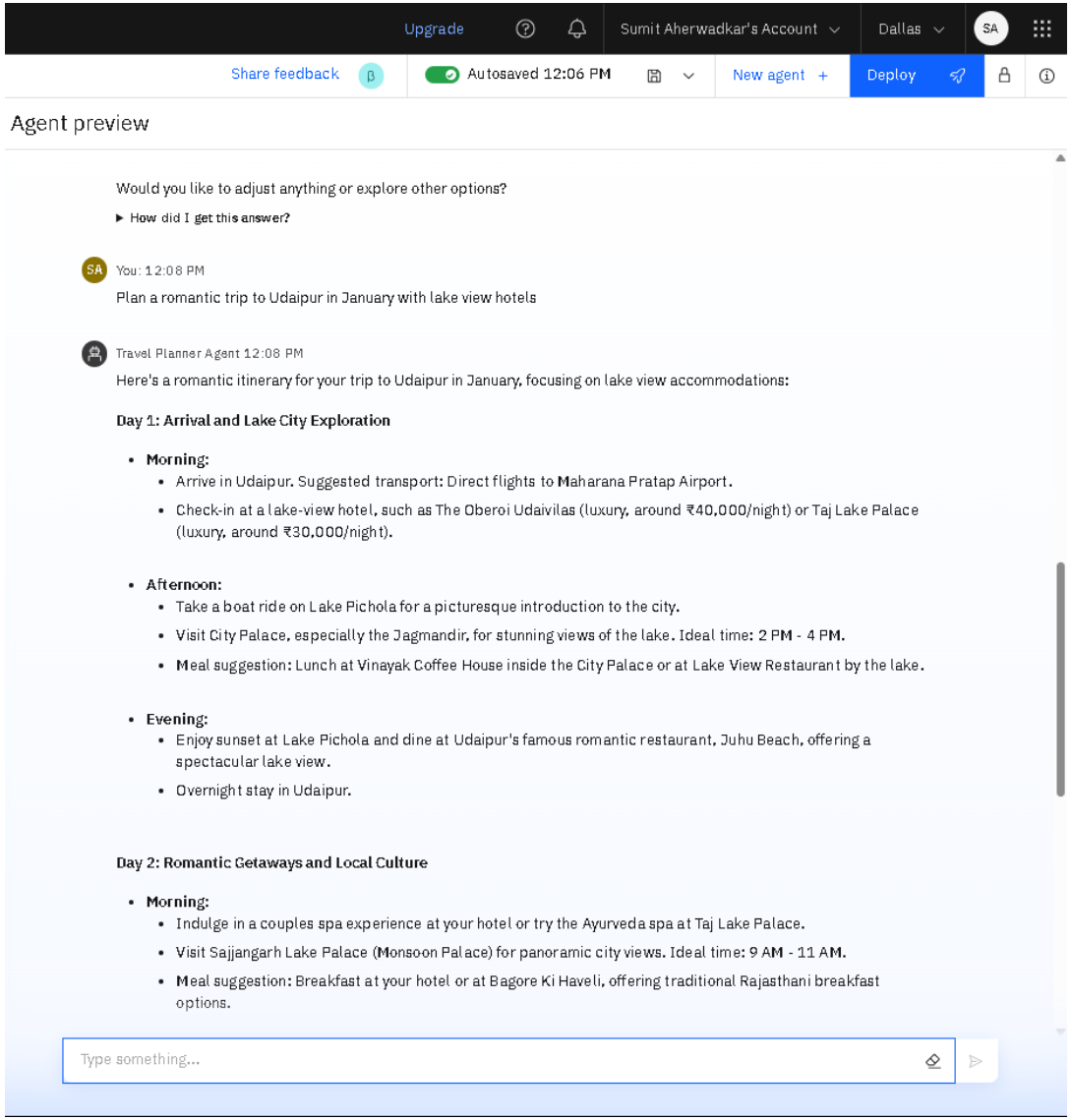


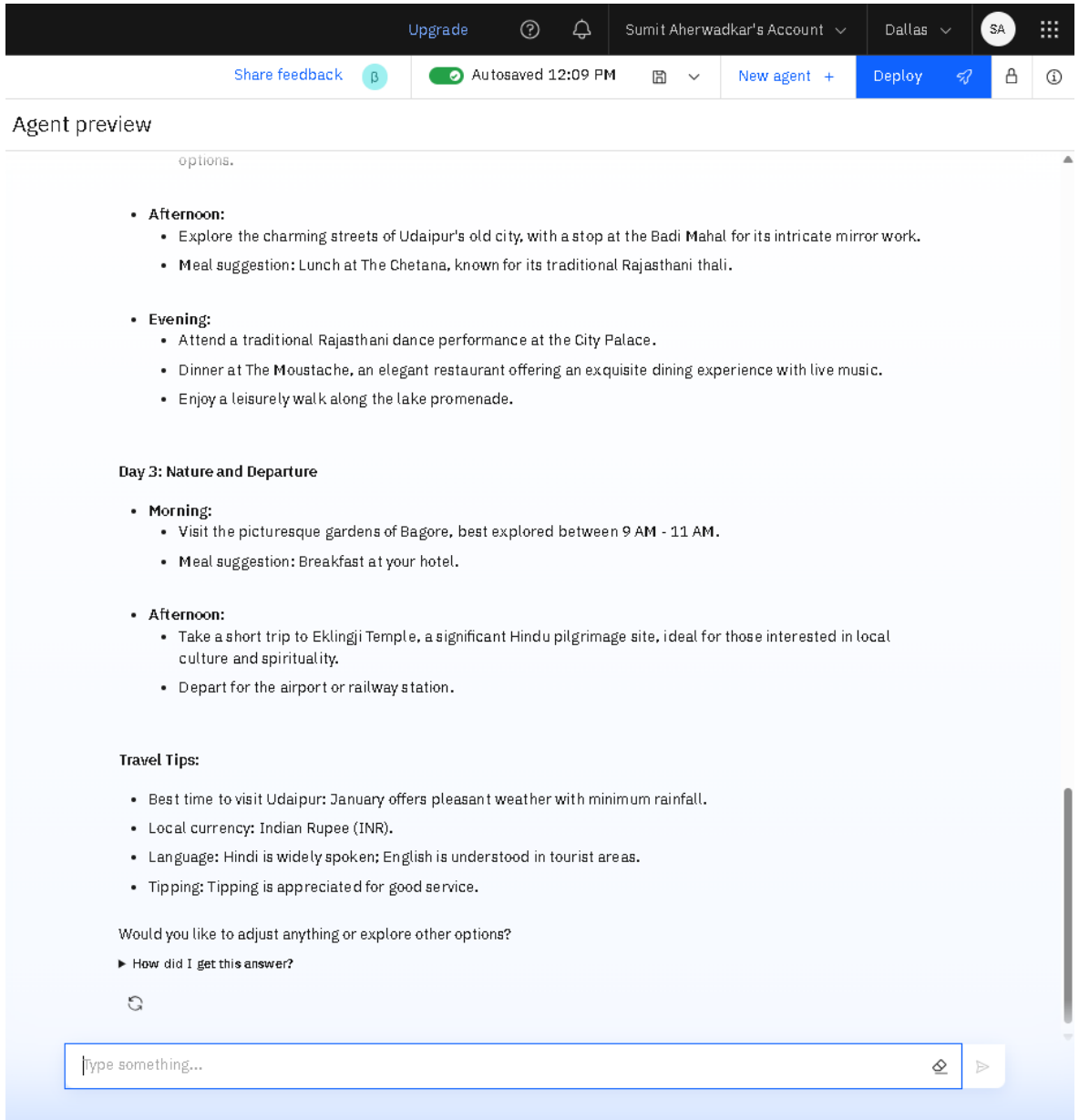

IBM watsonx
Upgrade
Sumit Aherwadkar's Account
Dallas
SA
Projects / Travel Planner Agent / Travel Planner Agent
Share feedback
Autosaved 11:14 AM
New agent +
Deploy
Build
Model: granite-3-3-8b-instruct
Setup
Configuration
Framework
LangGraph
Architecture
ReAct
Instructions
Advanced configuration
You 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:
1. 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.)
2. 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...











