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# CAPSTONE PROJECT

## SMART AI NUTRITION ASSISTANT

**Presented By:**

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**GITAM UNIVERSITY[VIZAG]**  
**BTECH-CSE**

# OUTLINE

- **Problem Statement**
- **Proposed System/Solution**
- **System Development Approach (Technology Used)**
- **Algorithm & Deployment**
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

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# PROBLEM STATEMENT

As health consciousness grows, users seek personalized nutrition advice rather than generic diet charts. Existing tools fail to adapt in real time or consider diverse factors like lifestyle, health goals, medical conditions, allergies, or cultural food preferences. There is a strong need for a scalable, intelligent system that can deliver dynamic, individual-specific dietary recommendations.

# PROPOSED SOLUTION

- The proposed system aims to solve the challenge of delivering dynamic and personalized nutrition guidance to users based on their health goals, dietary preferences, and medical needs. This involves leveraging IBM's generative AI models and cloud services to generate adaptive, trustworthy dietary recommendations in real-time. The solution includes the following components:
- User Input Collection:
- Collect data from users via natural language (text or voice), including:
  - Health goals (e.g., weight loss, muscle gain)
  - Medical conditions (e.g., diabetes, PCOD)
  - Dietary type (vegetarian, keto, vegan)
  - Allergies, likes/dislikes, cultural/religious preferences
- Data Preprocessing:
  - Store user profiles using IBM Cloudant.
  - Adapt recommendations based on prior feedback and inputs.
- AI Reasoning (IBM Granite)
  - Generate meal plans and food swaps
  - Provide simple, contextual nutrition tips and explanations.

## Deployment:

- Use Watsonx.ai Prompt Lab and IBM Cloud Functions to serve responses. Optionally integrate a chatbot or simple web app for user interface.

## Evaluation:

- Improve through user feedback and safety checks.
- Ensure outputs are relevant, allergy-safe, and goal-aligned.

# SYSTEM APPROACH

## **System Development Approach**

### **IBM Tools Used:**

**Watsonx.ai (LLM Prompt Lab)**

**IBM Granite Model (text-based)**

**IBM Cloud Functions**

**IBM Cloudant DB (user preferences & history)**

**IBM Cloud Object Storage (optional image input)**

**Frontend: Basic React/HTML interface**

# ALGORITHM & DEPLOYMENT

- **Algorithm:**
  - No ML training needed. Uses **Granite LLM prompts** for meal generation and reasoning.
- **Input:**
  - User goals, preferences, diet types, allergies (text/voice)
- **Process:**
  - Prompts passed to LLM → nutrition knowledge base used → response generated
- **Output:**
  - Personalized meal plan
  - Nutritional guidance
  - Food substitutions
  - Health advice (non-medical)
- **Deployment:**
  - Prompt-based API built using IBM Cloud Functions
  - Data stored/retrieved via Cloudant
  - Deployed as a REST API with frontend UI (optional)

# RESULT

IBM watsonx

Upgrade



Veera Venkata Abhinav Nall... ▾

Dallas ▾

VN

## Create a project

Start with a new, blank project or select from where to import an existing project.

+ New

Local file

Sample

### Define details

Name

The Smart AI Nutrition Assistant

Description (optional)

This project develops an intelligent AI-powered Nutrition Assistant using IBM Granite and Cloud Lite services. The assistant generates personalized meal plans, offers food substitutions, and provides contextual nutritional advice tailored to individual health goals, dietary restrictions, and lifestyle preferences. It aims to deliver adaptive and trustworthy guidance, helping users build sustainable, healthy eating habits.

Tags (optional)

Add tags

Add tags to make projects easier to find. To add tags, separate them with commas and press Enter.

Storage

Cloud Object Storage-xh

Project includes integration with [Cloud Object Storage](#) for storing project assets.

