CAPSTONE PROJECT

TRAVEL PLANNER AGENT

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OUTLINE

- **Problem Statement** (Should not include solution)
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

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. This smart assistant transforms complex travel planning into a seamless, enjoyable process.

PROPOSED SOLUTION

- The **Smart Travel Planner Agent**, developed using IBM Cloud (Lite services), is designed to assist users in planning personalized, budget-friendly, and optimized trips by leveraging real-time data, intelligent algorithms, and a conversational AI interface. It dynamically tailors itineraries based on user preferences, local conditions, and current events.
- 1. Data Collection
- **User Input**: Gathers user-specific details such as travel dates, destination preferences, budget, interests (e.g., adventure, nature, culture), and special requirements.
- Real-Time External Data:
  - **Weather APIs** to assess suitable days and locations.
  - **Event APIs** to suggest local events, festivals, or activities.
  - **Flight, hotel, and transport APIs** to fetch cost and availability in real time.
  - **Map and traffic data** to estimate travel times and routes.
- 2. Data Preprocessing
- **Data Cleaning**: Handles missing values, data inconsistencies, and outliers in travel and cost data.
- **Feature Engineering**: Extracts features like weather impact, event crowd levels, travel cost trends, and user ratings to improve recommendation relevance.

- 3. Machine Learning Algorithm
- **Recommendation Engine** :- Uses content-based and collaborative filtering to recommend destinations, accommodations, and activities.
- **Budget Prediction Model** :- Predicts the total cost based on location, travel style, and historical pricing.
- **Optimization Algorithm** :- Suggests the best itinerary by optimizing for time, budget, weather, and interest alignment.
- **Time-Series Forecasting** :- (Optional for future expansion) Predicts hotel/transport pricing trends using ARIMA, SARIMA, or LSTM models.
- 4. Deployment
- **User Interface** :- Developed using **IBM Watson Assistant**, enabling users to interact with the planner via chatbot using natural language.
- **IBM Cloud Services** :-
  - **Cloud Functions**: For executing logic such as fetching recommendations or calculating budgets.
  - **Cloud Object Storage**: For saving user preferences and past plans.
  - Scalable deployment ensures accessibility across devices with minimal cost using Lite-tier services.

- 5. Evaluation
- User-Centered Evaluation:
  - Collects user satisfaction ratings and feedback after each use.
  - Uses metrics like plan relevance, budget accuracy, and satisfaction score.
- Performance Tuning:
  - Regular updates to ML models and data sources based on real-time feedback to ensure relevance and accuracy.
- 🎯 Result
- The Travel Planner Agent helps users:
- Plan smarter, personalized trips within budget.
- Avoid weather disruptions and crowded or closed events.
- Discover location-relevant opportunities based on preferences.
- Make quick decisions through an AI-driven assistant that eliminates manual searching and comparison.

SYSTEM APPROACH

The **system approach** outlines the complete strategy and methodology for designing, developing, and deploying the Travel Planner Agent. The agent uses a modular, data-driven architecture with AI-powered recommendations and is hosted on IBM Cloud using Lite (free-tier) services for cost-effective scalability.

1. System Requirements

Hardware Requirements :-
Processor: Intel i5 or higher (for local development)
RAM: 8 GB or higher
Storage: Minimum 10 GB free space
Internet: Required for API access and cloud deployment

Software Requirements :-
Operating System: Windows 10/11, or macOS
Python (version 3.8 or above)
IBM Cloud CLI (for deployment)
Jupyter Notebook or any IDE (VS Code, PyCharm)

2. Libraries & Tools Required

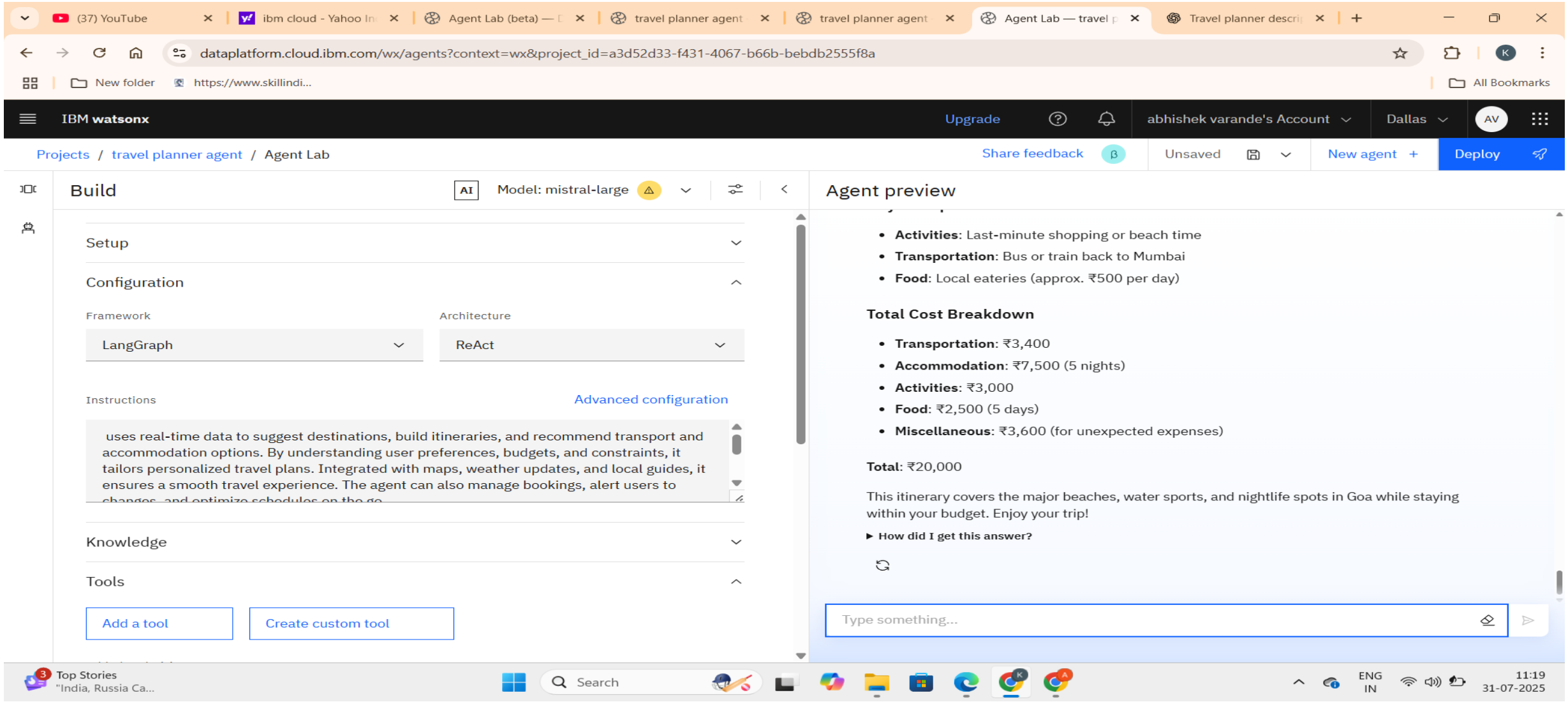
IBM Cloud Services :-

- **IBM Watson Assistant** – Conversational interface
- **IBM Cloud Functions** – Serverless backend logic
- **IBM Cloud Object Storage** – Store user preferences or trip history
- **IBM Weather APIs** (or external weather/event APIs)

