IBM HACKATHON PROJECT

SMART HOME AI AGENT

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PROBLEM STATEMENT

As energy prices continue to rise and sustainability becomes a global priority, many homeowners struggle to understand and manage their electricity consumption effectively. While smart meters and connected appliances generate vast amounts of energy data, most users find it difficult to interpret this information or take meaningful action based on it. Traditional energy reports are often complex, lacking the clarity and personalization needed for practical decision-making. Consequently, users are left asking questions like, “Why is my electricity bill so high this month?” or “When should I use certain appliances to save money?” There is a clear need for an intelligent solution that not only analyzes energy consumption in real-time but also provides user-friendly recommendations tailored to individual usage patterns. A smart, AI-powered assistant that can interact naturally with users, answer their queries, and guide them toward more efficient energy habits is essential for bridging this gap and promoting more responsible energy usage at home.

TECHNOLOGY USED

- **IBM Cloud Lite Services** – Used for hosting the backend services and integrating APIs securely.

- **IBM Granite AI Model –** Powers the natural language understanding and response generation.

- **Natural Language Processing (NLP)-** Using NLP, the AI can understand the user's intent, extract relevant information from the smart meter data, and generate simple, actionable responses. NLP bridges the gap between technical energy data and non-technical users, making the system accessible, intuitive, and user-friendly

IBM CLOUD SERVICES USED

- IBM Cloud Watsonx AI Studio
- IBM Cloud Watsonx AI runtime
- IBM Cloud Agent Lab
- IBM Granite foundation model

WOW FACTORS

•**Conversational AI that Understands Your Energy Use** – The agent can answer questions like “Why is my bill high?” or “How can I reduce energy usage this week?”.

•**Dynamic Recommendations** – Suggests optimal appliance usage times based on real-time electricity rates.

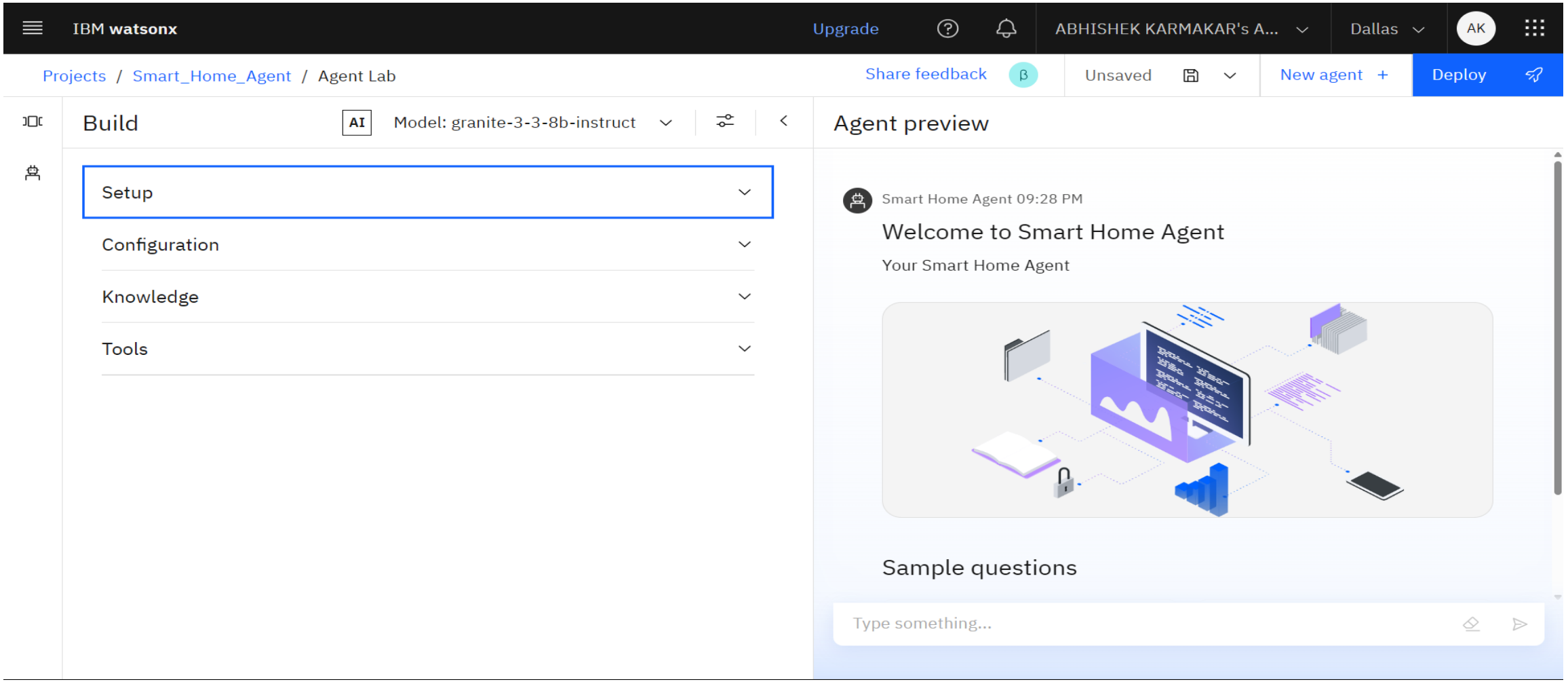
•**Personalization** – Learns from user behavior to tailor advice specific to your household.

