
CAPSTONE PROJECT

SMART-AI NUTRITION ASSISTANT

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OUTLINE

- Problem Statement
- Technology used
- Wow factor
- End users
- Result
- Conclusion
- Git-hub Link
- Future scope
- IBM Certifications

PROBLEM STATEMENT

- In today's fast-paced lifestyle, individuals increasingly seek to improve their health through better eating habits, but most lack access to reliable, personalized, and actionable nutritional guidance. People often struggle to estimate the calorie content and nutritional quality of their meals—especially when dining out, cooking without measurements, or managing specific health goals like weight loss, muscle gain, or diabetes management.
- Traditional tools such as food charts, mobile calorie counters, and online forums are either too generic, inaccurate, or time-consuming to use. These methods also fail to adapt to user-specific goals and do not offer real-time, context-aware suggestions that promote healthy decision-making.
- This project proposes the development of a **Smart AI Nutrition Assistant** powered by IBM Watsonx.ai and Granite foundation models that can analyze user-provided food images and goals to deliver instant, personalized nutrition advice in natural language.

TECHNOLOGY USED

IBM cloud lite services

Natural Language Processing (NLP)

Retrieval Augmented Generation (RAG)

IBM Granite model

IBM CLOUD SERVICES USED

- IBM Cloud Watsonx AI Studio
- IBM Cloud Watsonx AI runtime
- IBM Cloud Agent Lab
- IBM Granite foundation model

WOW FACTORS

- 🧠 **1. Multimodal AI Intelligence**
 - Combines **image recognition** and **natural language understanding** to analyze food visually and textually — mimicking how a human nutritionist would assess a meal.
- 📊 **2. Real-Time Calorie & Nutrition Estimation**
 - Instantly calculates **calories, proteins, carbs, and fats** from an image or user description — no need for manual lookup or portion estimates.
- 🎯 **3. Goal-Based Personalization**
 - Adapts recommendations based on **specific health goals** like weight loss, diabetes, muscle gain, or heart health — making advice more actionable and relevant.
- 🔄 **4. Smart Food Swap Suggestions**
 - Suggests **healthier alternatives** (e.g., brown rice instead of white rice), backed by real nutrition data and explains *why* the swap improves the meal.
- 📅 **5. AI-Generated Meal Plans**
 - Uses LLM agentic reasoning to generate **daily/weekly diet plans** that fit within calorie targets and nutritional preferences — personalized for each user.
- 🏢 **6. Built on IBM Watsonx + Granite**
 - Leverages enterprise-grade IBM tech stack (Granite LLM, Vision foundation model, Watsonx Vector Store) to demonstrate cutting-edge AI implementation in health and wellness.
- ☁️ **7. Cloud-Hosted, Cross-Device Access**
 - Deployed on **IBM Cloud Lite** with potential for mobile/web frontend — accessible anytime, anywhere, on any device.
- 📖 **8. Educational Feedback Loop**
 - Explains nutrition logic in plain language to help users *learn* while they interact — promotes informed, long-term behavior change.
 - Want me to format these for a **PowerPoint slide or PDF pitch deck**?

END USERS

- Academic Researchers
- Research Institutions and Universities
- Industry R&D Teams
- Educators

RESULTS

Model parameters

Frequency penalty

-2 2

2

Presence penalty

-2 2

0

Temperature

0 2

0

Top P (nucleus sampling)

0.01 1

1

Max tokens

2000

Random seed

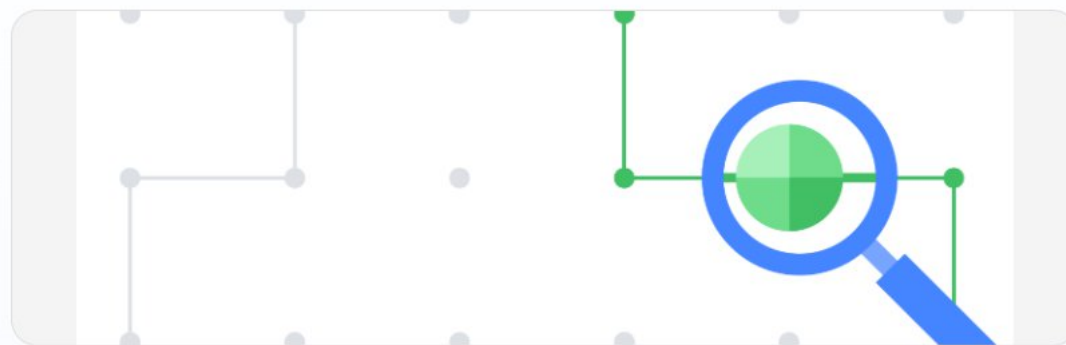
Agent preview



Research Agent 02:54 PM

Welcome to Research Agent

The agent can generate reports, suggest hypotheses, and even draft sections of research papers.



Type something...



Build

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

Setup

Configuration

Framework LangGraph Architecture ReAct

Instructions

Advanced configuration

You are a multimodal generative AI Nutrition Assistant. Your job is to analyze user inputs (food images and text descriptions) and provide personalized, practical, and health-oriented nutrition guidance.

