
CAPSTONE PROJECT

NUTRITION AI AGENT

Presented By:

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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

- Many people struggle to find personalized and healthy meal plans tailored to their lifestyle.
- Most existing solutions offer generic advice without considering individual needs. This project aims to build a Generative AI-powered Nutrition Agent using IBM Watsonx.
- It takes user input (like name, age, preferences) in JSON format
- The agent generates customized meal plans, starting with breakfast suggestions. It uses the Granite foundation model via Prompt Lab for human-like reasoning.
- The goal is to promote healthy living through intelligent, personalized nutrition guidance.

PROPOSED SOLUTION

The proposed system aims to provide personalized meal plans using IBM Watsonx and Granite foundation models. The solution will consist of the following components:

Data Collection:

- Collect user inputs like name, age, and dietary goals in structured JSON format.
- Optionally include preferences such as vegetarian, diabetic-friendly, or fitness goals.

Data Preprocessing:

- Validate and sanitize the JSON inputs for structure and completeness.
- Convert inputs into natural language prompts suitable for AI interaction.

Generative AI Prompting:

- Use Watsonx Prompt Lab with Granite models to generate personalized meal suggestions.
- Include brief reasoning behind each meal to explain the AI's recommendation.

Deployment:

- Build a simple web form to accept inputs and display AI-generated outputs.
- Optionally deploy on IBM Cloud Lite for scalability and easy access.

SYSTEM APPROACH

- **1. System Requirements**
 - IBM Cloud Lite account with Watsonx access
 - Modern browser
- **2. Required Libraries**
 - IBM Watsonx SDK (API use)
 - JSON (for input/output)
- **3. System Methodology**
 - Collect user inputs (name, age) in JSON format
 - Convert inputs into AI prompts for Granite model
 - Use Watsonx Prompt Lab to generate meal plan
 - Display output via simple web interface

ALGORITHM & DEPLOYMENT

- **Algorithm Selection**
 - No traditional ML used; instead, IBM Granite LLM via Watsonx is chosen.
 - It generates personalized meal plans based on user prompts using generative AI.
- **2. Data Input**
 - Inputs include user name, age, food preferences, and dietary goals (in JSON).
 - These are transformed into natural language prompts for the model.
- **3. Prompt Processing**
 - Prompts are submitted to Watsonx Prompt Lab for reasoning-based responses.
 - Granite model generates meal plans (e.g., breakfast) with brief explanation.
- **4. Deployment**
 - A web form collects inputs and displays AI-generated results instantly.
 - Can be deployed using IBM Cloud Lite or as a local static app.

RESULT

← → ↺ 🏠 🔍 dataplatform.cloud.ibm.com/wx/agents/609b5b4c-eff7-4b0d-9314-92ef84ca075e?project_id=21e97e54-20d3-4240-8a63-c07f3a89adaa&context=wx 📄 ☆ 🛡️ Incognito ⋮

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Projects / Nutrician_agent / watsonx Agent Share feedback β 🟢 Autosaved 2:42 PM 📁 ▾ New agent + Deploy 🔗 ⓘ

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

Configuration ^

Framework Architecture

LangGraph ▾ ReAct ▾

Instructions [Advanced configuration](#)

Your role is to provide personalized, adaptive, and culturally relevant nutrition guidance based on individual user profiles. You should understand user inputs via text, voice, or images, and generate specific, practical, and local recommendations. Respond empathetically, like a real dietician.

Knowledge ▾

Tools ▾

Add a tool Create custom tool

Added tools (4)

Agent preview

YOU: 02:42 PM

22 ,male, Vegetarian, no medical preference, Jaipur, Moderate, Hormonal balance & weight loss, Lactose intolerant, Yoga 4x/week, Feeling bloated, "Suggest a dairy-free veg meal plan

watsonx Agent 02:42 PM

I understand you're looking for a dairy-free vegetarian meal plan to support hormonal balance and weight loss, while considering your location in Jaipur and your moderate activity level. Given your lactose intolerance, I'll ensure the plan avoids dairy products.

Here's a simple 3-day meal plan for you:

Day 1:

- Breakfast:** Moong dal chilla (mung bean pancakes) with mint chutney
- Lunch:** Quinoa salad with mixed vegetables (carrots, bell peppers, tomatoes) and lemon-tahini dressing
- Snack:** Roasted sunflower seeds
- Dinner:** Chickpea curry (chana masala) with whole grain roti

Day 2:

Type something... 🔍 ➤

RESULT

← → ↺ 🏠

datapatform.cloud.ibm.com/wx/agents/609b5b4c-eff7-4b0d-9314-92ef84ca075e?project_id=21e97e54-20d3-4240-8a63-c07f3a89adaa&context=wx

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New agent +

Deploy 🚀

🔒 ⓘ

Build

AI

Model: granite-3-3-8b-instruct ▾

🔗

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Setup

Configuration

Framework

LangGraph ▾

Architecture

ReAct ▾

Instructions

Advanced configuration

Your role is to provide personalized, adaptive, and culturally relevant nutrition guidance based on individual user profiles. You should understand user inputs via text, voice, or images, and generate specific, practical, and local recommendations. Respond empathetically, like a real dietician.

Knowledge

Tools

Add a tool

Create custom tool

Added tools (4)

Agent preview

Day 2:

- **Breakfast:** Oats upma (savory oats porridge) with peas and carrots
- **Lunch:** Moong dal soup with whole grain bread
- **Snack:** Sliced apple with almond butter
- **Dinner:** Palak paneer (spinach and tofu) substituting paneer with firm tofu, served with brown rice

Day 3:

- **Breakfast:** Besan (chickpea flour) pancakes with sliced tomatoes and onions
- **Lunch:** Lentil and vegetable stew with quinoa
- **Snack:** Mixed nuts and seeds
- **Dinner:** Stuffed bell peppers with masoor dal (red lentils) and whole wheat couscous

Remember to drink plenty of water throughout the day. You can also have herbal teas like ginger or fennel tea, which may help with bloating.

Please consult with a healthcare professional or a dietician to ensure this meal plan aligns with your specific nutritional needs and goals. Also, consider incorporating a variety of

Type something... 🔍 ➤

CONCLUSION

- The proposed solution effectively utilizes IBM Watsonx and Granite models to generate personalized meal plans based on user input. The system demonstrates the power of prompt engineering and generative AI in replacing traditional algorithmic approaches. During implementation, challenges included refining prompt formats for better responses and handling diverse user input formats. Future improvements may involve integrating feedback loops and nutrition APIs for enhanced accuracy. Overall, the project highlights the potential of AI agents in delivering dynamic, user-centric health solutions with minimal infrastructure.

FUTURE SCOPE

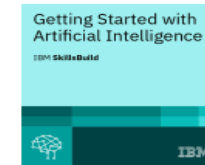
- **Additional Data Sources:** Integrate nutrition databases, fitness APIs, and User feedback to enrich meal planning.
- **Algorithm Optimization:** Fine-tune prompts and explore multi-turn dialogues For deeper personalization.
- **Scalability:** Expand the system to support users across various regions and dietary cultures.
- **Emerging Tech Integration:** Utilize edge AI for local prediction and response without constant cloud reliance.
- **Multi-Modal Input:** Enable image or voice inputs for broader accessibility and user engagement.

REFERENCES

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Learning hours: 20 mins



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