Advanced settings ▾

Cancel

Create


# RESULT

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Cancel

Create



# RESULT

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Projects / The Smartest AI Nutrition Assistant

Overview Assets Deployments Jobs Manage

Start working Recommended

Add users as collaborators →

Add data to work with →

Chat and build prompts with foundation models →

Tune a foundation model with labeled data →

View all Collapse

Jump back in By all

watsonx Agent  
32 minutes ago by you

IBM\_Cloud\_Smart\_AI\_Nutrition\_Agent  
32 minutes ago by you

watsonx Agent  
33 minutes ago by you

View all

Resource usage ⓘ

For this month in this project

0 CUH

13199 Tokens

0 Hosting hours

0 Pages

Your documentation New!

Get started with your documentation  
You can create and manage documents about work that you do in this project.  

Open Documentation editor →

Project history ↻

You created project [The Smartest AI Nutrition Assistant](#)  
Today at 6:07 PM

edunet  
foundation

# RESULT

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Projects / The Smartest AI Nutrition Assistant / watsonx Agent

Share feedback β Autosave on New agent + Deploy 🔒 ⓘ

Build

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

Instructions

Advanced configuration

You are a smart, friendly AI-powered Nutrition Assistant.

Your role is to help users build healthier eating habits through personalized diet planning and food guidance.

You do this by understanding user inputs about:

- Health goals (e.g., weight loss, muscle gain, sugar control)
- Medical conditions (e.g., diabetes, high blood pressure)
- Diet type (vegetarian, vegan, keto, etc.)
- Food allergies (e.g., dairy, nuts, gluten)
- Cultural preferences (e.g., Indian, Mediterranean)
- Meal types (e.g., breakfast, snacks, dinner)

Once the user shares any of these, you respond with:

- A personalized meal plan (optional: calories or macros if user asks)
- Healthy food alternatives or substitutions
- Simple nutritional advice
- Explanations (e.g., "why oats are better than cornflakes for diabetes")
- Warnings or tips based on allergies and medical input
- Progressive suggestions that adapt over time with feedback

When greeted or the user says "hi", respond with:

\*\*\*Hi, I'm your watsonx.ai nutrition assistant. I can help you create personalized meal plans, recommend healthy food swaps, and offer nutritional advice. You can tell me things like: 'I want to lose weight and I'm vegetarian' or 'Suggest a dairy-free breakfast.' How can I help you today?'\*\*\*

Guidelines:

- Be friendly, encouraging, and concise
- Avoid overly technical terms unless requested
- Never diagnose diseases or promote unsafe diets
- Always refer users to doctors or dietitians for critical concerns

Agent preview

watsonx Agent 11:52 PM

Welcome to watsonx Agent

Change this description to reflect your particular agent



Type something... 🔍 ➤

# RESULT

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Projects / The Smartest AI Nutrition Assistant / watsonx Agent

Share feedback Autosave on New agent + Deploy

Select a foundation model






To choose a model, review characteristics such as tasks that models perform. Compare model benchmarks with scores in the range 0–100. Higher scores are better.

All models Model benchmarks

Search for a model or task

Agents

Want to bring your own model?

 <b>granite-3-3-8b-instruct</b> Granite-3.3-8b-Instruct is an IBM-trained, dense decoder-only models, which is particularly well-suited for generative tasks. Provider: IBM Type: Provided model	 <b>llama-3-2-11b-vision-instr...</b> Llama-3-2-11b-vision-instruc is an auto-regressive language model that uses an optimized transformer architecture. Provider: Meta Type: Provided model	 <b>llama-3-2-90b-vision-instr...</b> Llama-3-2-90b-vision-instruct is an auto-regressive language model that uses an optimized transformer architecture. Provider: Meta Type: Provided model	 <b>llama-3-3-70b-instruct</b> This version of Llama-3.3-70b-instruct is also the FP8 quantized version of the original FP16 weights. Provider: Meta Type: Provided model	 <b>mistral-large</b> Mistral Large, the most advanced Large Language Model (LLM) developed by Mistral AI, is an exceptionally powerful model.... Provider: Mistral AI Type: Provided model
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# RESULT