ALGORITHM & DEPLOYMENT

- **1. Algorithm Selection:**
  We use an **LSTM (Long Short-Term Memory)** model to predict suitable travel plans based on time-dependent data like weather, events, and user preferences. LSTM is ideal for handling sequences and temporal patterns.**Data Input:**
  - Specify the input features used by the algorithm, such as historical bike rental data, weather conditions, day of the week, and any other relevant factors.
- **2. Data Input:**
- Historical travel trends
- Real-time weather updates
- User budget and preferences
- Dates (weekend/holiday)
- Location-based events
- **3. Training Process:**
  The model is trained on historical data using techniques like **cross-validation** and **hyperparameter tuning** to improve accuracy.
- **4. Prediction Process:**
  The trained model uses real-time inputs to suggest optimized travel plans. It adapts to changes in weather, budget, and events to provide personalized recommendations.

RESULT



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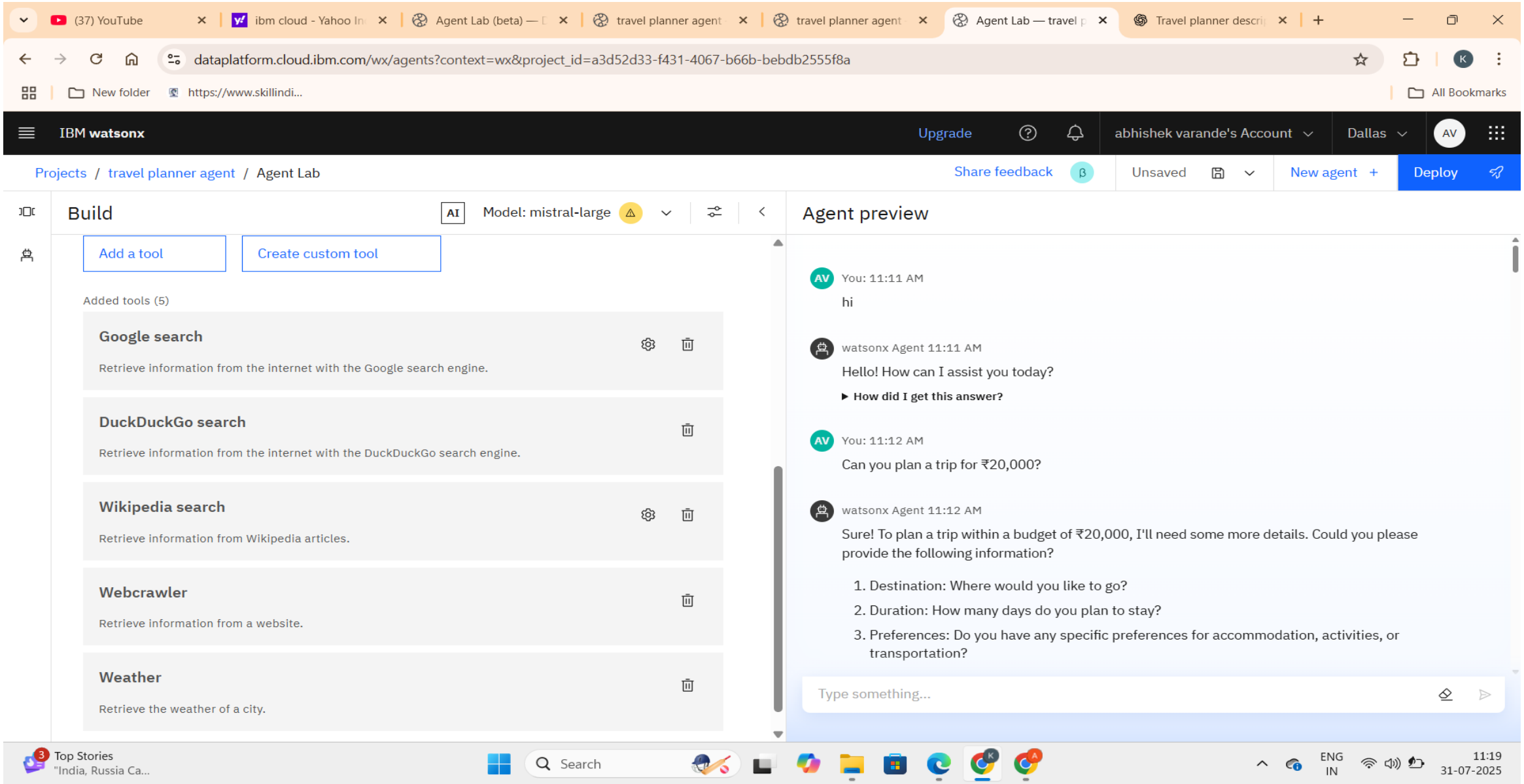

