ECO LIFESTYLE AGENT

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OUTLINE

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PROBLEM STATEMENT

Despite increased environmental consciousness, people frequently find it difficult to form sustainable habits because there is a dearth of easily accessible, tailored, and useful information.
The eco-friendly living resources that are currently available are dispersed, general, or challenging to implement in day-to-day situations. A clever, context-aware solution that can direct users toward sensible green decisions that are suited to their lifestyle and location is obviously needed.

PROPOSED SOLUTION

The proposed system is designed to help people live a more eco-friendly life by giving them smart and personalized tips based on their daily habits and surroundings. The main goal is to make sustainable choices easier and more effective for everyone. The system uses data and AI to suggest actions like reducing plastic use, saving energy, or eco-friendly transport, etc. Here's how the solution is built:

- **Data Collection:**
  - **Publically accessible past information about people's lifestyle, such as their use of plastic, water and transportation, as well as their electricity bills is used.**
  - **Real-time data is also used, like weather (if it's sunny, suggest line-drying clothes), pollution levels, nearby recycling drives, and even local eco rules or events. This helps in giving better, more timely tips.**
- **Data Preprocessing:**
  - **Clean and preprocess the collected data to handle missing values, outliers, and inconsistencies.**
  - **Additionally, it performs feature engineering, which involves turning raw data into actionable data points like "total plastic used per week" or "number of eco-products bought" .**
- **Machine Learning Algorithm:**
  - **Using machine learning models, it can suggest eco-actions based on patterns. For example, if someone consistently uses plastic bags, it can recommend a better alternative.**
  - **Models can be simple recommendation engines or more advanced like classification or even natural language models if needed.**

- **Deployment:**
  - **I have built an interface where people can ask questions like "How to save water in summer?" or “How can I reduce plastic use at home?".**
  - **It’s made sure to work fast, on all devices, and can handle many users. I have kept it simple so even non-techy users can use it easily.**
- **Evaluation:**
  - **It can checked that how good the suggestion are using feedback from some user and technical metrics like accuracy or how many suggestion were followed.**
  - **Also, the model can be improved on the basis of real-world feedback and people are actually changing habits**
- **Result:**

  -- People get small, easy-to-do eco tips that actually fits in their lifestyle.

  -- over time, the agent helps them build greener habits, reduces waste, save energy, and be more aware about their impact on the environment.

SYSTEM APPROACH

The overall strategy and methodology used for developing and implementing the Eco Lifestyle Agent are as follows :

- System requirements

•Access to **IBM Cloud account** with appropriate permissions.

•IBM **WatsonX.ai platform** for building and deploying AI models and agents.

•A reliable internet connection for using cloud-based development and deployment tools.

•Basic hardware (laptop/PC) capable of running a modern web browser to access IBM Cloud console.

•Optionally, integration access to external data sources (like APIs for weather, recycling info, or local eco programs).

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- Libraries Required

Since the Eco Lifestyle Agent is based on IBM WatsonX, the ML libraries are managed by the platform itself.

However, the IBM WatsonX ecosystem makes utilizes the following essential services and libraries **:**

Watson Assistant : for understanding natural language and developing conversational interfaces.

IBM Cloud Object Storage : For serverless workflows and the storage of logs or training data, use IBM Cloud Functions or IBM Cloud Object Storage.

ALGORITHM & DEPLOYMENT

- **Algorithm Selection:**
  - In order to provide personalized eco-friendly recommendations along with understanding natural language queries, rather than relying just on numerical forecasting, the Eco Lifestyle Agent uses a Large Language Model (LLM), specifically Mistral Large 2.Because of its reliable reasoning, multilingual support, and capacity to manage agentic tasks like retrieving external data (such as weather or recycling information), Mistral Large 2 was selected.
- **Data Input:**

  The input features for the model and agent include:

  -> **User queries** (e.g., “How can I save electricity at home?”)

  -> **User context** (location, language preference, device type)

  -> **Real-time data** from sources like:

  - Weather (hot, rainy, etc.)
  - Recycling rules or local events
  - Government eco-schemes (retrieved using search tools like Google or DuckDuckGo)
  - Product databases (for eco-friendly alternatives)

Although not traditional structured features like in ML forecasting, these inputs are dynamically used by the LLM to generate relevant and accurate responses.

Training Process:

Since I used Mistral Large 2 and deployed it through IBM WatsonX, I didn't need to train the model from scratch.