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

REFERENCES

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

IBM CERTIFICATIONS

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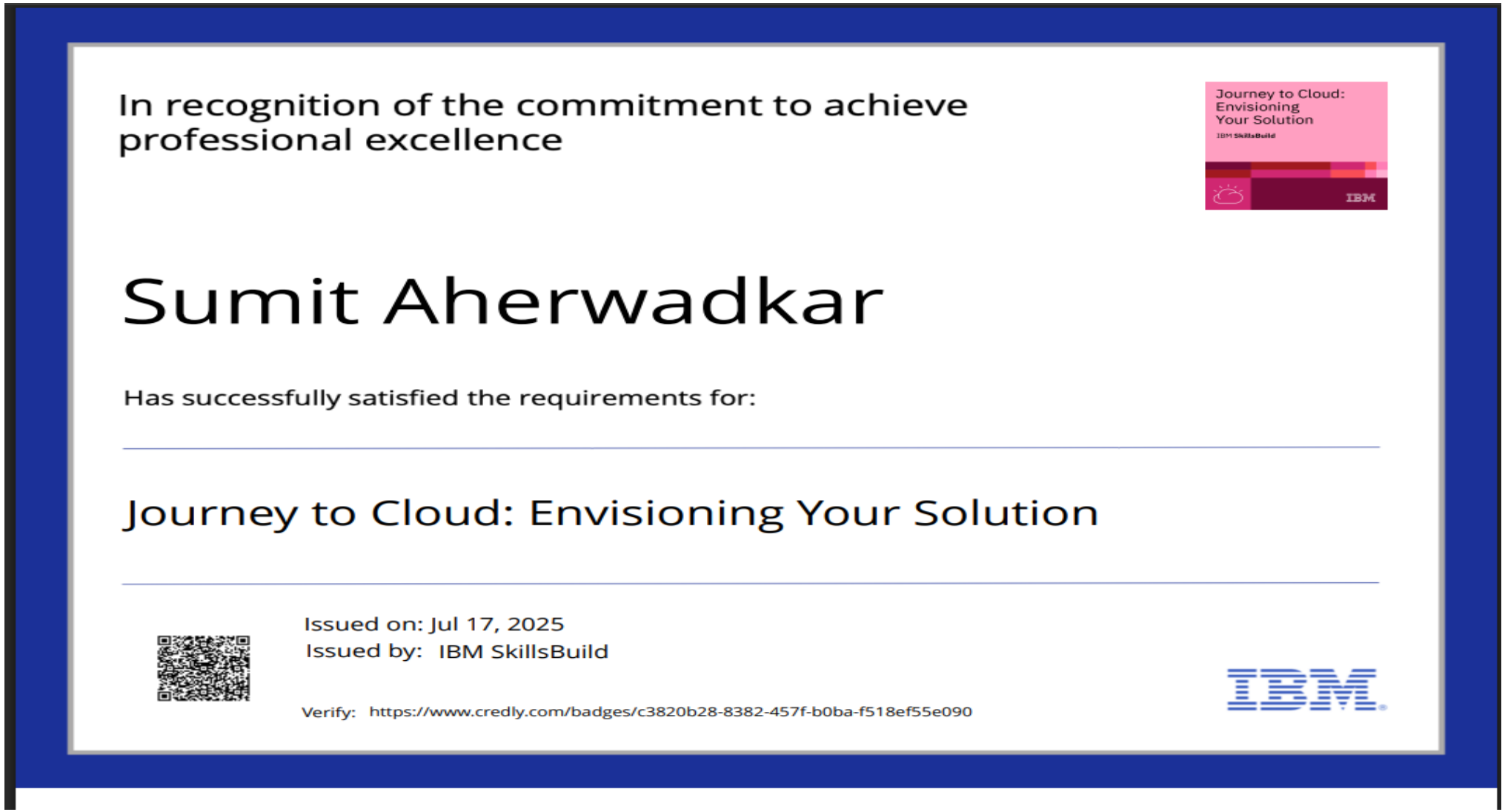