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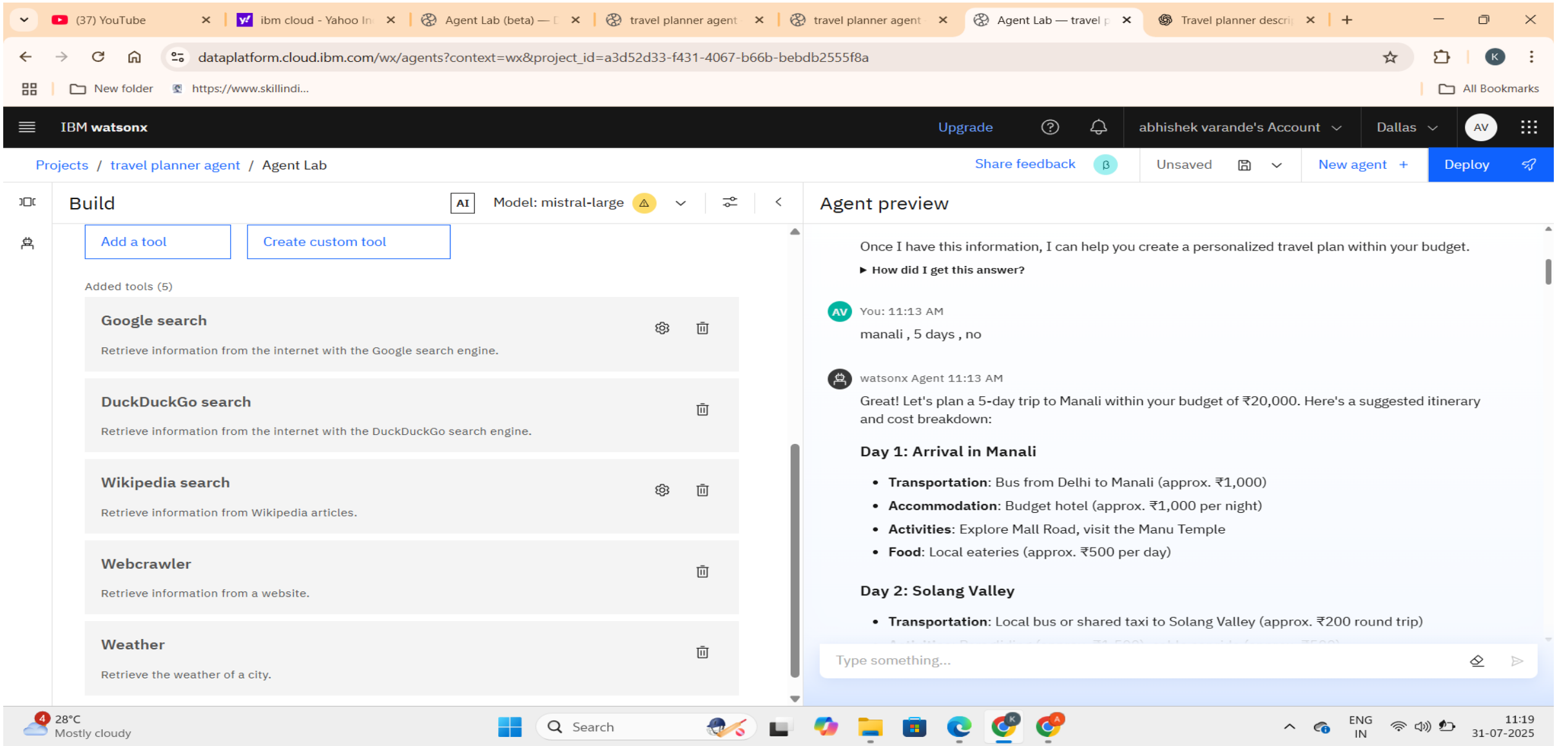

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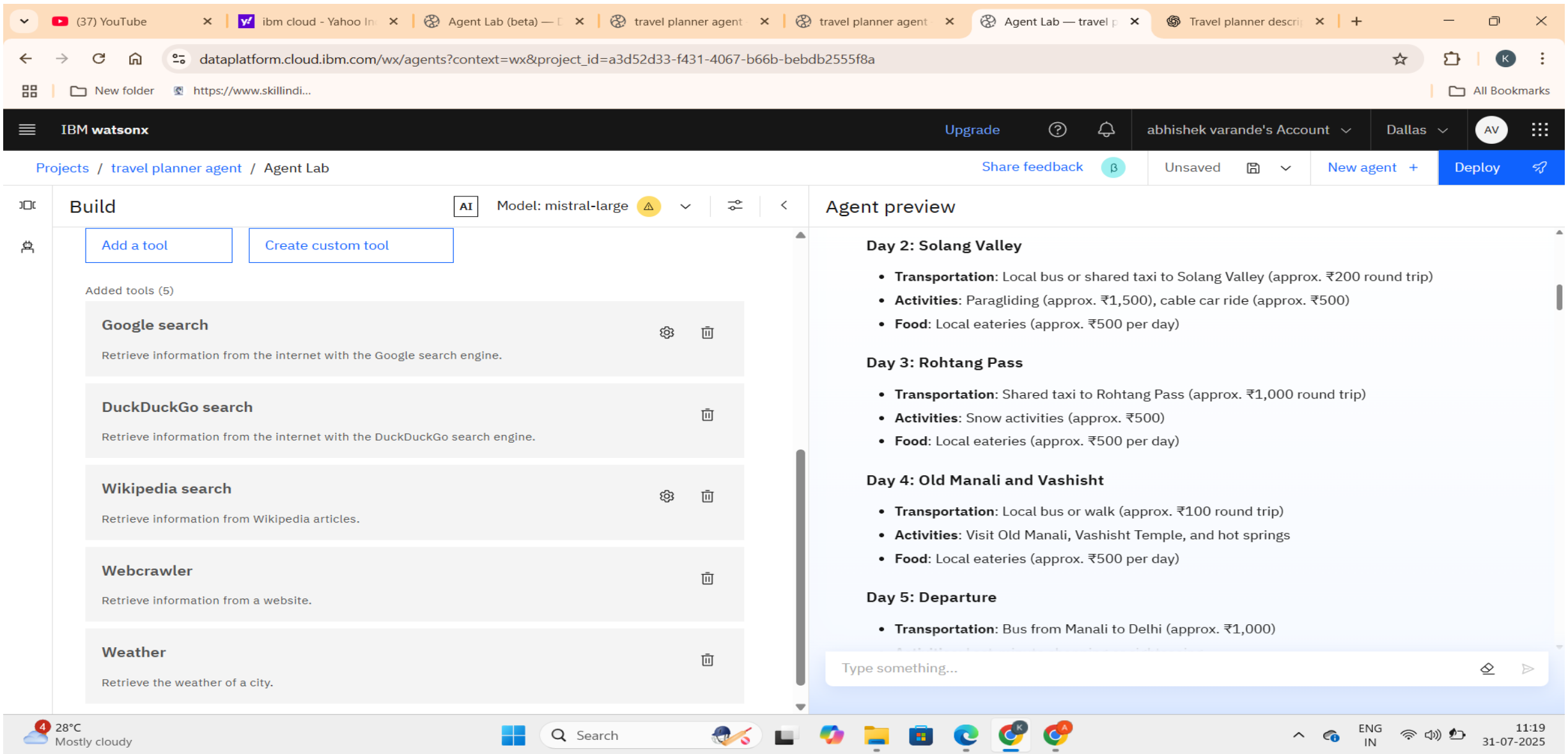