The LLM is already pretrained on a large amount of knowledge, including topics on sustainability, environmental science, and even coding.

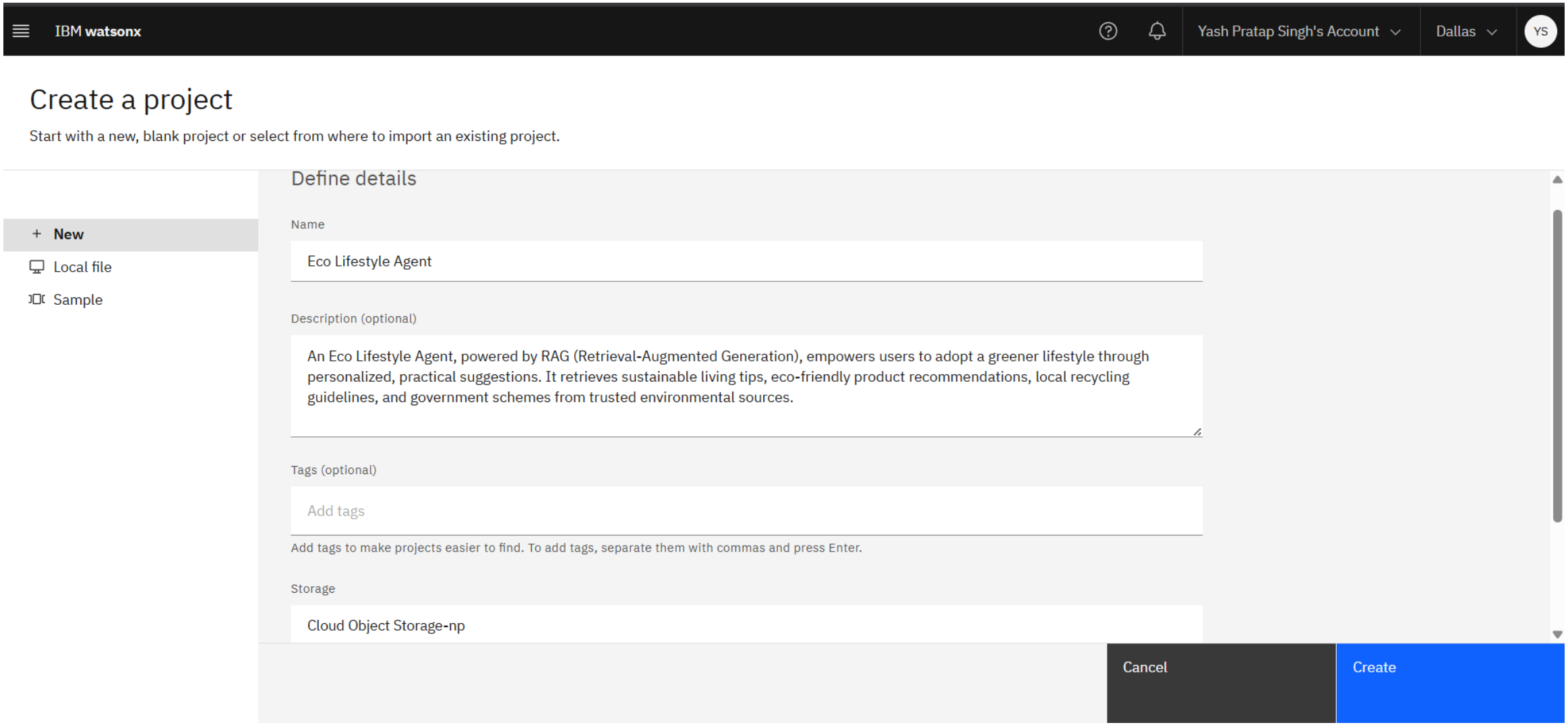
- However, to improve the performance for my specific use case (eco guidance), I used techniques like:
- **Prompt engineering** — Light fine-tuning or prompt engineering is used to better match outputs with recommendations for sustainable living.
- **RAG (Retrieval-Augmented Generation)** — allowing the model to fetch current data from the web and trusted sources.