When given an image, first identify the food items present and estimate their nutritional

Knowledge

Vector index

nutrition

A vector index searches documents for relevant information to ground the model. Upload the files to index or select an existing index.

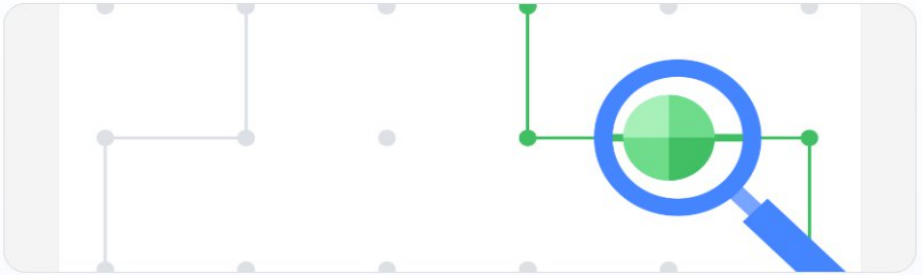
Tools

Agent preview

watsonx Agent 10:48 PM

Welcome to watsonx Agent

Change this description to reflect your particular agent



Type something...

RESULTS

Agent preview

VC You: 10:51 PM
RaviLal is a diabetic patient create a diet plan for him to help him regulate the Sugar level along with hitting protein goal

watsonx Agent 10:51 PM
To help RaviLal regulate his sugar levels and hit his protein goal, I would recommend the following diet plan:

- Breakfast: Overnight oats with fruit and nuts (400 calories, 20gm protein)
- Lunch: Grilled chicken breast with quinoa and mixed vegetables (500 calories, 40gm protein)
- Snack: Greek yogurt with berries and honey (200 calories, 15gm protein)
- Dinner: Baked salmon with sweet potato and green beans (500 calories, 35gm protein)

Total Calories: 1600 Total Protein: 110gm

This diet plan is tailored to RaviLal's specific needs as a diabetic patient, with a focus on regulating sugar levels and hitting his protein goal. The portion sizes can be adjusted based on his individual calorie and protein needs. Additionally, it's important for RaviLal to drink plenty of water throughout the day to stay hydrated.

► How did I get this answer?



Type something...



Agent preview

VC You: 10:49 PM
Prepare a Meal Prep For me under 2000 Calories and 120 gm of protein

watsonx Agent 10:49 PM
Here's a meal prep plan that's under 2000 calories and 120gm of protein:

- Breakfast: Overnight oats with fruit and nuts (400 calories, 20gm protein)
- Lunch: Grilled chicken breast with quinoa and mixed vegetables (500 calories, 40gm protein)
- Snack: Greek yogurt with berries and honey (200 calories, 15gm protein)
- Dinner: Baked salmon with sweet potato and green beans (500 calories, 35gm protein)

Total Calories: 1600 Total Protein: 110gm

You can adjust the portion sizes to meet your specific calorie and protein needs. Also, make sure to drink plenty of water throughout the day to stay hydrated.

► How did I get this answer?



Type something...



RESULTS

Deployed AI Agent

IBM watsonx

Upgrade ? 🔔

VIVEK Chauhan's Account ▾

Dallas ▾


VC

Deployment spaces / NUTRITION-APPLICATION / watsonx Agent /

Nutrition-Application ✓ Deployed Online

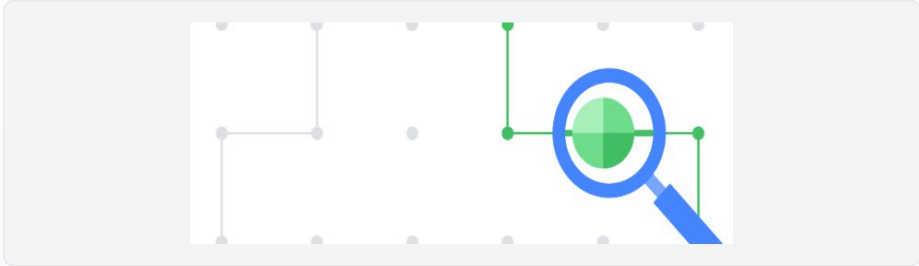
API reference Test **Preview**

New chat +

 Nutrition-Application 10:59 PM


Welcome to Nutrition-Application

Change this description to reflect your particular agent




Type something... ➤

About this deployment ×

Name 


Nutrition-Application

Description 


Change this description to reflect your particular agent

Deployment Details


Deployment ID: 20d31d8c-587c-4a...

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](#)

d891604f-9793-4813-9d7e-6af6842e5329

Last modified

42 seconds ago

CONCLUSION

- The Smart AI Nutrition Assistant successfully demonstrates how AI can transform personal health guidance.
- By leveraging IBM Watsonx.ai and Granite models, the assistant offers real-time, personalized nutrition advice through image and text inputs.
- It bridges the gap between user intent and actionable diet planning, making healthy living more accessible and informed.

FUTURE SCOPE

- **Voice Interaction:** Add speech-to-text for hands-free use
- **Circuit/OCR Integration:** Support reading food labels or handwritten logs
- **Multilingual Support:** Expand to Indian regional languages
- **Mobile App:** Lightweight version for on-the-go tracking
- **Custom Knowledge Base:** Enable user-specific dietary rules (e.g., allergies, religion)