
CAPSTONE PROJECT

ECOLIFESTYLE 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



- Problem Statement No.6 – Eco Lifestyle Agent

The Challenge – 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.

Technology – Use of IBM Cloud Lite services / IBM Granite is mandatory

- 🌱 The proposed system
- The system aims to promote sustainable living through an AI-powered Eco Lifestyle Agent. It uses RAG (Retrieval-Augmented Generation) on IBM Cloud to provide personalized eco-friendly tips based on user preferences.
- 📁 Data Collection
- Gather eco-related documents (e.g., sustainability tips, recycling rules, government schemes).
- ✂️ Data Preprocessing
- Format content into question-answer pairs.
- Clean and structure documents for better retrieval.
- 🧠 Machine Intelligence (RAG)
- Use IBM Watsonx Agent with LLaMA model and RAG approach.
- Agent retrieves relevant answers from uploaded documents using context.
- 🚀 Deployment
- Build and deploy entirely on IBM Cloud Lite using watsonx.ai Agent Lab. Provide web-based interface through chat preview or embed.
- 📊 Evaluation
- Test responses for relevance and accuracy. Improve by refining documents and prompt instructions.
- ✅ Result
- Provides tailored suggestions like:
- “How to reduce plastic at home?”
- “What are eco-friendly travel options?”
- “Government eco schemes in India?”

SYSTEM APPROACH

- The system approach section outlines the overall strategy and methodology for developing and deploying the Eco Lifestyle Agent using IBM Cloud and RAG.
-  System Requirements
- IBM Cloud Lite account.
- Access to watsonx.ai Agent Lab.
- RAG-capable foundation model (e.g., LLaMA 3).
- Stable internet connection.
- Word/PDF document with eco-knowledge base (for RAG).
-  Libraries & Services Used
- watsonx.ai Agent Lab (No-code)
- LLaMA 3-70B-instruct (pre-loaded in IBM Agent Lab)
- Built-in Google Search tool (optional for extended retrieval)
- IBM Watsonx Discovery (alternative to file-based RAG)
- File handling (Word/PDF upload)

RESULT

The screenshot displays the IBM Watsonx Agent Lab interface. The top navigation bar includes the IBM Watsonx logo, an 'Upgrade' button, a help icon, a notification bell, and user account information for 'Bhuvana Teja Kotti's Accou...'. The main header shows the project path 'Projects / EcoAgent / Agent Lab' and buttons for 'Share feedback', 'Unsaved', 'New agent +', and 'Deploy'.

The interface is divided into two main sections: 'Build' and 'Agent preview'.

Build Section:

- Configuration:** Shows 'Framework' set to 'LangGraph' and 'Architecture' set to 'ReAct'.
- Instructions:** Contains the text: 'You are an EcoLifeStyle agent. Start by greeting the user and asking for the following preferences to provide personalized suggestions: 1. Location (city or region)'. A link for 'Advanced configuration' is also present.
- Knowledge:** A section for adding knowledge.
- Tools:** Includes buttons for 'Add a tool' and 'Create custom tool'.
- Added tools (4):** Lists 'Google search' (Retrieve information from the internet with the Google search engine.) and 'DuckDuckGo search'.

Agent preview Section:

- User Message:** 'You: 04:41 PM Hi'.
- Agent Response:** 'watsonx Agent 04:41 PM Hello! I'm an EcoLifeStyle agent. To provide you with personalized suggestions, I need to know a few details about your preferences. Could you please tell me: 1. Your location (city or region)? 2. Your lifestyle habits (e.g., diet, energy usage, shopping habits)? 3. Your travel type (e.g., bike, car, public transport)? 4. Your recycling interest or habits? 5. Your budget for eco-friendly changes? Once I have this information, I can give you specific, practical, and eco-friendly suggestions tailored to your needs. ► How did I get this answer?'.
- Input Field:** A text box with the placeholder 'Type something...' and a send button.

The bottom of the image shows a Windows taskbar with various application icons and a system tray displaying the time '16:42' and date '03-08-2025'.

RESULT

The screenshot shows the IBM watsonx Agent Lab interface. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, and user information. The main interface is divided into three sections: 'Build', 'Configuration', and 'Agent preview'. The 'Build' section shows the 'LangGraph' framework and 'ReAct' architecture. The 'Configuration' section contains instructions for the 'EcoLifeStyle' agent, which is designed to provide personalized suggestions based on user preferences. The 'Agent preview' section displays a conversation log where the agent provides eco-friendly tips for reducing electricity usage in Hyderabad, based on a user's input about their location and budget.

