

CAPSTONE PROJECT

An AI-Powered Assistant for Sustainable Living using RAG and IBM Granite

ECO LIFESTYLE AGENT

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OUTLINE

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PROBLEM STATEMENT

– An Eco Lifestyle Agent, powered by RAG (Retrieval-Augmented Generation), empowers users to adopt a greener lifestyle through personalized, practical suggestions. It retrieves sustainable living tips, eco-friendly product recommendations, local recycling guidelines, and government schemes from trusted environmental sources. Users can ask natural language questions such as “How can I reduce plastic use at home?” or “What are eco-friendly travel options in my city?” and receive instant, actionable guidance. The agent promotes small daily actions with big environmental impact, making sustainability easy and accessible. This AI-driven assistant fosters eco-conscious decisions, raises awareness, and helps build a more sustainable future.

PROPOSED SOLUTION

- We propose the Eco Lifestyle Agent, an AI-powered assistant leveraging Retrieval-Augmented Generation (RAG) and IBM Granite models, that:
 - - Answers natural language queries
 - - Suggests local eco-friendly habits
 - - Recommends green products
 - - Shares government schemes and recycling rules
 - - Empowers small lifestyle changes with big impact

SYSTEM DEVELOPMENT AND APPROACH

Technologies Used:

- IBM Granite Foundation Models
- Watson Discovery / Vector DB
- IBM Cloud Functions
- React/HTML UI

System Components:

- Query Handler
- RAG Engine
- Trusted Knowledge Base
- IBM Cloud Deployment

ALGORITHM & DEPLOYMENT

- Algorithm: Retrieval-Augmented Generation (RAG)

- 1. Input: Natural language query
- 2. Retriever: Queries eco-knowledge base
- 3. Generator: IBM Granite model
- 4. Output: Personalized response

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- Deployment:

- - IBM Cloud Functions
- - Watson Discovery
- - Frontend on IBM Cloud or GitHub

WOW FACTORS

- ☐ **Watsonx Integration**
 - Used **Watsonx Assistant** with **Actions UI** to build a functional AI chatbot — no heavy coding required.
- ☐ **Live Chat Web Integration**
 - Fully deployed via **IBM Web Chat Embed** — assistant is live and usable like a real customer service agent.
- ☐ **OpenAPI + Custom Extensions Ready**
 - Designed to connect with live data via **OpenAPI JSON files** for dynamic eco updates (like recycling tips or solar schemes).
- ☐ **Clean Intent-Actions Architecture**
 - Over **23+ eco-topic actions** built, covering major lifestyle areas: plastic, energy, travel, water, e-waste, etc.
- ☐ **RAG-Style Approach (Optional)**
 - Retrieval-ready setup for future **Retrieval-Augmented Generation**, aligning with Problem Statement 6.
- ☐ **Personalized Eco Tips in Natural Language**
 - Users can type simple questions like “How to save water at home?” and get actionable advice.

END USERS (TARGET AUDIENCE)