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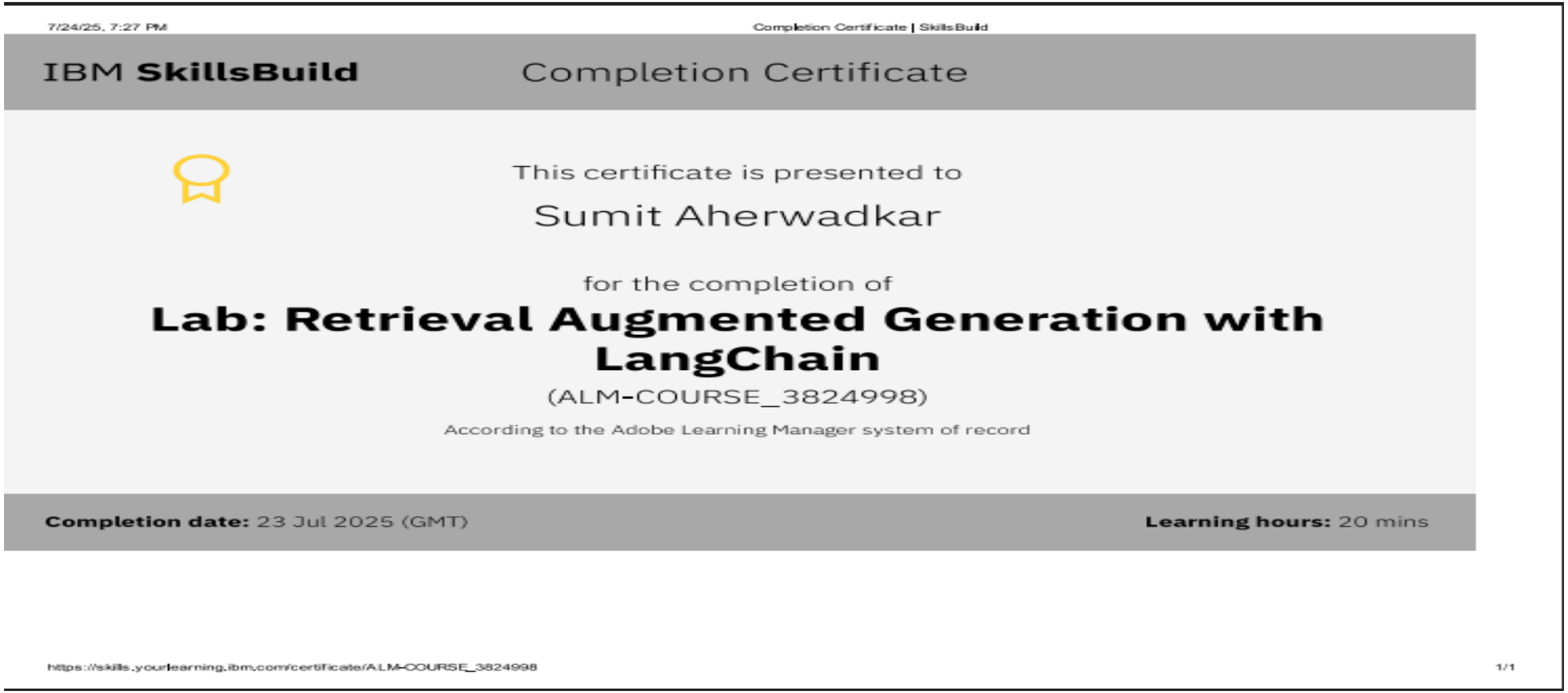

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