
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

IBM watsonx

Upgrade ? 🔔

ABHISHEK KARMAKAR's A... ▾

Dallas ▾

AK ⋮

Projects / Smart_Home_Agent / Agent Lab

Share feedback β Unsaved 📁 ▾ New agent + Deploy 🚀

Build

AI Model: granite-3-3-8b-instruct ▾ ⚙️ <

Setup ▾

Configuration ▾

Knowledge ▾


Tools ▾

Agent preview

Smart Home Agent 09:28 PM

Welcome to Smart Home Agent

Your Smart Home Agent



Sample questions

Type something... 🗑️ ▶️

RESULTS

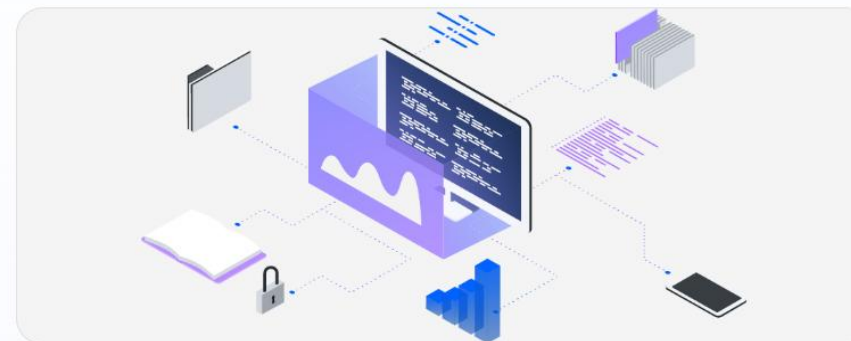
Agent preview



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

IBM watsonx

Upgrade ?

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Projects / Smart Home Agent / Agent Lab

Share feedback β Unsaved New agent + Deploy

Build

AI Model: llama-3-3-70b-instruct

Setup

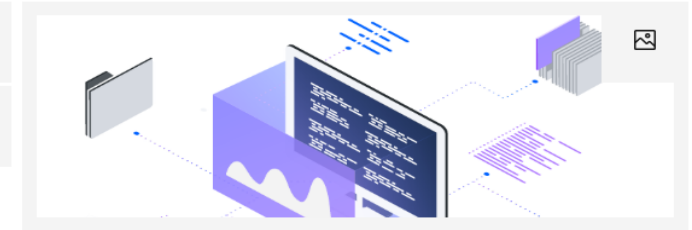


Name

Smart Home Agent

Description 21/100

Your Smart Home Agent

Icon Placeholder image



Agent preview

AK You: 09:55 PM

Why is my bill so high this month?


Smart Home Agent 09:55 PM

Based on the search engine results, there are several possible reasons why your bill may be high this month. Some common causes of high bills include:



- Inefficient light bulbs
- Using older appliances
- Vampire devices (devices that continue to draw power even when turned off)
- Running appliances at half-capacity
- Changes in weather (e.g. hotter or colder temperatures)
- Increased energy usage due to seasonal activities (e.g. heating or cooling)

RESULTS

Deployed AI Agent


 IBM watsonx

Upgrade







 

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Dallas ▾

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[Deployment spaces](#) / [Smart Home Agent](#) / [watsonx Agent](#) /


Smart Home Agent ✓ Deployed Online

[API reference](#) [Test](#) [Preview](#)

[New chat](#) +


 You 09:34 PM


What time should I run the washing machine to save money?

 Smart Home Agent 09:34 PM

The best time to run the washing machine to save money is during off-peak hours, which are typically from 11 pm to 7 am. This is because most people have a lower tariff overnight, and running the washing machine during this time can help save energy and money. Additionally, doing laundry in the morning during the summer months can also help save energy, as people tend to use more energy in the afternoon to combat the heat. It's also important to note that running the washing machine during peak hours (4 pm to 8 pm) can increase energy consumption and costs.

► **How did I get this answer?**





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



Abhishek Karmakar

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



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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



THANK YOU