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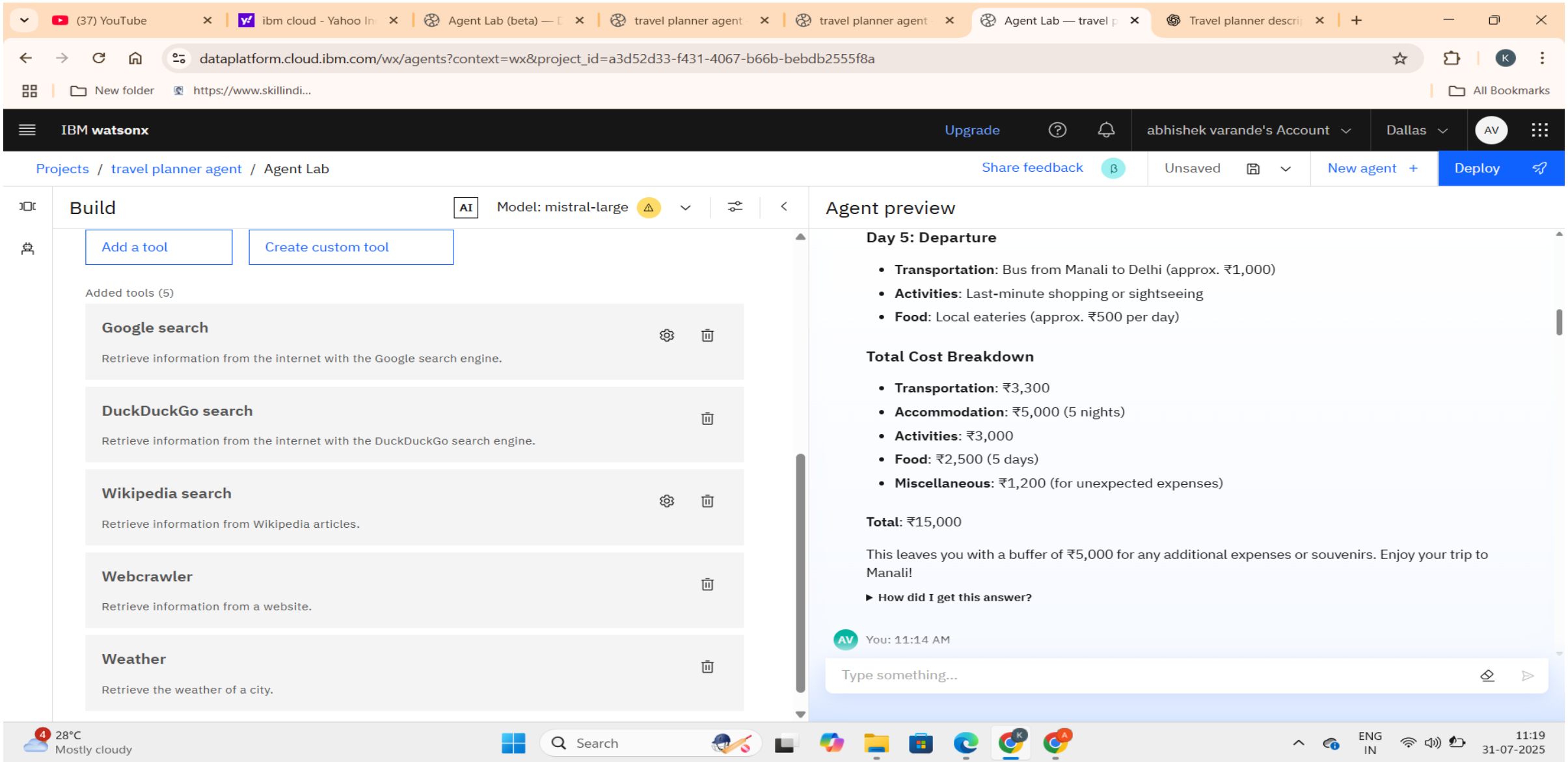

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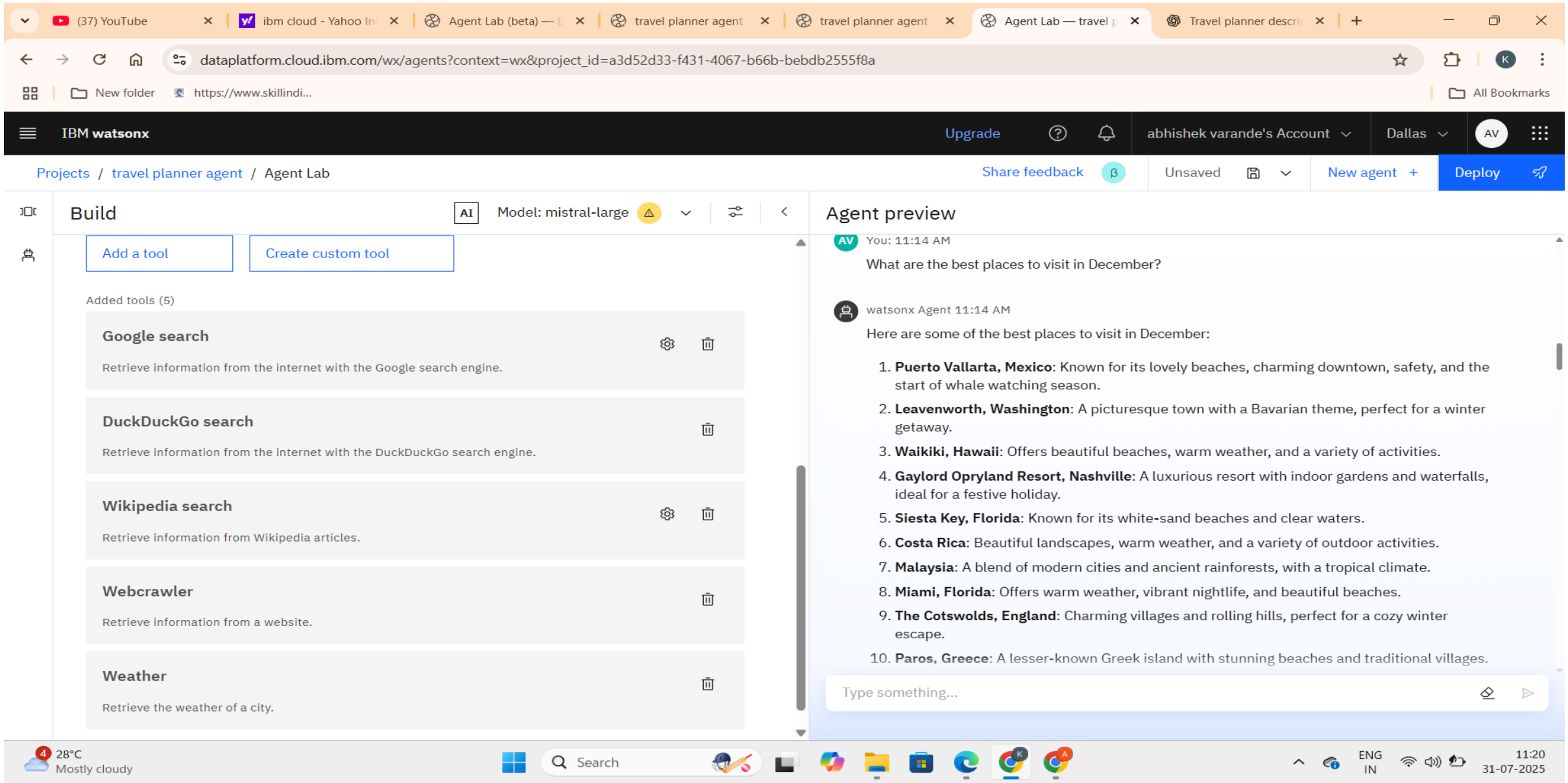

