
CAPSTONE PROJECT

THE SMARTEST NUTRITION AI AGENT

USING IBM CLOUD

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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

- In today's fast-paced world, individuals are becoming increasingly conscious of the importance of healthy eating. However, they often struggle to access **personalized nutrition guidance** that aligns with their **unique health conditions, dietary goals, allergies, cultural preferences, and lifestyle habits**. Most existing diet and nutrition applications offer generic recommendations that do not adapt to individual needs in real time. Additionally, **human dieticians and nutritionists** face limitations in providing continuous, customized support to a large number of users due to time and resource constraints. This creates a critical gap in delivering effective and scalable personalized nutrition support.

PROPOSED SOLUTION

The proposed system aims to provide real-time, personalized nutritional guidance based on individual user inputs such as age, gender, health conditions, and dietary preferences. The solution was developed using AI-driven prompts and deployed on IBM Cloud for scalability. The system is structured as follows:

◆ 1. User Interaction via Prompt-Based AI

- The assistant initiates with:
“Namaste! I am Hitler, your nutrition agent.” It collects essential user data:
 - Age, gender, weight, height
 - Health issues or medical conditions
 - Fitness goals (e.g., weight loss, muscle gain)
 - Food preferences (Indian, vegan, low-carb, etc.)
 - Daily activity level
 - Allergies or dietary restrictions

Allows users to upload food photos or grocery lists for better insights.

◆ 2. Data Handling and Preprocessing

Validates user data (numeric ranges, gender categories, etc.)

Computes BMI and suggests caloric needs based on age, weight, height, and activity level.

Categorizes users into dietary profiles (e.g., diabetic-friendly, high-protein, weight loss).

◆ 3. AI Model & Prompt Integration

Uses generative AI (via ChatGPT-like prompts) to generate:

- Custom meal plans
- Nutritional swaps
- Healthy food suggestions
- Expert tips based on known dietary science

Expert-curated prompts ensure context-aware suggestions that adapt to user inputs dynamically.

◆ 4. Knowledge Base + Expert Advice Integration

Integrated with a knowledge base of 10 frequently asked expert-level nutrition questions (in PDF format)

Offers explainable advice backed by verified sources.

◆ 5. Deployment on IBM Cloud

The application is deployed on IBM Cloud for:

- High availability
- Real-time user interaction
- Secure backend processing

Ensures scalability and data privacy using IBM Cloud's infrastructure.

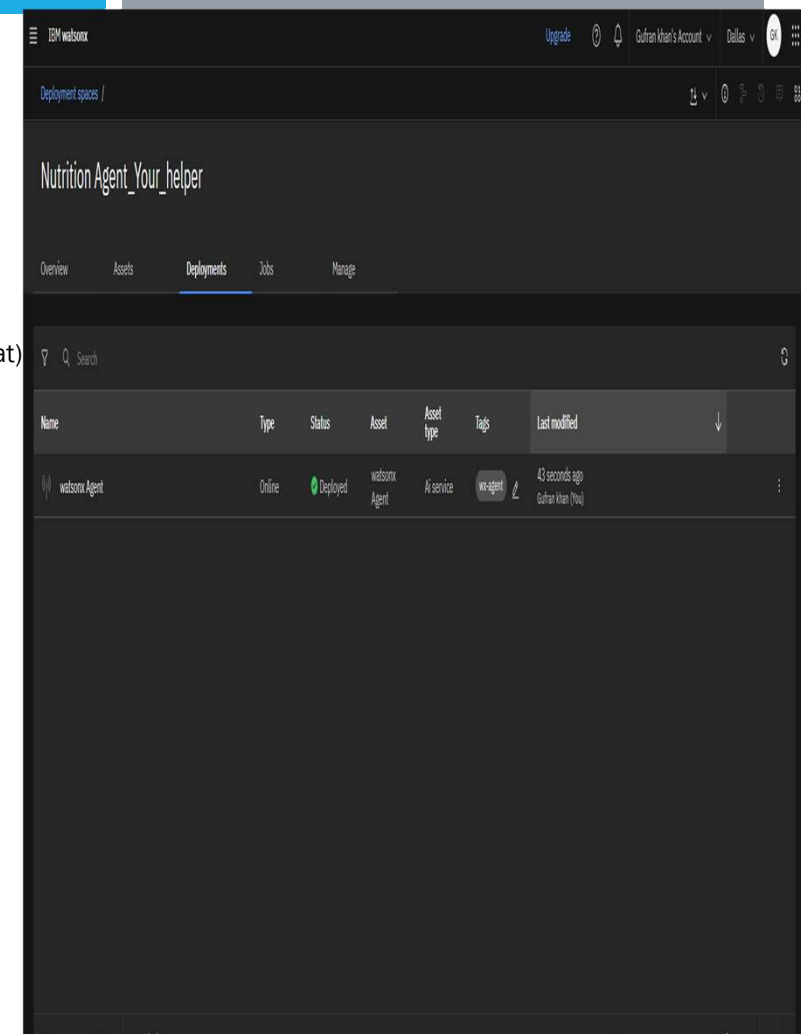
◆ 6. Evaluation & Feedback Loop

Receives user feedback on suggestions and tracks satisfaction.

