

Agentic AI Hackathon: Building Intelligent Agents with IBM Granite and LangFlow

AI-Based Climate Risk Assessment for
Agriculture

Name of the team: Deep Minds

Details of Team members

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Problem statement

AI-Based Climate Risk Assessment for Agriculture

The Challenge

Climate variability significantly affects agricultural productivity through extreme weather events, shifting seasons, and unpredictable rainfall. Farmers and planners often lack tools to interpret climate data in an actionable manner. There is a need for an intelligent assistive system that can analyze climate trends and assess agricultural risk at a local level.

Climate & Crop Data Analysis Agent

An agent that processes historical climate data, seasonal forecasts, and crop calendars.

Climate Risk Detection Agent

An agent that identifies potential climate-related risks such as drought stress, heat waves, or excessive rainfall using trend analysis.

Advisory & Planning Assistant

An agent that provides climate-risk insights and adaptive planning suggestions
(assistive only).

Outcome

Enhances climate resilience planning and supports informed agricultural decision-making.

Mandatory Tech Stack

Lang Flow using IBM Granite Model

Proposed solution

We propose **AgriDoctor**, an Agentic AI system built using **LangFlow + IBM Granite + RAG (Retrieval-Augmented Generation)**.

The system:

- Uses RAG to retrieve relevant information from agricultural documents.
- Embeds and stores knowledge in a vector database (Chroma).
- Employs an AI agent to reason over retrieved data.
- Generates trustworthy, explainable, and farmer-friendly recommendations.
- This ensures that responses are not just AI-generated but grounded in real agricultural knowledge.

Need of project

- To bridge the gap between farmers and scientific agricultural knowledge.
- To provide climate-resilient decision support.
- To reduce dependency on unreliable online information.
- To improve crop productivity and sustainability using AI.

End user of project

- Farmers and agricultural communities
- Agricultural extension officers
- Policy makers
- Researchers and agronomists
- Agri-tech startups

Technology Used

1. IBM Watsonx.ai & Granite Model

IBM Watsonx.ai with the IBM Granite foundation model is used to understand agricultural queries and generate intelligent, climate-based insights and recommendations.

2. LangFlow

LangFlow is used to design and manage the AI workflow by visually connecting components such as language models, agents, and output modules.

3. Multi-Agent Architecture

The system follows a multi-agent approach with specialized AI agents:

Climate Analyst Agent – analyzes climate data and user inputs.

Climate Risk Detector Agent – identifies potential climate and crop-related risks.

Advisory & Planning Agent – provides climate-smart agricultural recommendations.

Novelty and Uniqueness

Combines climate-smart agriculture knowledge with Agentic AI.

Uses RAG to ensure factual, policy-backed responses.