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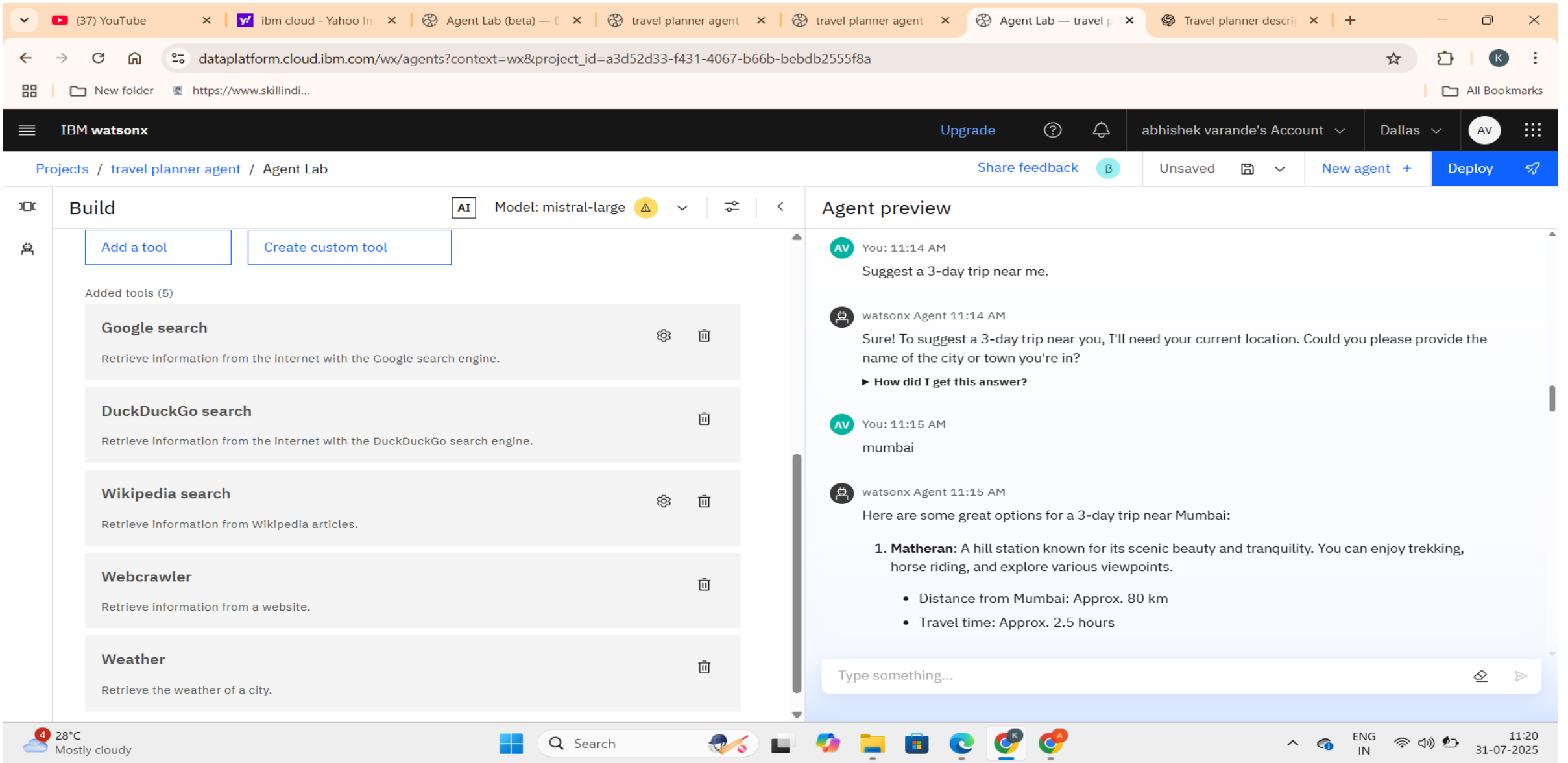

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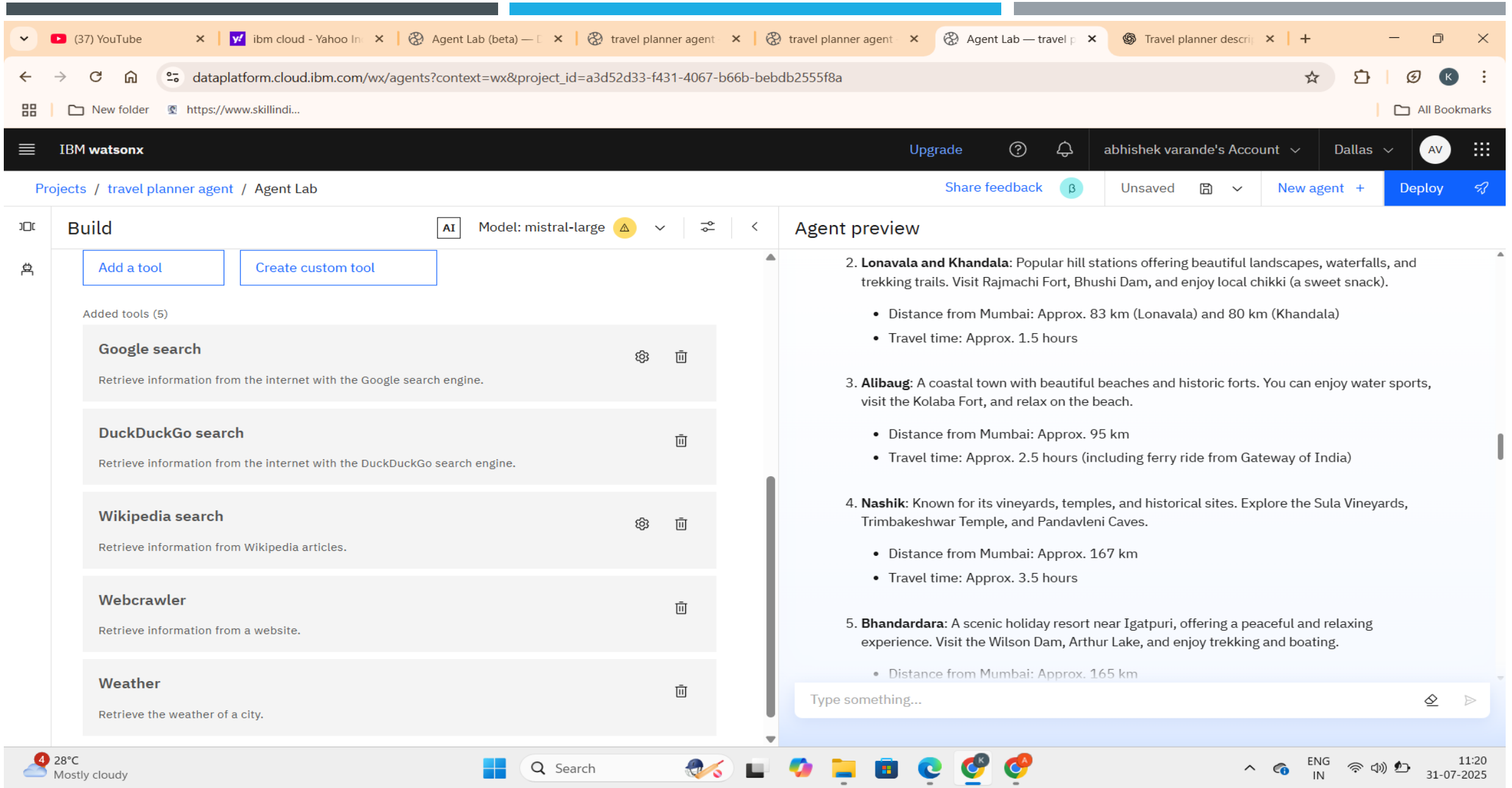