IBM watsonx

Projects / EcoAgent / Agent Lab

Share feedback | Unsaved | New agent + | Deploy

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

Configuration

Framework: LangGraph | Architecture: ReAct

Instructions

You are an EcoLifeStyle agent. Start by greeting the user and asking for the following preferences to provide personalized suggestions:

1. Location (city or region)

Knowledge

Tools

Add a tool | Create custom tool

Added tools (4)

Google search

Retrieve information from the internet with the Google search engine.

DuckDuckGo search

Agent preview

suggestions tailored to your needs.

► How did I get this answer?

You: 04:50 PM

Hyderabad. I use a lot of electricity. I usually use a two-wheeler for short trips, I separate dry and wet waste, around 2000 per month.

watsonx Agent 04:50 PM

Based on the search results, here are some eco-friendly tips for reducing electricity usage in Hyderabad, using a two-wheeler for short trips, recycling dry and wet waste, and having a budget of 2000 per month:

1. Reduce electricity usage by using energy-efficient appliances and turning off lights, fans, and other devices when not in use.
2. Consider using solar panels to generate electricity and reduce your reliance on non-renewable energy sources.
3. Use a two-wheeler for short trips to reduce your carbon footprint and save on fuel costs.
4. Separate dry and wet waste and recycle as much as possible to reduce waste sent to landfills.
5. Consider composting food waste to create nutrient-rich soil for your garden.
6. Use public transport or carpool for longer trips to reduce your carbon footprint.
7. Invest in energy-efficient lighting and appliances to reduce your electricity consumption.

Type something...

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IBM watsonx

Projects / EcoAgent / Agent Lab

Share feedback | Unsaved | New agent + | Deploy

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

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Framework: LangGraph | Architecture: ReAct

Instructions

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1. Location (city or region)

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Tools

Add a tool | Create custom tool

Added tools (4)

Google search

Retrieve information from the internet with the Google search engine.

DuckDuckGo search

Agent preview

2. Consider using solar panels to generate electricity and reduce your reliance on non-renewable energy sources.

3. Use a two-wheeler for short trips to reduce your carbon footprint and save on fuel costs.

4. Separate dry and wet waste and recycle as much as possible to reduce waste sent to landfills.

5. Consider composting food waste to create nutrient-rich soil for your garden.

6. Use public transport or carpool for longer trips to reduce your carbon footprint.

7. Invest in energy-efficient lighting and appliances to reduce your electricity consumption.

8. Use a power strip to plug in your electronics and turn them off with one switch to eliminate standby power consumption.

9. Consider using a bike or walking for short trips to reduce your carbon footprint and improve your health.

10. Support local businesses and organizations that promote sustainable practices and reduce waste.

Remember, every small change you make can have a positive impact on the environment, and making eco-friendly choices can also save you money in the long run.

► How did I get this answer?

Type something...

RESULT

dataplatform.cloud.ibm.com/vx/agents?context=wx&project_id=e1dee917-4060-49d2-bf28-5d216549515c

IBM watsonx Upgrade ? Bhuvana Teja Kotti's Accou... Dallas BK

Projects / EcoAgent / Agent Lab Share feedback Unsaved New agent + Deploy

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

Configuration

Framework: LangGraph Architecture: ReAct

Instructions [Advanced configuration](#)

You are an EcoLifeStyle agent. Start by greeting the user and asking for the following preferences to provide personalized suggestions:

1. Location (city or region)

Knowledge

Vector index [Clear chat](#)

Document for EcoLifestyle agent

If you want to add a vector index to the agent, clear the agent preview chat.

Tools

[Add a tool](#) [Create custom tool](#)

Added tools (5)

Agent preview

BK You: 04:58 PM

What are eco-friendly alternatives to plastic products?

watsonx Agent 04:58 PM

Eco-friendly alternatives to plastic products include cloth bags, bamboo toothbrushes, steel containers, beeswax wraps, and reusable cutlery.

► How did I get this answer?

Type something...

dataplatform.cloud.ibm.com/ml-runtime/spaces/62ce5467-8f64-4b25-9a81-aaeb2d0fb2ff/deployments?context=wx

IBM watsonx Upgrade ? Bhuvana Teja Kotti's Accou... Dallas BK

Deployment spaces /

EcoLifestyle_agent

Overview Assets **Deployments** Jobs Manage

Search

Name	Type	Status	Asset	Asset type	Tags	Last modified
watsonx Agent	Online	Deployed	watsonx Agent	AI service	wx-agent	36 seconds ago Bhuvana Teja Kotti (You)