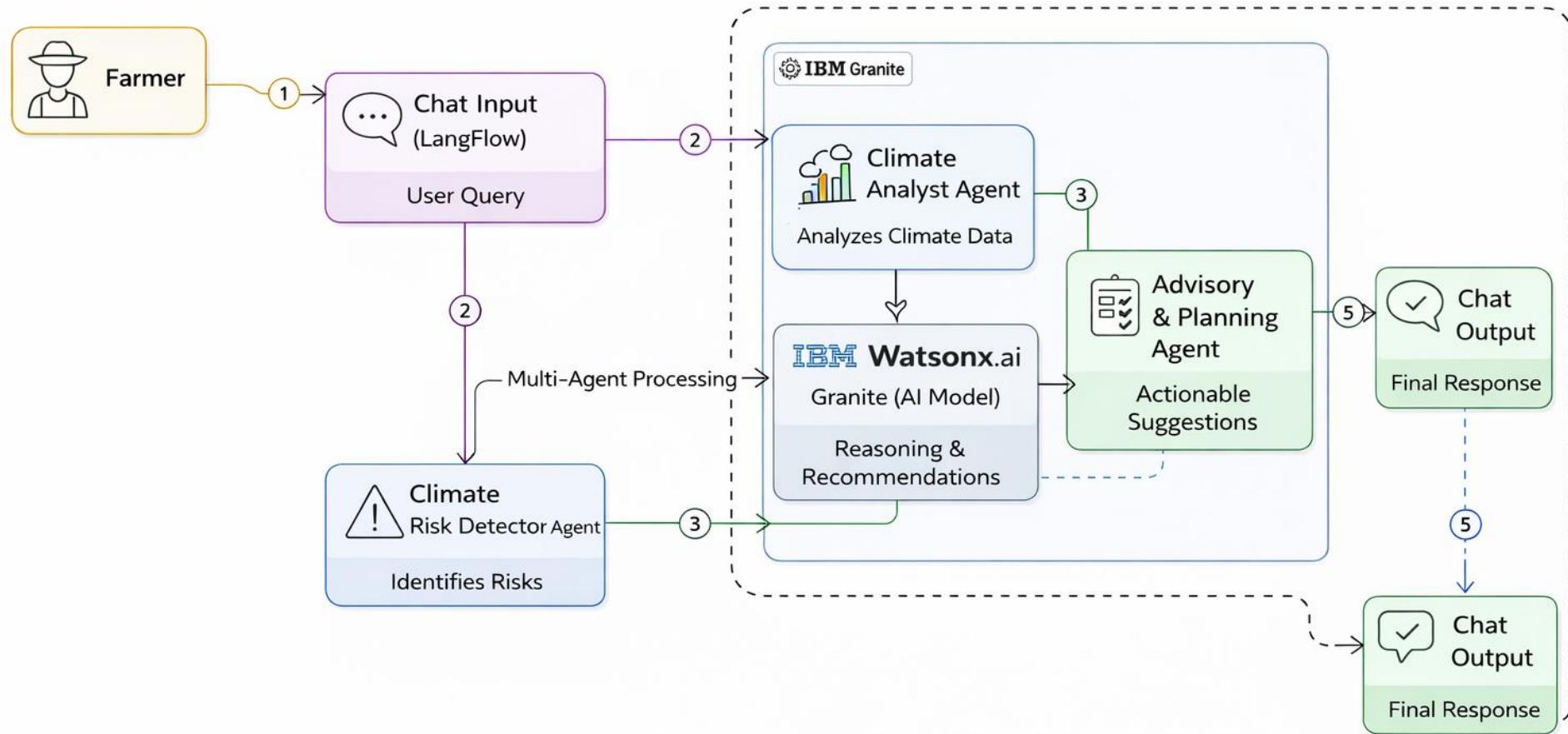
Reduces hallucinations in AI outputs.

Domain-specific AI tailored for agriculture.

Scalable for multiple crops, regions, and languages.

Unlike traditional chatbots, AgriDoctor acts as a **knowledge-grounded agricultural expert**.

Technical flow Diagram - Architecture Blueprint



Langflow component Used

1. User Query

The farmer asks a question related to climate or agriculture.

2. LangFlow Chat Input

The query enters the system through the LangFlow interface.

3. Multi-Agent Processing

The query is processed by specialized AI agents:

Climate Analyst Agent – analyzes climate-related information.

Climate Risk Detector Agent – identifies possible risks.

4. IBM Watsonx.ai (Granite Model)

The Granite AI model reasons over the input and generates intelligent recommendations.