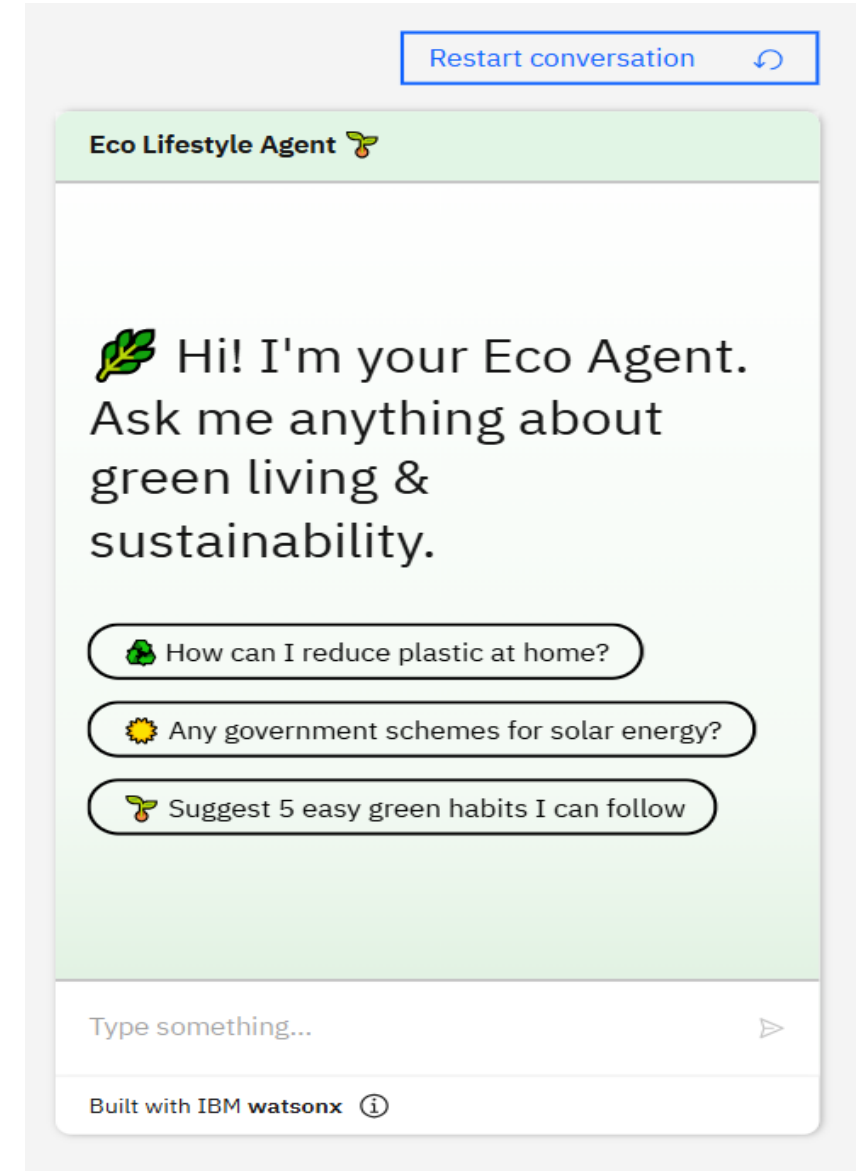
- ☐ **Homeowners**
 - Get personalized suggestions to reduce household waste and energy usage.
- ☐ ☐ **Students / School Clubs**
 - Use it for sustainability projects, climate education, and green habit tracking.
- ☐ **Corporate Employees**
 - As part of corporate green initiatives and sustainable office behavior.
-  **Urban Citizens**
 - Learn about public schemes, waste segregation rules, and local green options.
-  **Families & Parents**
 - Promote eco-habits at home and involve kids in sustainability.
- ☐ **NGOs & Climate Advocacy Groups**
 - Can use and promote the tool for awareness campaigns and behavior nudges.

RESULT

- Successfully answers eco-queries
- Recommends products, tips, and schemes
- Example:

Q: 'Eco-friendly travel in Delhi?'

A: Metro, e-cycle stations, carpool apps, EV subsidies



RESULT

Restart conversation ↺

Eco Lifestyle Agent 🦉

You 9:29 PM

🌿 How can I reduce plastic at home?

9:29 PM

🌿 **Recycling Basics:**

- Separate dry & wet waste
- Rinse plastic containers before binning
- Don't mix e-waste or batteries with regular garbage
- Check your local municipality app/site for exact rules

Type something... ➤

Built with IBM watsonx ⓘ

Restart conversation ↺

Eco Lifestyle Agent 🦉

You 9:22 PM

☀️ Any government schemes for solar energy?