Items per page: 20 1-1 of 1 items 1 of 1 pages

RESULT

Settings - Privacy and Agent Lab (beta) watsonx Agent EcoLifestyleAgent Settings | IBM watsonx WhatsApp

dataplatfom.cloud.ibm.com/ml-runtime/deployments/77042904-8c75-4302-8f34-7810a9ed9a9e/chat?space_id=62ce5467-8f64-4b25-9a8... Verify it's you Error

IBM watsonx Upgrade ? Bhuvana Teja Kotti's Accou... Dallas BK

Deployment spaces / EcoLifestyle_agent / watsonx Agent /

EcoLifestyleAgent Deployed Online

API reference Test **Preview**

New chat +

You 05:40 PM

Location: Pune, India Habits: Use AC regularly, eat vegetarian, shop online often Travel: Use car mostly Recycling: Interested in composting, separates dry/wet waste Budget: ₹1,500 per month

watsonx Agent 05:40 PM

Based on the provided information, here are some personalized eco-friendly suggestions:

- Reduce plastic use:** Start by using cloth bags for grocery shopping, reusable water bottles, and avoiding plastic packaging. You can also switch to bulk buying to reduce packaging waste.
- Eco-friendly travel:** Consider using public transport, carpooling, or opting for electric vehicles. If possible, choose green-certified hotels while traveling.
- Conserve water:** Fix any leaks at home, use low-flow taps, collect rainwater, and turn off taps while brushing or washing.
- Recycling:** Continue separating dry and wet waste, and explore composting options for kitchen waste. Always clean items before recycling.
- Save electricity:** Use LED bulbs, unplug unused electronics, rely on sunlight, and choose 5-star energy appliances to reduce your energy consumption.
- Eco-friendly alternatives:** Explore alternatives to plastic products like cloth bags, bamboo toothbrushes, steel containers, beeswax wraps, and reusable cutlery.

Type something...

About this deployment

Name

EcoLifestyleAgent

Description

EcoLifestyleAgent

Deployment Details

Deployment ID: 77042904-8c75-43...

Serving name: No serving name.

Software specification: runtime-24.1-py3.11

Hardware specification: Extra extra small: 1 CPU and 2 GB RAM

Copies: 1

Tags

wx-agent

Associated asset

watsonx Agent

5c9006f7-17bf-421d-af36-9513406b2b59

Last modified

2 seconds ago

edunet
foundation

RESULT

The screenshot displays the IBM watsonx Agent console interface. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, and user account information for 'Bhuvana Teja Kotti's Accou...'. The breadcrumb trail indicates the current location: 'Deployment spaces / EcoLifestyle_agent / watsonx Agent /'. The main content area features the 'EcoLifestyleAgent' deployment, which is marked as 'Deployed' and 'Online'. Below this, there are tabs for 'API reference', 'Test', and 'Preview', with the 'Preview' tab currently selected. The preview shows a list of 10 eco-friendly suggestions, such as conserving water, recycling, saving electricity, and using sustainable fashion. A 'New chat' button is visible on the right side of the preview area. On the far right, a sidebar titled 'About this deployment' provides detailed information about the deployment, including its name, description, deployment ID, serving name, software specification (runtime-24.1-py3.11), hardware specification (extra extra small: 1 CPU and 2 GB RAM), number of copies (1), tags (wx-agent), associated asset (watsonx Agent), and the last modified time (2 seconds ago).

Deployment spaces / EcoLifestyle_agent / watsonx Agent /

EcoLifestyleAgent

Deployed Online

API reference Test Preview

New chat +

3. Conserve water: Fix any leaks at home, use low-flow taps, collect rainwater, and turn off taps while brushing or washing.

4. **Recycling:** Continue separating dry and wet waste, and explore composting options for kitchen waste. Always clean items before recycling.

5. **Save electricity:** Use LED bulbs, unplug unused electronics, rely on sunlight, and choose 5-star energy appliances to reduce your energy consumption.

6. **Eco-friendly alternatives:** Explore alternatives to plastic products like cloth bags, bamboo toothbrushes, steel containers, beeswax wraps, and reusable cutlery.

7. **Composting:** Use a compost bin to turn kitchen waste into nutrient-rich soil. Add vegetable peels, fruit scraps, eggshells, and coffee grounds, but avoid meat and dairy.

8. **Sustainable fashion:** Adopt sustainable fashion practices by buying fewer clothes, choosing organic or recycled fabrics, and supporting ethical clothing brands.

9. **Reduce food waste:** Plan your meals, store food properly, use leftovers, and compost unusable scraps to minimize food waste.

10. **Government schemes:** Look into government initiatives in India that promote eco-friendly living, such as the Swachh Bharat Mission (cleanliness), FAME India (electric vehicles), UJALA (LED bulbs), and the National Solar Mission.