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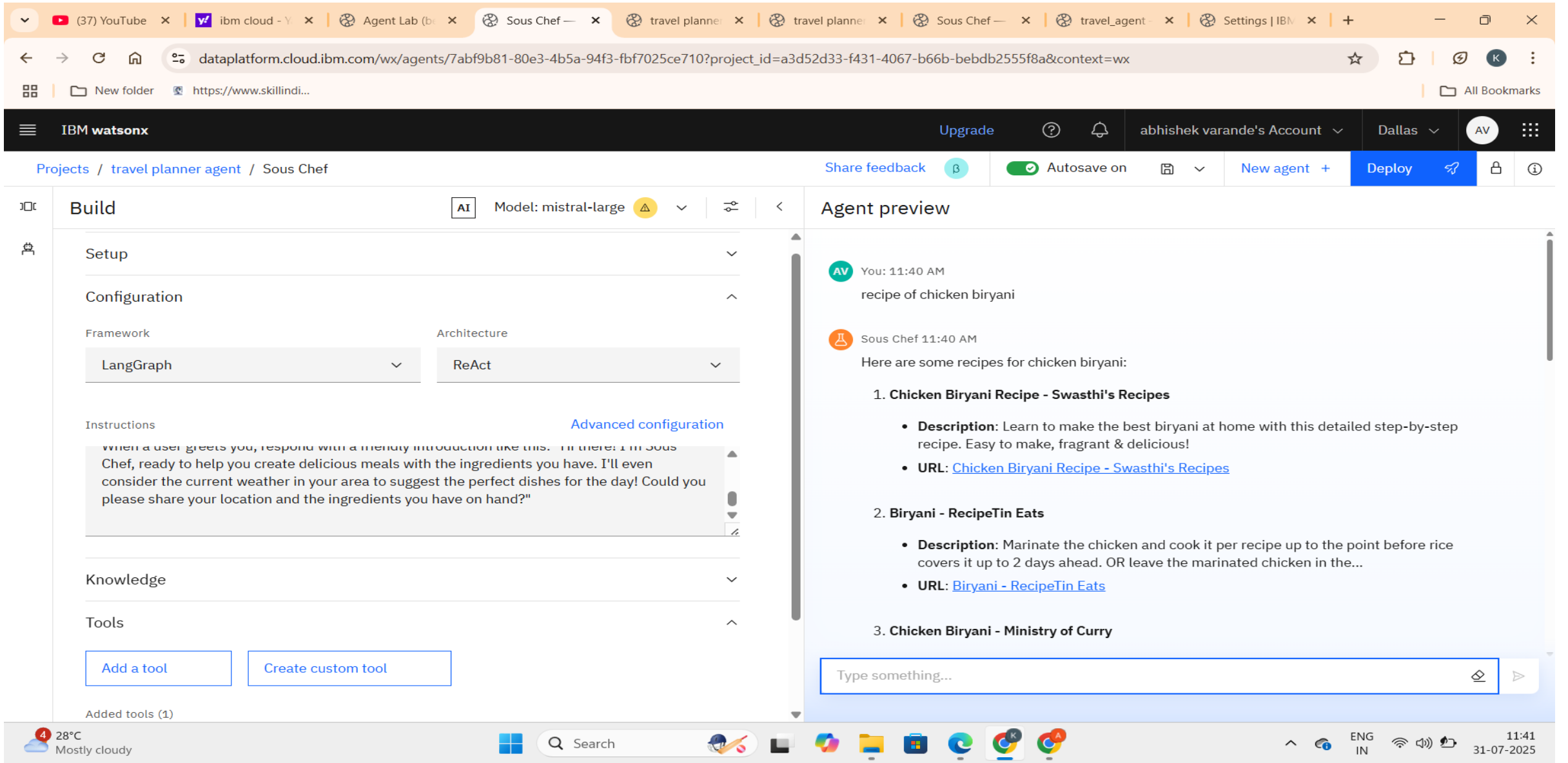

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IBM watsonx | Upgrade | abhishek varande's Account | Dallas | AV

Projects / travel planner agent / Sous Chef | Share feedback | Autosaved 11:41 AM | New agent + | Deploy

Build

AI | Model: mistral-large

Setup

Configuration

Framework: LangGraph

Architecture: ReAct

Instructions | Advanced configuration

When a user greets you, respond with a friendly introduction like this: "Hi there! I'm Sous Chef, ready to help you create delicious meals with the ingredients you have. I'll even consider the current weather in your area to suggest the perfect dishes for the day! Could you please share your location and the ingredients you have on hand?"

Knowledge

Tools

Add a tool | Create custom tool

Added tools (1)

Agent preview

3. **Chicken Biryani - Ministry of Curry**
   - **Description**: Cook on medium heat for 8 to 10 minutes, turning halfway through. Layer and cook Biryani on Dum. Carefully layer the partially cooked rice over...
   - **URL**: Chicken Biryani - Ministry of Curry

4. **Pakistani Chicken Biryani Recipe (The BEST!) - Tea for Turmeric**
   - **Description**: An authentic Chicken Biryani recipe with simple, easy-to-follow instructions (no curveballs!) and mouthwatering, traditional Pakistani and Indian flavor.
   - **URL**: Pakistani Chicken Biryani Recipe (The BEST!) - Tea for Turmeric

5. **Weeknight Chicken Biryani Recipe**
   - **Description**: Ingredients · 1 1/2 cups (150g) long-grain white rice, like basmati · 4 bone-in, skin-on chicken thighs (about 1 1/2 pounds) · 1 teaspoon salt, or more to taste.
   - **URL**: Weeknight Chicken Biryani Recipe

6. **One Pot Chicken Biryani, my easy way of making biryani! : r ...**
   - **Description**: Marinate for 15 mins or more: Chicken thighs (1 lb) in big cubes. Add 1/2