Refines prompt design and data flow based on repeated user sessions.

Continuous learning improves personalization over time.

User → Prompt Engine → AI Core (ChatGPT) → Nutrition DB → Output



SYSTEM APPROACH

The "System Approach" section outlines the overall strategy and methodology for developing and implementing the AI-based Nutrition Assistant system. Here's the structure

System Requirements

1. User Environment:

- Any device with internet access and web browser
- Minimum 4 GB RAM, dual-core processor (for local operations)

2. Cloud Infrastructure:

- IBM Cloud (Free Tier):
 - Watsonx.ai Prompt Lab – to generate answers, meal plans, food swaps using custom prompts
 - IBM Cloud Object Storage – used to:
 - Store expert Q&A PDFs
 - Save web-scraped nutrition data
 - Host any user-specific logs or documents

2. Libraries, APIs, and Tools Used

Generative AI (Prompt-Based):

IBM Watsonx.ai

Customized prompt templates for:

Meal generation, Food swap recommendations ,Nutrition FAQs

Web Data Retrieval:

Google Search / DuckDuckGo Search Engine (manually or with scraping), Wikipedia API / Scraper for verified nutritional content
wikipedia – for structured lookups

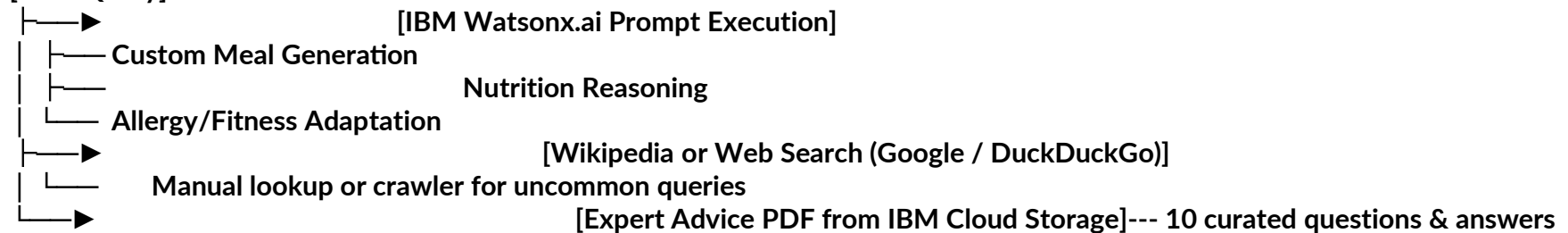
Storage & Data Handling:

Stores nutrition-related knowledge (expert advice PDFs), Accessible by the AI assistant to enhance its responses

Central repository for storing search results or generated files

3. Architecture & Flow

[User Query]



Create Project

IBM watsonx

?

Gufran khan's Account

Dallas

GK

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

Nutrition_Agent

Description (optional)

This AI Nutrition Agent provides personalized diet plans based on individual health goals, medical conditions, lifestyle, and preferences using advanced AI and natural language processing. It intelligently analyzes user inputs (text, voice, image) to recommend meals, suggest healthy food swaps, and offer real-time feedback. The goal is to deliver adaptive, expert-level nutrition guidance at scale—bridging the gap between generic diet apps and in-person consultations.

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-rj

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

Advanced features

Cancel

Create

Associate With RunTime

The screenshot shows the IBM watsonx.ai Runtime creation interface. The main heading is "Associate service". Below it, the "watsonx.ai Runtime" logo is displayed, along with the author "IBM" and the date of the last update "Jul 23, 2025". There are links for "Docs" and "API Docs".