Prediction Process:

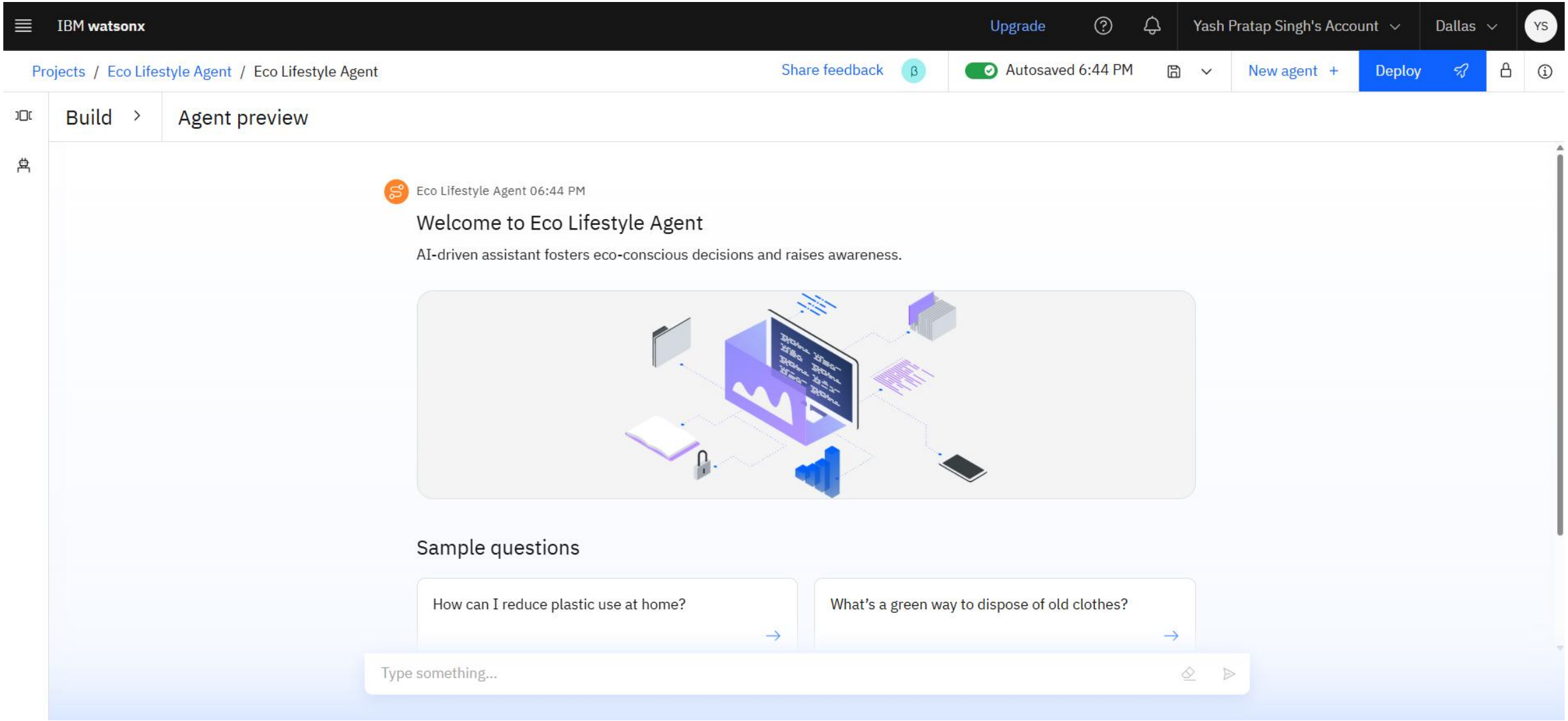
- the agent "predicts" or generates eco-friendly suggestions based on the user's query and external data.
- Here's how it works step-by-step:
  1. User asks a question (e.g., "How can I reduce plastic waste at home?" or "what is the current weather of my city")
  2. The system checks for any needed real-time data (like user location, weather, etc.)
  3. Mistral Large 2 processes the question, uses external tools or search if needed, and then generates a personalized and actionable response
  4. The response may include suggestions, links to weather website or products, government schemes, or nearby places (like recycling centers) .

This way, the agent gives smart, real-time, and easy-to-follow advice for sustainable living.