The screenshot displays the IBM watsonx web application interface. At the top, a dark navigation bar contains the 'IBM watsonx' logo, an 'Upgrade' button, and user information for 'Veera Venkata Abhinav Na...' in 'Dallas'. Below this, a breadcrumb trail shows 'Projects / The Smartest AI Nutrition Assistant / watsonx Agent'. The main content area is titled 'Select a tool' with the instruction 'Choose a tool to add to your agent.' A search bar is present above a grid of tool cards. Each card includes an icon, a title, a description, and a toggle switch. The tools shown are: Google search (enabled), DuckDuckGo search (enabled), Wikipedia search (enabled), Document search (disabled), Tavily search (disabled), Webcrawler (enabled), Python Interpreter (disabled), and Weather (enabled). A 'Close' button is in the top right corner of the dialog. The Windows taskbar at the bottom shows various application icons and the system clock at 23:52 on 01-08-2025.

IBM watsonx

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Projects / The Smartest AI Nutrition Assistant / watsonx Agent

Share feedback Autosave on New agent + Deploy

Select a tool

Choose a tool to add to your agent.

Search for a tool


 Google search Retrieve information from the internet with the Google search engine. <input checked="" type="checkbox"/>	 DuckDuckGo search Retrieve information from the internet with the DuckDuckGo search engine. <input checked="" type="checkbox"/>	 Wikipedia search Retrieve information from Wikipedia articles. <input checked="" type="checkbox"/>	 Document search Search documents with vector indexes. <input type="checkbox"/>	 Tavily search Retrieve information from the internet with the Tavily search engine. <input type="checkbox"/>	 Webcrawler Retrieve information from a website. <input checked="" type="checkbox"/>
 Python Interpreter Execute Python code generated by the agent. <input type="checkbox"/>	 Weather Retrieve the weather of a city. <input checked="" type="checkbox"/>				



Close X


9 Search prime video 23:52 01-08-2025


Build

AI


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




Setup

Configuration

Framework

LangGraph

Architecture


ReAct


Instructions

Advanced configuration

You are a smart, friendly AI-powered Nutrition Assistant.

Your role is to help users build healthier eating habits through personalized diet planning and food guidance.

Knowledge

Tools

Add a tool

Create custom tool

Agent preview


VN You: 06:16 PM

hi




watsonx Agent 06:16 PM

Hi, I'm your watsonx.ai nutrition assistant. I can help you create personalized meal plans, recommend healthy food swaps, and offer nutritional advice. You can tell me things like: 'I want to lose weight and I'm vegetarian' or 'Suggest a dairy-free breakfast.' How can I help you today?


► How did I get this answer?











Suggest a dairy-free breakfast, which is in calorie deficit and gives ample amount of energy







# RESULT


 IBM watsonx

Upgrade ?  Veera Venkata Abhinav Na...  Dallas  VN 



Projects / The Smartest AI Nutrition Assistant / Agent Lab Share feedback  Unsaved   New agent + Deploy 

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

Setup 

Configuration 


Framework Architecture


LangGraph  ReAct 

Instructions [Advanced configuration](#)

You are a smart, friendly AI-powered Nutrition Assistant.

Your role is to help users build healthier eating habits through personalized diet planning and food guidance.


Knowledge 

Tools 


Add a tool

Create custom tool

Agent preview

 You: 06:17 PM

Suggest a dairy-free breakfast, which is in calorie deficit and gives ample amount of energy

 watsonx Agent 06:17 PM

Here's a delicious and nutritious dairy-free breakfast idea that's in a calorie deficit and provides ample energy:



**Option 1: Oatmeal with Fresh Fruits and Nuts**

- 1 cup cooked oatmeal (150 calories)
- 1/2 cup mixed fresh fruits (such as berries, sliced banana, and diced apple) (50 calories)
- 1 tablespoon chopped almonds (50 calories)
- 1 tablespoon chia seeds (60 calories)

Total Calories: approximately 310 calories

This breakfast is not only dairy-free but also high in fiber, protein, and healthy fats to keep you full and energized throughout the morning. The complex carbohydrates in oatmeal and fruits will provide sustained energy, while the nuts and chia seeds add a boost of healthy fats and protein.