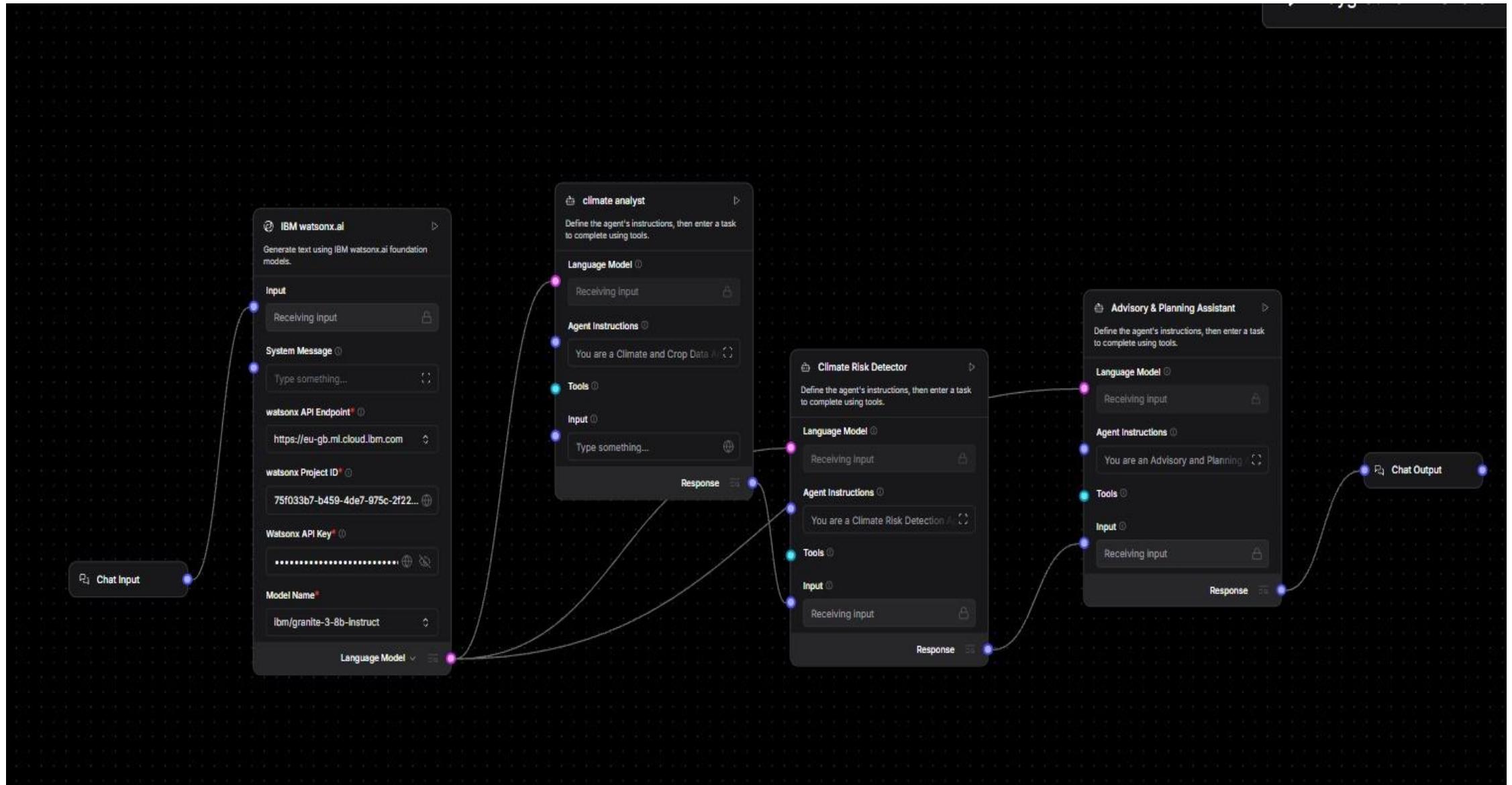
5. Advisory & Planning Agent

The system formulates actionable agricultural suggestions and strategies.

6. Chat Output

The final response is delivered to the user.

Input Screenshot



Future Scope

- Multilingual support for farmers (Kannada, Hindi, etc.)
- Integration with real-time weather APIs
- Mobile app for farmers
- Personalized crop advisory using location data
- Integration with government agricultural portals
- Autonomous AI agents for crop monitoring

Git Hub Link

<https://github.com/chandanabp14/ClimateRiskRag>

References

- FAO Climate-Smart Agriculture Guidelines
- Government of India Agricultural Policy Documents
- IBM Watsonx Documentation
- LangChain & LangFlow Documentation

Thank You!

Thank you for your time and interest.