9:22 PM

☀️ Yes! The Indian government offers several schemes to promote solar energy:

- PM-KUSUM: Solar pumps for farmers
- Rooftop Solar Program: 40% residential subsidy
- Solar Park Scheme: For large-scale developers

More at: <https://mnre.gov.in>

Type something... ➤

Built with IBM watsonx ⓘ

Restart conversation ↺

Eco Lifestyle Agent 🦉

You 9:30 PM

🦉 Suggest 5 easy green habits I can follow

9:30 PM

🌿 **Recycling Basics:**

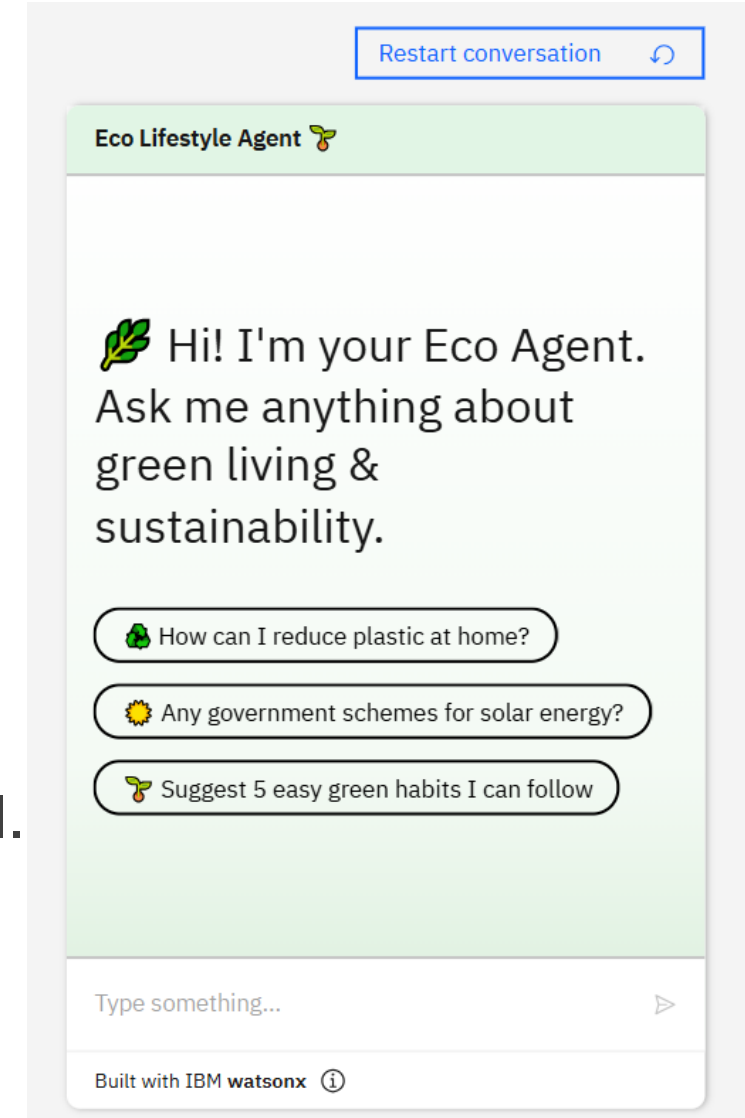
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Type something... ➤

Built with IBM watsonx ⓘ

CONCLUSION

- The Eco Lifestyle Agent empowers users to:
- - Access green guidance easily
- - Discover eco-schemes and products
- - Take small actions for a big impact
- - It makes sustainable living more accessible and practical.



GIT-HUB LINK

Github Repository Link:-

<https://github.com/aryangoyal001/Eco-Lifestyle-Agent>

Github Published Link:-

<https://aryangoyal001.github.io/Eco-Lifestyle-Agent/>

Readme File:-

<https://github.com/aryangoyal001/Eco-Lifestyle-Agent/blob/main/README.md>

REFERENCES

- - cpcb.nic.in (CPCB)
- - moef.gov.in (MoEFCC)
- - UNEP Sustainable Living Toolkit
- - IBM Granite Documentation
- - Watson Discovery Docs

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