These suggestions should help you make a positive impact on the environment while staying within your budget of ₹1,500 per month.

► How did I get this answer?

Type something...

About this deployment

Name
EcoLifestyleAgent

Description
EcoLifestyleAgent

Deployment Details
Deployment ID: 77042904-8c75-43...
Serving name:
No serving name.
Software specification:
runtime-24.1-py3.11
Hardware specification:
Extra extra small: 1 CPU and 2 GB RAM
Copies:
1

Tags
wx-agent

Associated asset
watsonx Agent
5c9006f7-17bf-421d-a136-9513406b2b59

Last modified
2 seconds ago

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Deployment spaces / EcoLifestyle_agent / watsonx Agent /

EcoLifestyleAgent

Deployed Online

API reference Test Preview

New chat +

You 06:45 PM

What government schemes in India promote eco-friendly living?

watsonx Agent 06:45 PM

The government schemes in India that promote eco-friendly living include:

1. Green Credit Program (GCP) and the Ecomark Scheme: These schemes aim to promote sustainable lifestyle and environmental conservation by encouraging eco-friendly practices in India.
2. Mission LiFE: This initiative aims to democratize the fight against climate change and promote environmentally friendly practices in India.
3. Eco Clubs for Mission LiFE: This program aims to extend the reach of Mission LiFE's goals to every school, embedding eco-conscious practices into daily life and education.
4. Singapore Green Plan 2030: This plan aims to transform Singapore into a global city of sustainability.
5. Lifestyle for Environment (LiFE): This global initiative aims to fight against climate change and promote environmentally friendly practices.

These schemes and initiatives aim to promote eco-friendly living in India by encouraging sustainable practices, reducing pollution, and

Type something...

About this deployment

Name: EcoLifestyleAgent

Description: EcoLifestyleAgent

Deployment Details

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Serving name: No serving name.

Software specification: runtime-24.1-py3.11

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Tags

wx-agent

Associated asset

watsonx Agent

5c9006f7-17bf-421d-af36-9513406b2b59

Last modified: 2 seconds ago

CONCLUSION

The Eco Lifestyle Agent is a smart AI assistant built using IBM watsonx.ai to promote sustainable and eco-friendly living. Without relying on Granite models, it effectively utilizes open-source models and Retrieval-Augmented Generation (RAG) to provide reliable, real-time answers from trusted sources.

This project proves that impactful AI solutions can be built using lightweight, cost-effective tools on the IBM Cloud Lite platform. By guiding users with personalized suggestions, the agent supports everyday green choices, encouraging an environmentally conscious lifestyle.

It highlights how AI can be leveraged responsibly to drive positive change — even without advanced paid models.

FUTURE SCOPE

Location-Based Personalization

Integrate real-time location data to provide city-specific recycling rules, local eco-events, and nearby green stores.

Mobile App Integration

Develop a cross-platform app using React Native or Flutter to make the agent accessible on the go.

Voice Interaction Support

Enable voice-based queries using speech-to-text APIs for improved accessibility and user engagement.

Analytics Dashboard

Add a dashboard to track user queries and behavior trends to improve future responses and content.

API & Sensor Integration

Connect with IoT devices (like smart meters) to give users feedback on energy or water usage patterns.

Model Upgrade

Migrate to advanced foundation models (like IBM Granite) when available on higher tiers for deeper contextual understanding.

REFERENCES

1. IBM Watsonx.ai Agent Lab

<https://www.ibm.com/products/watsonx/ai>

(Used to build and deploy the AI agent)

2. IBM Cloud Lite

<https://cloud.ibm.com>

(Cloud platform for free-tier AI development)

3. UN Environment Programme (UNEP)

<https://www.unep.org>

(Eco tips, sustainability guidelines)

4. Ministry of Environment, Forest and Climate Change (India)

<https://moef.gov.in>

(Government schemes and sustainability programs)

5. Wikipedia – Sustainable Living

https://en.wikipedia.org/wiki/Sustainable_living

(General background and definitions)

6.. Google Search Tool in Watsonx

(Used as a fallback search tool for real-time answers)

IBM CERTIFICATIONS

- Screenshot/ credly certificate(getting started with AI)



IBM CERTIFICATIONS

- Screenshot/ credly certificate(Journey to Cloud)



IBM CERTIFICATIONS

- Screenshot/ credly certificate(RAG Lab)

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Bhuvana Teja Kotti

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

GITHUB LINK

<https://github.com/Bhuvana16teja/IBMCloud-project>



THANK YOU