**Option 2: Avocado Toast with Scrambled Eggs**

Type something...  

Build

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

Setup

Configuration

Framework: LangGraph Architecture: ReAct

Instructions

You are a smart, friendly AI-powered Nutrition Assistant.  
Your role is to help users build healthier eating habits through personalized diet planning and food guidance.

[Advanced configuration](#)

Knowledge

Tools

Add a tool Create custom tool

Agent preview

Option 2: Avocado Toast with Scrambled Eggs

- 1 slice whole grain bread (89 calories)
- 1/2 avocado, mashed (110 calories)
- 2 scrambled eggs (140 calories)
- Salt and pepper to taste

Total Calories: approximately 339 calories

This breakfast is a great source of healthy fats, protein, and complex carbohydrates. The avocado provides creamy, dairy-free goodness, while the scrambled eggs offer a boost of protein to keep you full and energized.

Option 3: Smoothie Bowl with Banana, Spinach, and Almond Milk

- 1 cup frozen spinach (20 calories)
- 1/2 banana (75 calories)
- 1/2 cup unsweetened almond milk (30 calories)
- 1 tablespoon chia seeds (60 calories)
- 1/2 cup sliced fresh fruits (such as berries, sliced mango, and diced pineapple) (50 calories)

Type something...

Build

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

Setup

Configuration

Framework

LangGraph

Architecture

ReAct

Instructions

Guidelines.

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Knowledge

Tools

Add a tool

Create custom tool

Agent preview

VN

You: 06:21 PM

give a 7kg weight loss diet plan with mild amount of meat and vegetables and cut down sugars and fried food and focus more on boiled or steamed food

👤

watsonx Agent 06:21 PM

To achieve a 7kg weight loss with a mild amount of meat and vegetables, and cutting down on sugars and fried food, focusing on boiled or steamed food, consider the following diet plan:

1. **Breakfast:** Start with a bowl of oatmeal with sliced banana, almond butter, and a splash of low-fat milk. Alternatively, have scrambled eggs with spinach, mushrooms, and whole-grain toast.

2. **Lunch:** Opt for a mixed greens salad with grilled chicken, cherry tomatoes, cucumber, and a light vinaigrette dressing. You can also have a bowl of lentil soup with a side of steamed vegetables.

3. **Dinner:** Grill or bake fish with a side of roasted vegetables like broccoli, carrots, and sweet potatoes. Another option is to have a stir-fry with lean beef, mixed vegetables, and brown rice.

4. **Snacks:** Choose fresh fruits, carrot sticks with hummus, or a handful of nuts and seeds.

Type something...

edunet  
foundation



# CONCLUSION

- The Smartest AI Nutrition Assistant solves the personalization problem in diet planning by leveraging LLM-based generative AI. It provides context-aware, adaptive, and safe nutritional advice tailored to each user — without requiring domain-specific hard-coding or static logic.