•**Environmentally Conscious** – Encourages greener living by highlighting wasteful energy practices.

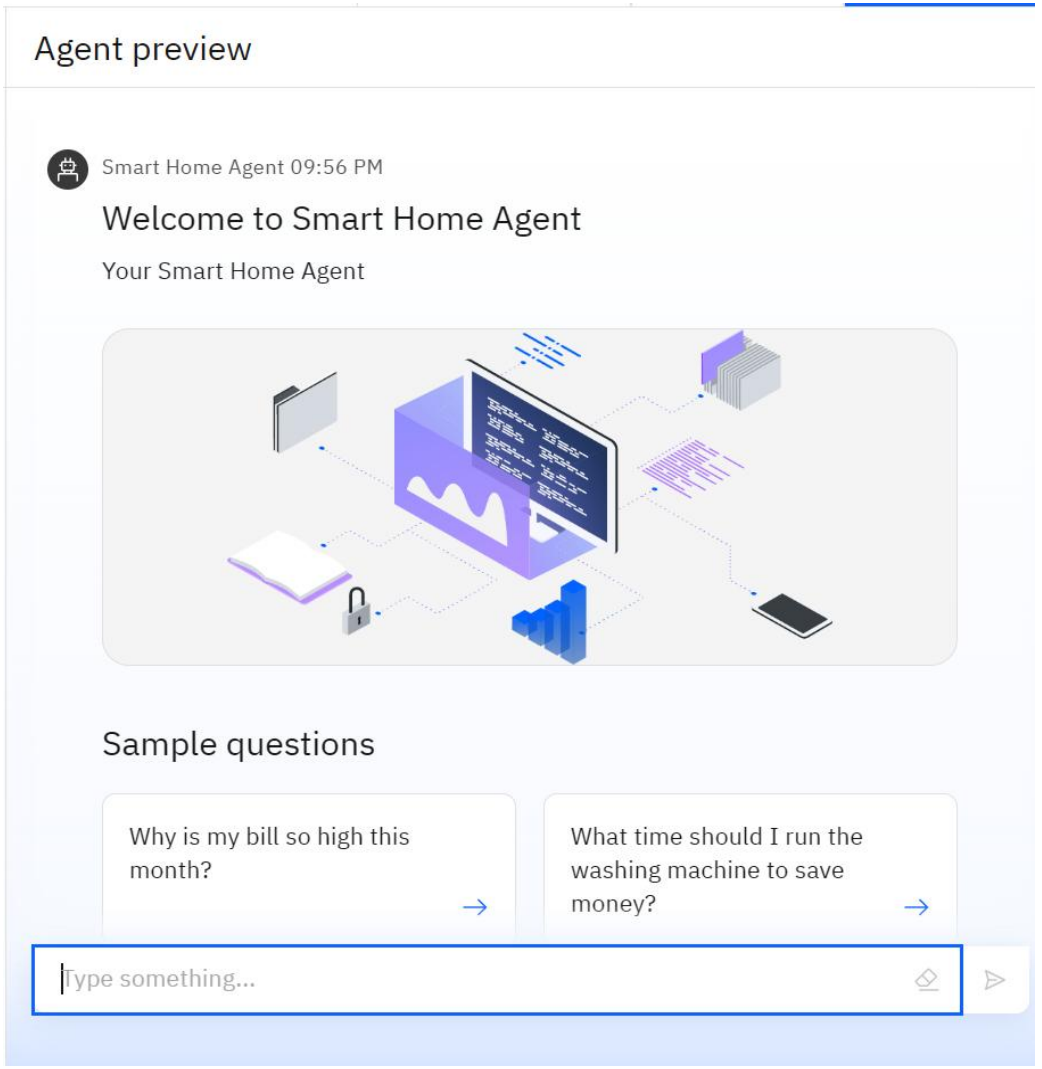
END USERS

- **Homeowners** with smart meters looking to lower electricity bills.
- **Environmentally conscious users** aiming to reduce carbon footprint.
- **Utility companies** wanting to provide added value to customers.
- **Smart home enthusiasts** integrating AI into their daily lives.