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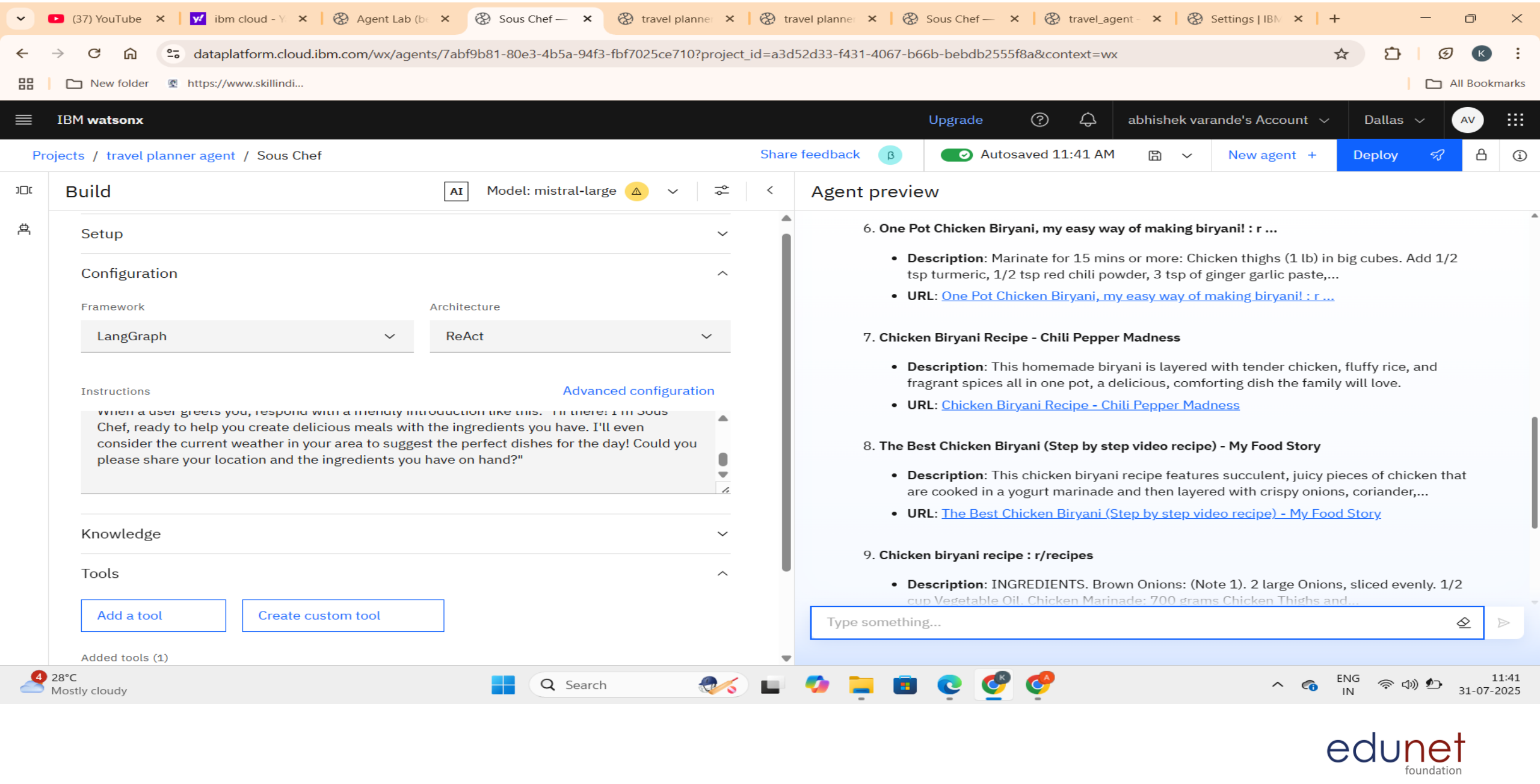

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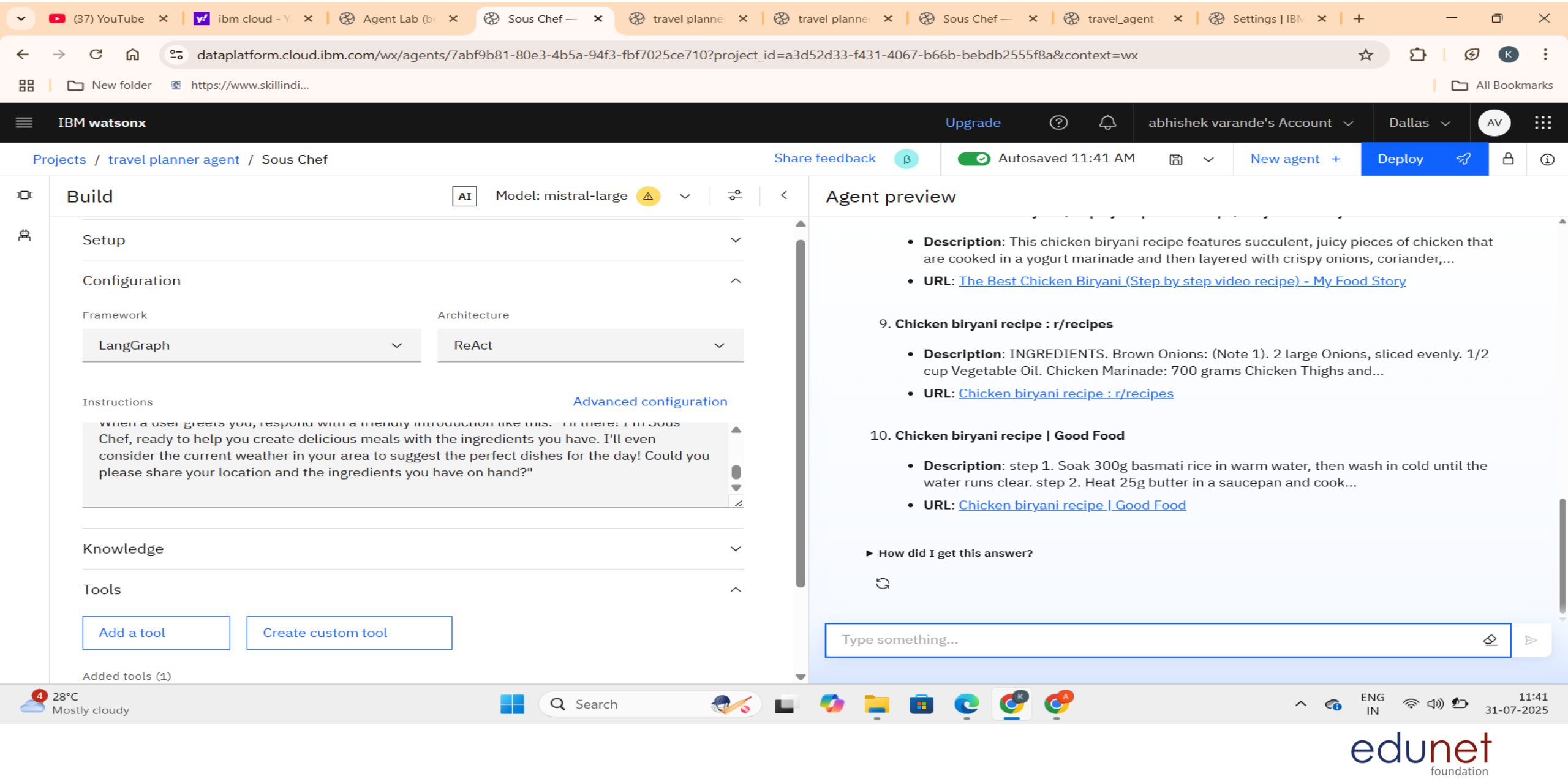