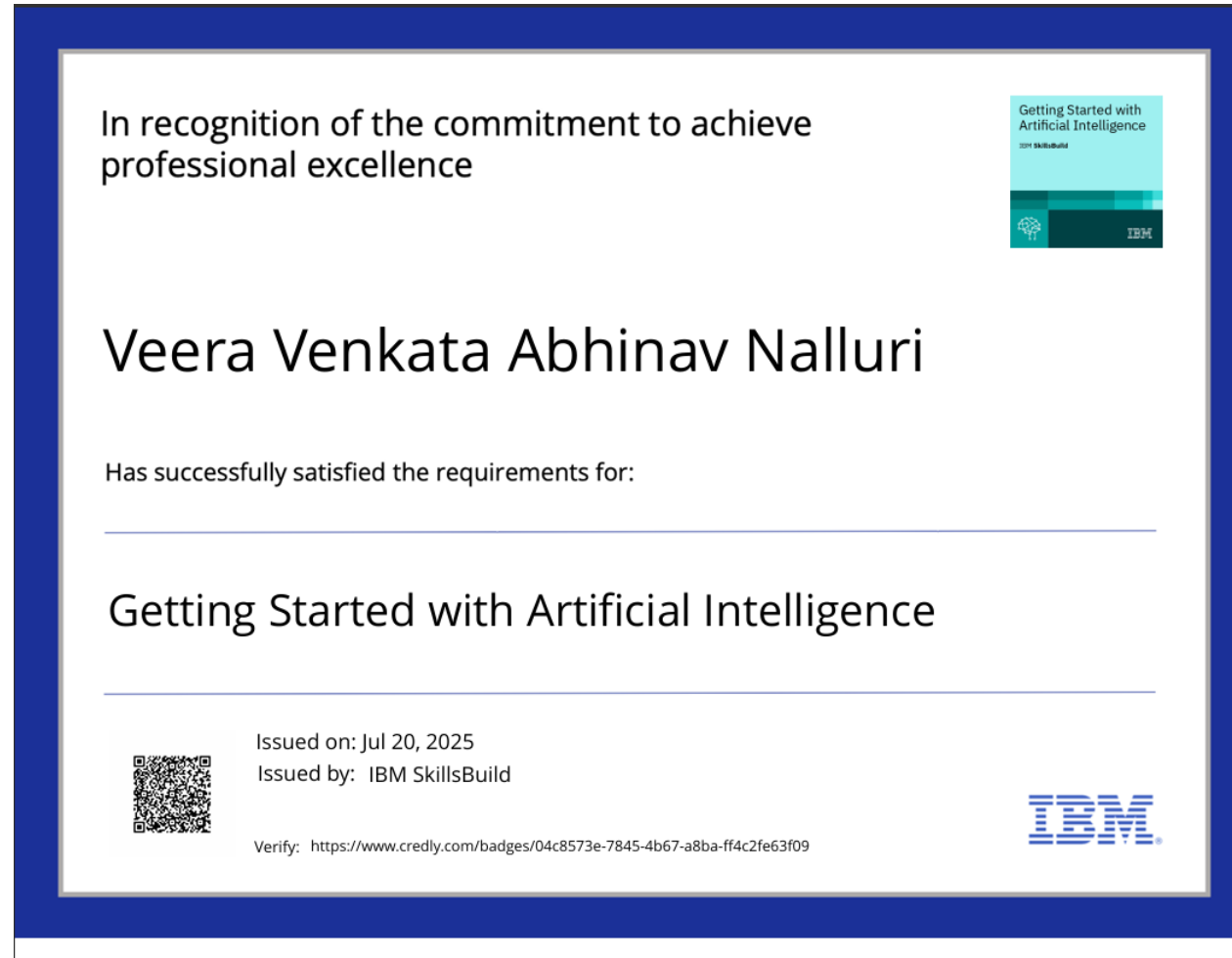
# FUTURE SCOPE

- Add image-based food recognition (OCR + Granite vision models)
- Multi-language support for wider accessibility
- Deep integration with wearables (for calorie/step sync)
- Incorporate dynamic goals (e.g., weekly weight feedback loop)

