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# Eco Lifestyle AI Agent

An intelligent assistant built on IBM watsonx.ai, designed to make sustainable living easy and accessible for everyone. This agent provides personalized, practical, and trusted advice to help users adopt a more eco-friendly lifestyle.

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## Features

The Eco Lifestyle Agent is more than just a chatbot. It's a comprehensive tool to guide your sustainability journey.

- **Personalized Eco Tips:** Get tailored advice based on your specific questions, lifestyle, and location.
  - **Trusted Information Retrieval:** The agent uses a Retrieval-Augmented Generation (RAG) approach, sourcing guidance from a dedicated knowledge base of reputable environmental organizations and governmental policies to provide reliable answers.
  - **Actionable & Practical Suggestions:** Moves beyond generic advice to provide actionable steps, such as recommending specific reusable products or offering step-by-step instructions for home composting.
  - **Local Resource Discovery:** Connects you with nearby recycling centers, eco-friendly businesses, and community green initiatives.
  - **Government Scheme Awareness:** Keeps you updated on relevant government incentives, grants, and schemes that promote sustainable practices.
  - **Dynamic Web Search:** Utilizes tools like **Google Search**, **DuckDuckGo**, and **Wikipedia** to find the most current information available.
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## How It Works

This agent is built using an agentic framework powered by **LangChain** and the meta-llama/llama-3-3-70b-instruct model hosted on **IBM watsonx.ai**.

When a user asks a question, the agent can use a suite of tools to formulate the best possible

answer:

1. **RAG Query:** It first searches a specialized vector index to retrieve trusted, in-depth information.
2. **Web Search:** If the internal knowledge base isn't sufficient, it can query external search engines.
3. **Other Utilities:** It can use other tools like a weather service or a web crawler for more specific data.

This multi-tool approach, orchestrated by LangGraph, ensures that the responses are not only contextually relevant but also grounded in reliable data. The entire application is packaged and deployed as a scalable AI Service on IBM Cloud.

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## Technology Stack

- **Platform:** IBM Cloud & IBM watsonx.ai
  - **AI Orchestration:** LangChain & LangGraph
  - **Foundation Model:** meta-llama/llama-3-3-70b-instruct
  - **Core SDK:** ibm\_watsonx\_ai
  - **Tools:**
    - Retrieval-Augmented Generation (RAG)
    - Google Search
    - DuckDuckGo
    - Wikipedia
    - WebCrawler
    - Weather
  - **Deployment:** IBM watsonx AI Service Deployment
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## Setup and Deployment

To get this agent running in your own IBM Cloud account, follow the steps outlined in the `ECO__LIFESTYLE.ipynb` notebook.

## Prerequisites

- An **IBM Cloud account**.
- An **IBM Cloud API Key**.
- A watsonx.ai **Project** and a **Deployment Space**.

## Deployment Steps

1. **Configure Credentials:** Open the notebook and add your IBM Cloud API key in the designated cell to establish a connection with the `ibm_watsonx_ai` APIClient.
  2. **Set Project and Space IDs:** Update the `source_project_id` and `space_id` variables with your specific IDs from your watsonx environment.
  3. **Run the Notebook:** Execute the cells in the notebook sequentially. The script will:
    - Promote the necessary assets (like the vector index) to your deployment space.
    - Define the agent's logic and tools.
    - Store the agent as a reusable AI Service in the watsonx repository.
    - Deploy the AI Service to your space, making it available via a REST API endpoint.
  4. **Test the Deployment:** Use the final cells in the notebook to send a test query to your newly deployed agent and verify that it's working correctly.
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