CREATING AGENT



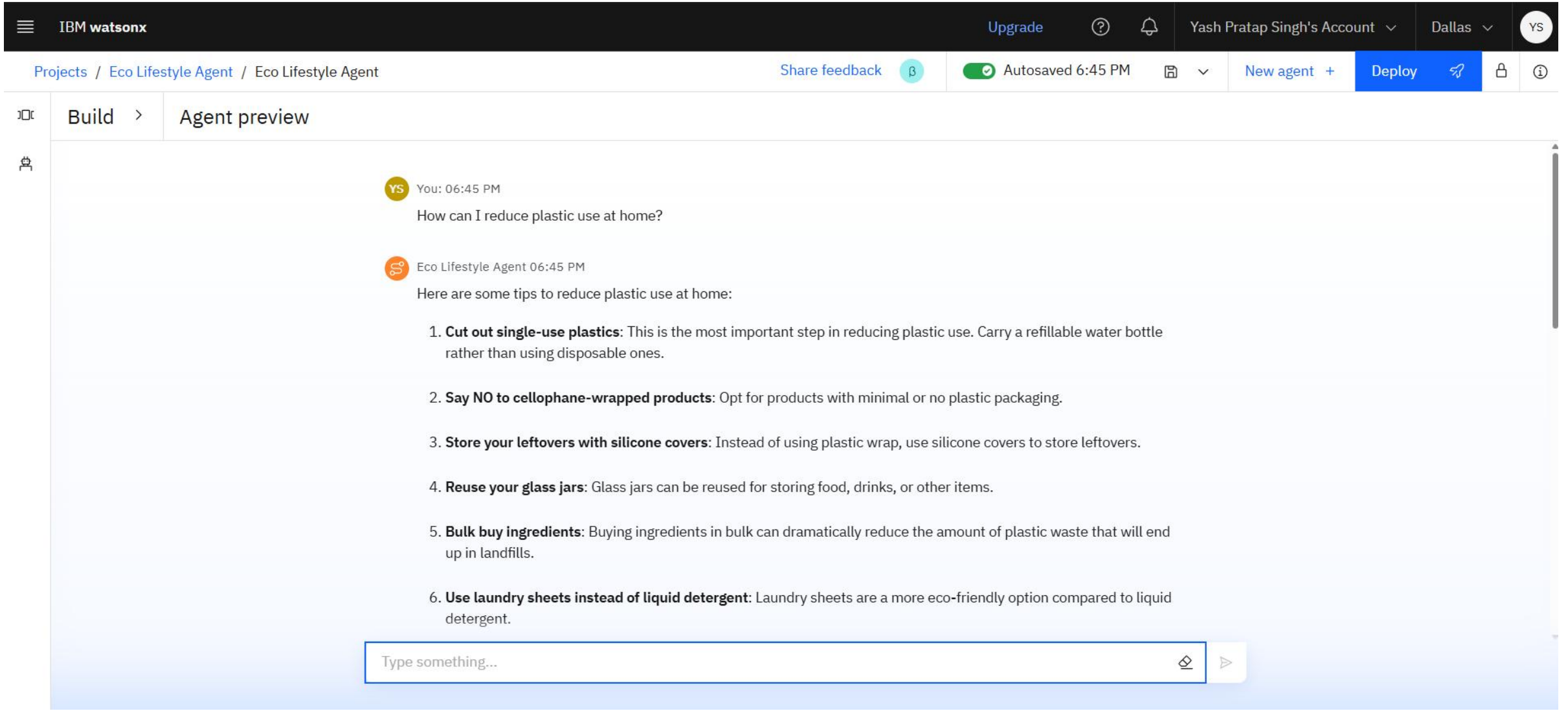
INTERFACE OF ECO LIFESTYLE AGENT (DEPLOYMENT)