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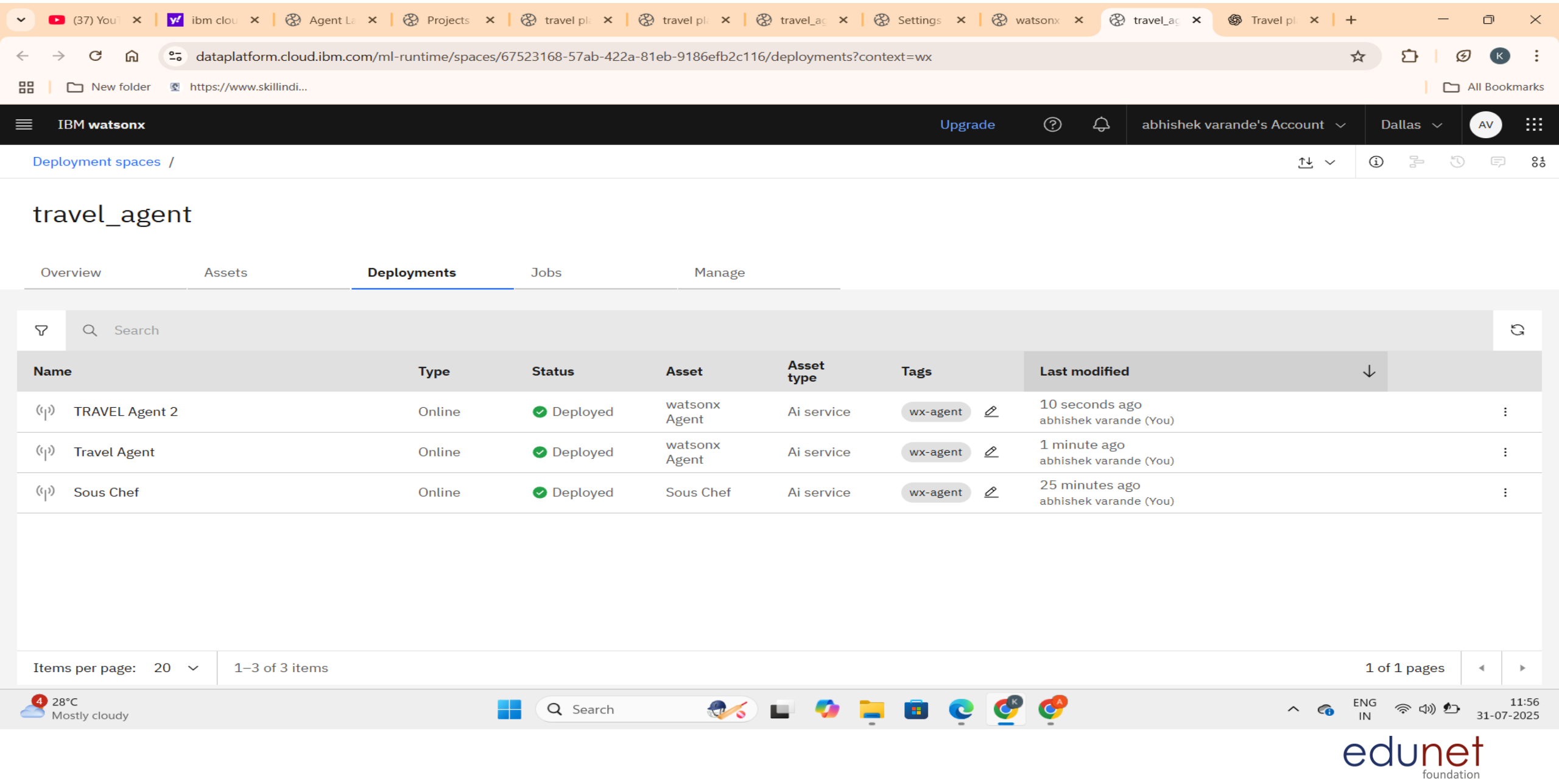

CONCLUSION

- The Travel Planner Agent proves to be a smart and efficient solution for creating personalized travel plans. By combining real-time data and machine learning, it helps users find the best destinations, stay within budget, and adapt to weather or events. While challenges like real-time data integration were encountered, the system remains highly effective. With future enhancements, it can become an even more powerful tool for hassle-free and smart travel planning.

FUTURE SCOPE

- The Travel Planner Agent has strong potential to evolve into a powerful, intelligent travel assistant with several exciting opportunities for growth and innovation:
- **Scalability Across Cities**
  The system can be expanded to support multiple cities or even countries, offering users seamless trip planning no matter where they are. This opens the door to a truly global travel assistant.
- **Integration of Richer Data Sources**
  By incorporating real-time traffic, public transit updates, local events, user preferences, and live weather conditions, the agent can deliver smarter and more customized travel recommendations.
- **Algorithm Optimization for Performance**
  Improving the core recommendation algorithms will ensure faster, more accurate results even under high user loads — essential as the platform grows.
- **Adoption of Emerging Technologies**
  Integrating **edge computing** can bring faster response times by processing data closer to the user. Using **advanced machine learning** and **AI models** (e.g., deep learning, reinforcement learning) will enhance prediction accuracy, route optimization, and user intent understanding.
- **Smarter Personalization**
  Leveraging AI to learn user behavior over time can lead to hyper-personalized travel plans, dynamic budgeting, and real-time adjustments during the trip.

REFERENCES

- **IBM Cloud Documentation**
  IBM Cloud - Product Documentation for Lite Plan Services.

  ▸ Provided official guidance for using Watson Assistant, Cloud Functions, and other free-tier services to build and deploy the travel planner agent.

- **IBM Watson Assistant Documentation**
  Conversational AI powered by Watson.

  ▸ Used to design and implement the chat-based travel planner interface with natural language understanding.

IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Getting Started with Artificial Intelligence
IBM SkillsBuild

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Has successfully satisfied the requirements for:

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IBM **SkillsBuild** Completion Certificate

This certificate is presented to

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According to the Adobe Learning Manager system of record

Completion date: 24 Jul 2025 (GMT) **Learning hours:** 20 mins

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