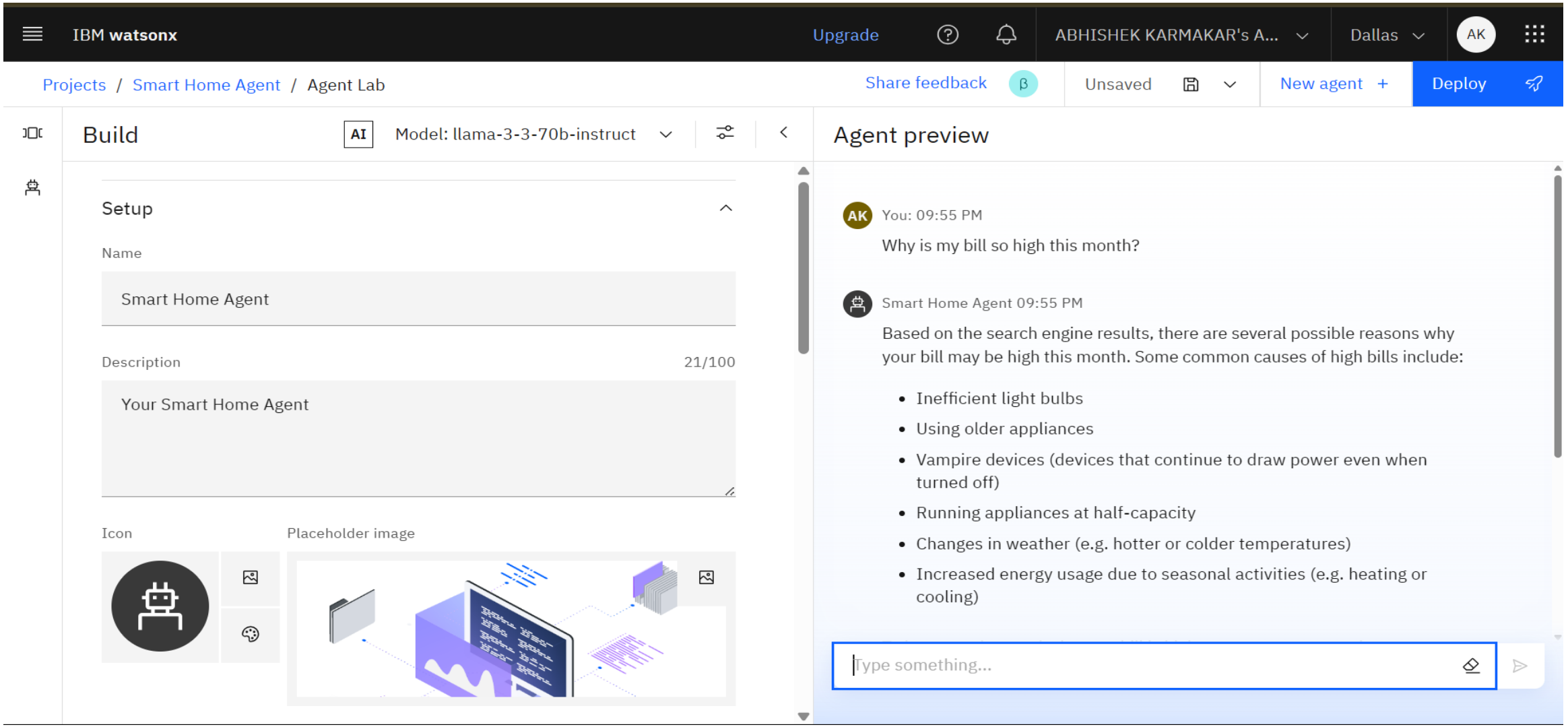
RESULTS



RESULTS

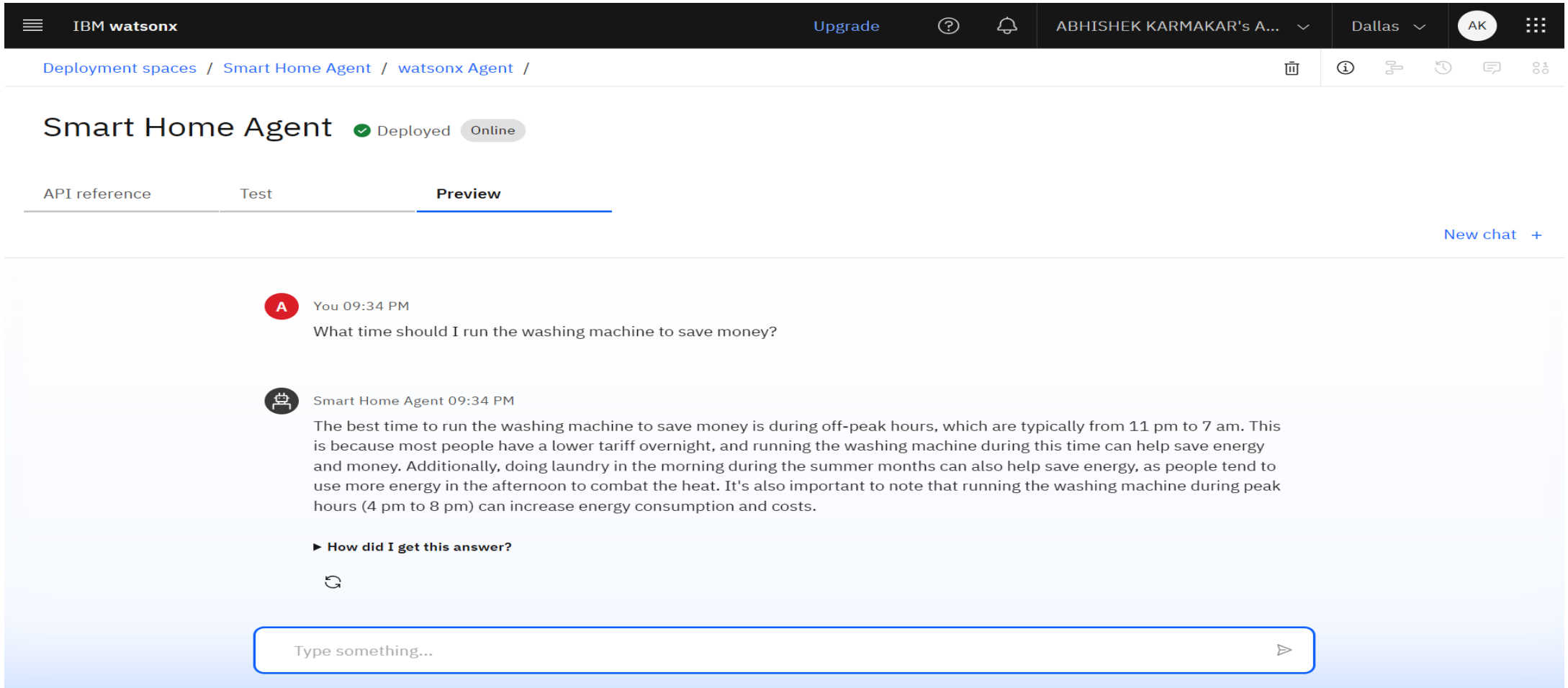

Agent preview
Smart Home Agent 09:56 PM
Welcome to Smart Home Agent
Your Smart Home Agent
Sample questions
Why is my bill so high this month?
What time should I run the washing machine to save money?
Type something...

RESULTS



RESULTS

Deployed AI Agent



CONCLUSION

- The project successfully demonstrates the use of IBM’s AI capabilities to address a real-world challenge. By leveraging cloud technology and natural language AI, the Smart Home Energy Advisor bridges the gap between complex energy data and everyday user understanding

GITHUB LINK

- https://github.com/Abhi1398-glitech/Smart-Home-Agent

FUTURE SCOPE

- **Voice Assistant Integration** (e.g., Alexa, Google Assistant) for hands-free advice.
- **Machine Learning Enhancements** to predict and alert users about potential spikes in usage.
- **Gamification** to encourage users to beat their own energy-saving goals.
- **Community Comparison Metrics** – See how your energy usage compares to similar households.
- **Smart Grid Integration** for real-time electricity pricing and demand-side response.

IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Getting Started with Artificial Intelligence
IBM SkillsBuild
IBM

Abhishek Karmakar

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence

Issued on: Jul 15, 2025
Issued by: IBM SkillsBuild

Verify: https://www.credly.com/badges/c5f5dac4-5147-46af-82ac-8e461d2f9444

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IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Abhishek karmakar

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 23 Jul 2025 (GMT)

Learning hours: 20 mins

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THANK YOU

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