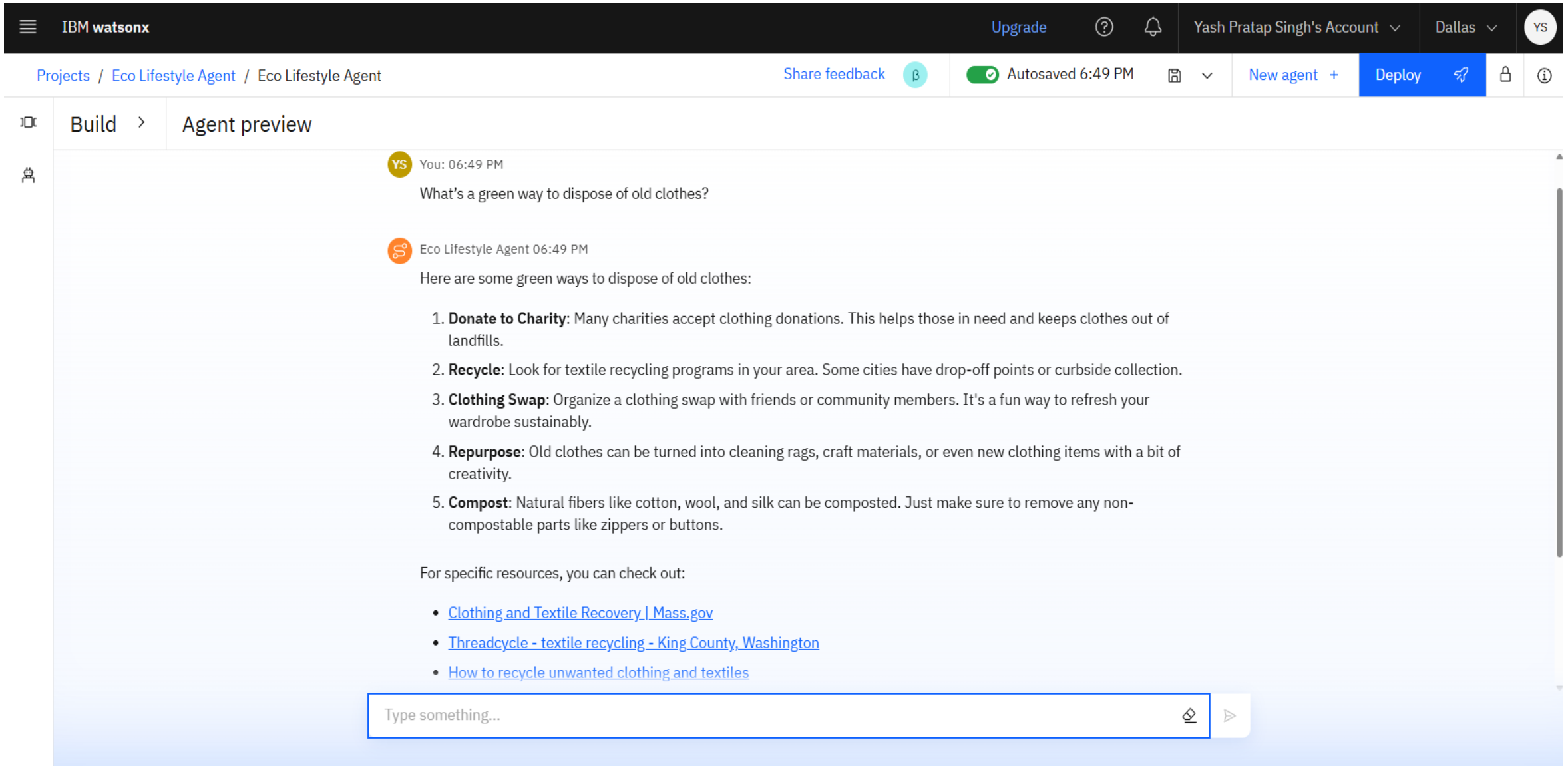


RESULT

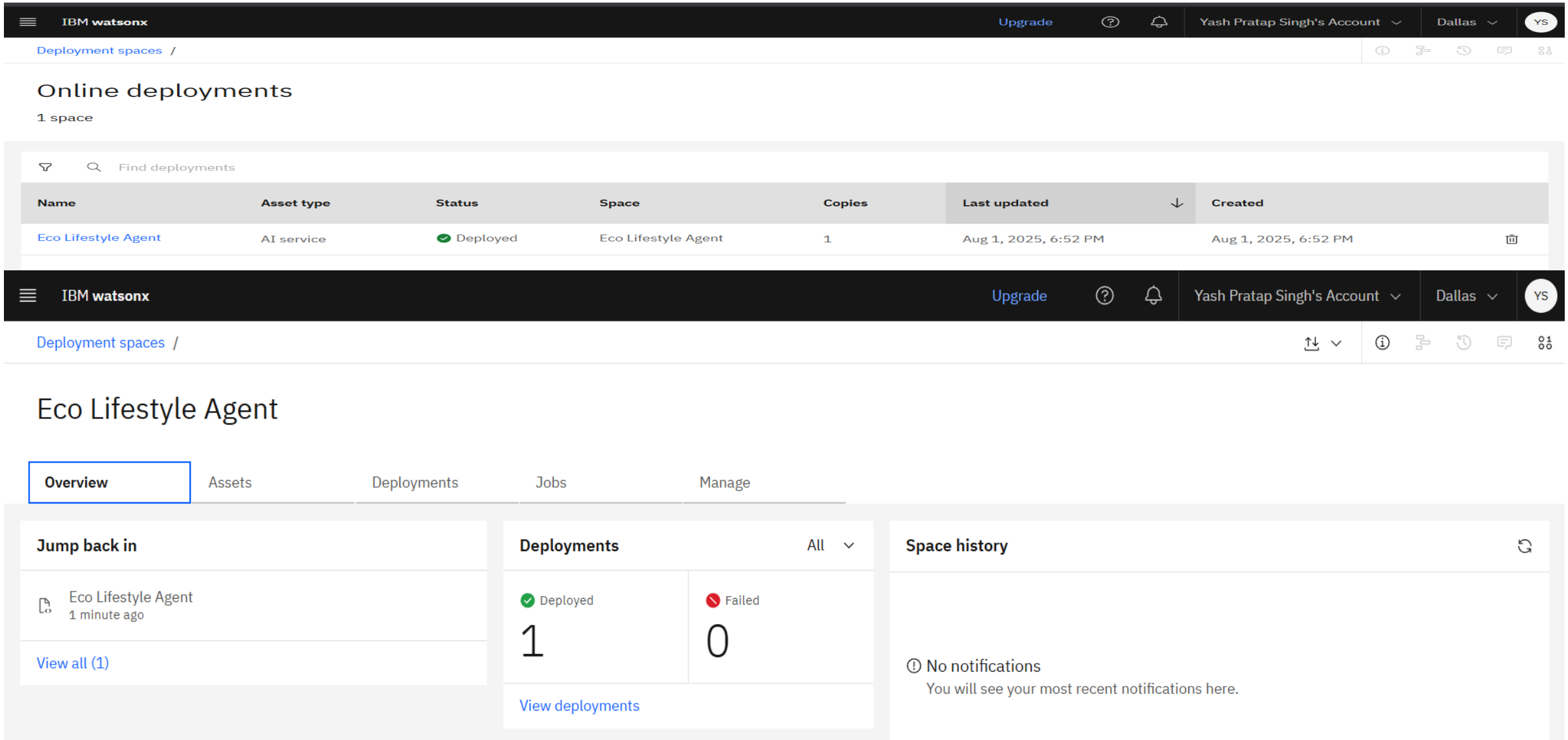
After building the Eco Lifestyle Agent, the system was successfully able to give useful and personalized eco-friendly suggestions to users. It responded well to different types of questions like “**How to reduce plastic use at home**?” or “**How can I compost kitchen waste easily**?”, and gave practical answers based on the user's needs.

QUESTION ASKED BY USER AND ANSWERS GIVEN BY AGENT





ONLINE DEPLOYMENT



CONCLUSION

- In conclusion, the Eco Lifestyle Agent is a smart and helpful tool designed to make sustainable living easier for everyone. By using IBM WatsonX and AI technologies, it gives personalized, real-time suggestions that help people make small but meaningful changes in their daily life. Whether it's reducing plastic use, saving energy, or finding local recycling options, the agent supports users with practical and eco-friendly advice.
- This system not only promotes awareness but also encourages long-term green habits, making it a step forward in building a cleaner and more sustainable future. As technology and data improve, the Eco Lifestyle Agent can grow smarter and even more impactful for both individuals and communities.

FUTURE SCOPE

- Add more live data sources like air quality sensors and smart devices for better, real-time eco tips.
- Support more languages and local data so people everywhere get personalized suggestions.
- Introduce gamification with badges or points to motivate eco-friendly actions.
- Connect with shopping apps to recommend eco-friendly products during online purchases.
- Integrate with government or NGO programs to inform users about subsidies and local recycling schemes.
- Make the AI understand natural conversations better so it feels like chatting with a real person.

REFERENCES

- List and cite relevant sources, research papers, and articles that were instrumental in developing the proposed solution. This could include academic papers on bike demand prediction, machine learning algorithms, and best practices in data preprocessing and model evaluation.

IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Yash Pratap Singh

for the completion of

Getting Started with Artificial Intelligence

(PLAN-E624C2604060)

According to the Your Learning Builder - Plans system of record

Completion date: 20 Jul 2025 (GMT)

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IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

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Journey to Cloud: Envisioning Your Solution

(PLAN-32CB1E21D8B4)

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Completion date: 20 Jul 2025 (GMT)

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IBM CERTIFICATIONS

IBM **SkillsBuild** Completion Certificate

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Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

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

THANK YOU