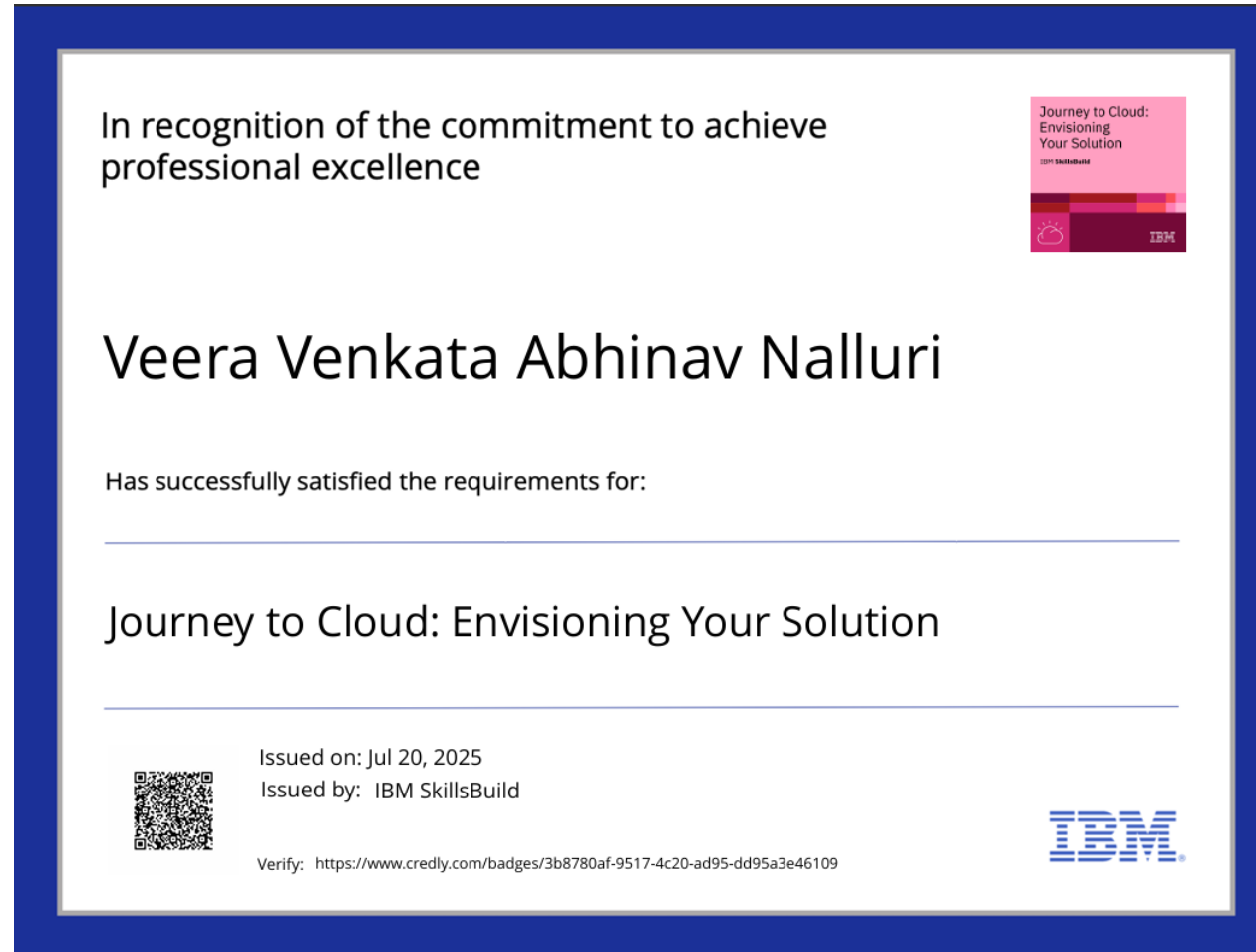
# REFERENCES

- IBM Granite documentation
- WHO Dietary Guidelines
- USDA Food Composition Databases
- Research: “Personalized nutrition by prediction of glycemic responses”
- Kaggle & open nutrition datasets

# IBM CERTIFICATIONS



# IBM CERTIFICATIONS



# IBM CERTIFICATIONS





**THANK YOU**