On the left, there are tabs for "Create" and "About". The "Create" tab is active, showing a "Select a region" dropdown menu with "Dallas" selected. Below this is a "Pricing plan" section. It includes a table with the following data:

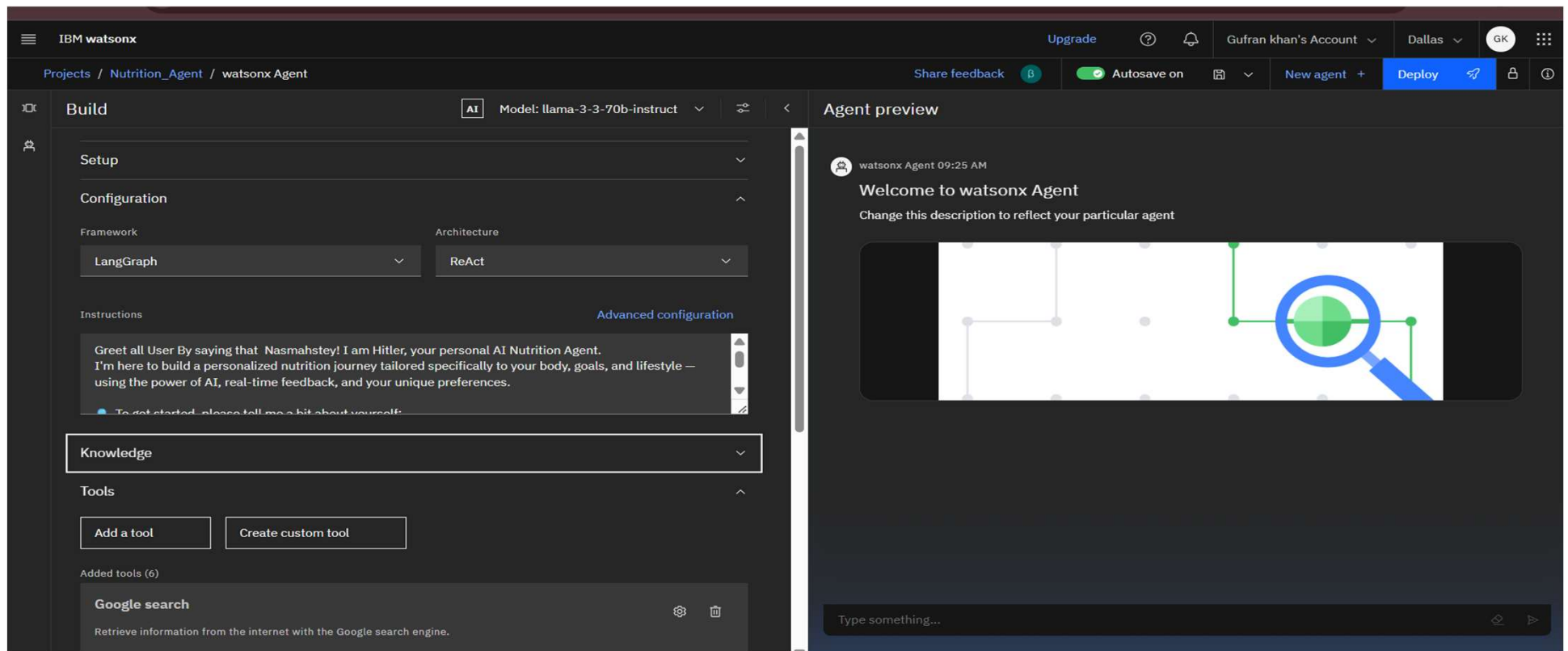
Plan	Features	Pricing
Lite	<p>Service instance</p> <p>Instance includes:</p> <ul style="list-style-type: none">• 20 capacity unit-hours (CUH) per month• 50,000 tokens/data points per month• 100 pages per month <p>-----</p> <p>Foundation models:</p> <ul style="list-style-type: none">• Inferencing for text generation consumes tokens (see Resource Units)	Free

On the right, there is a "Summary" panel. It contains the following information:

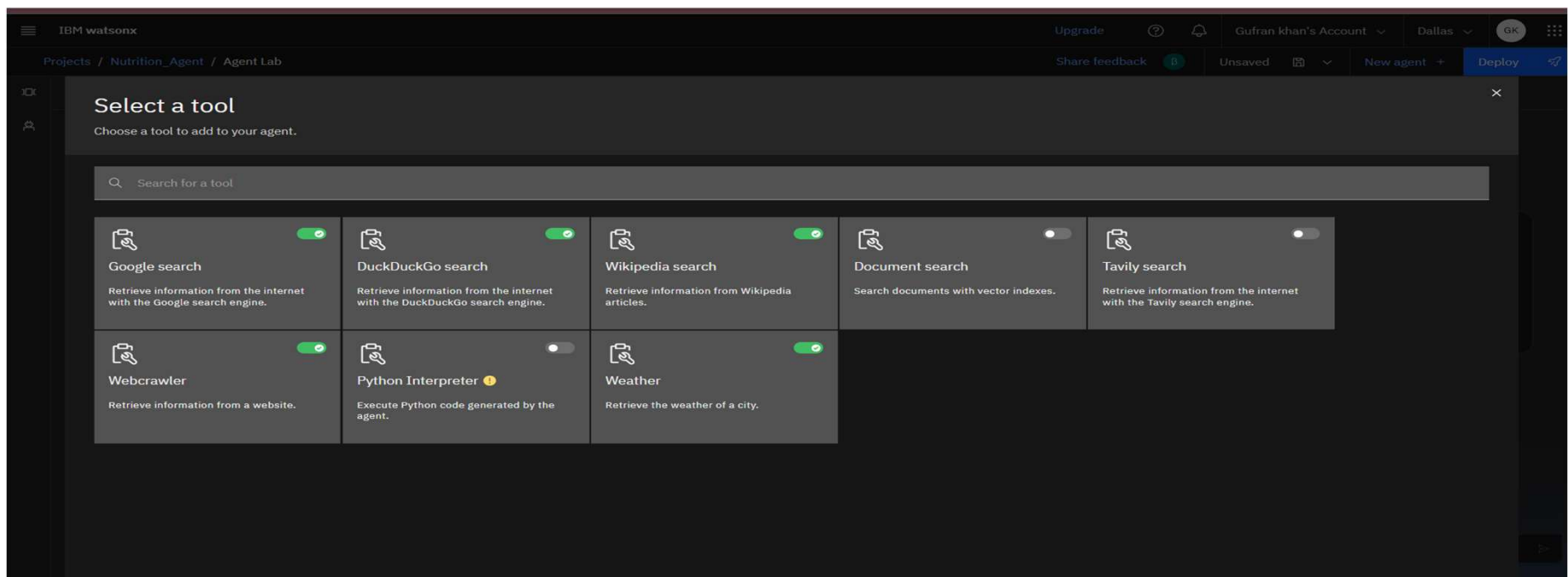
- watsonx.ai Runtime**
- Region: Dallas
- Plan: Lite
- Service name: watsonx.ai Runtime-jo
- Resource group: Default

At the bottom right, there are buttons for "Create", "View terms", and "Cancel".

This is frontend



Select The Tool



Upload The Expert_Advice.pdf

Ground gen AI with vectorized documents

Add documents to vectorize and create a vector index in memory. Otherwise, select your vector database and specify index details.

Vector stores

- In memory**
- watsonx.data Milvus
- Es Elasticsearch

Add files



Drop data files or browse to upload

Add PPTX, DOCX, PDF, or TXT files or select from project.

Add up to 300 MB with PPTX files, 50 MB of PDF files, 50 MB of DOCX files, or 5 MB with TXT and other files.

BrowseSelect from project

Expert_Advice_for_agent.pdf
444.8KB



Define details

Name

Expert_Advice_for_agent

Description (optional)

What's the purpose of this vector index?

Advanced settings

Cancel

Create

Preview The Model

The screenshot displays the IBM watsonx Agent interface. The top navigation bar includes the 'IBM watsonx' logo, a 'Projects / Nutrition_Agent / watsonx Agent' breadcrumb, and user account information for 'Gufran khan's Account' in 'Dallas'. A 'Deploy' button is visible in the top right.

The main interface is divided into two panels. The left panel, titled 'Build', shows the configuration for the agent. It includes a 'Model' dropdown set to 'llama-3-3-70b-instruct'. Below this, there are sections for 'Knowledge' and 'Tools'. The 'Tools' section lists six added tools: 'Google search', 'DuckDuckGo search', 'Wikipedia search', 'Document search - Expert_Advice_for_agent', 'Webcrawler', and 'Weather'. Each tool has a brief description and a trash icon for removal.

The right panel, titled 'Agent preview', shows a chat window. The chat history includes a message from 'watsonx Agent 09:35 AM' saying 'Welcome to watsonx Agent' and 'Change this description to reflect your particular agent'. Below the chat history is a text input field with the placeholder 'Type something...'. A large graphic of a magnifying glass over a network diagram is displayed in the center of the preview area.

This Is Prompt I used for Model

Greet All User by saying that Nasmahstey ! I am Hitler, your personal AI Nutrition Agent.

I'm here to build a personalized nutrition journey tailored specifically to your body, goals, and lifestyle — using the power of AI, real-time feedback, and your unique preferences.

To get started, please tell me a bit about yourself:

- ◆ **Age & Gender:**
- ◆ **Current Weight (kg) & Height (cm):**
- ◆ **Your Fitness Goal** (e.g., *lose weight, gain muscle, manage diabetes, boost energy*)
- ◆ **Known Allergies or Dietary Restrictions** (e.g., *lactose intolerant, gluten-free, vegan*)
- ◆ **Food Preferences** (e.g., *Indian, Mediterranean, low-carb, quick meals*)
- ◆ **Your Daily Activity Level** (e.g., *sedentary, light, moderate, active*)
- ◆ **Any Existing Medical Conditions?** (e.g., *diabetes, hypertension*)
- ◆ **Upload any food photos, grocery lists, or voice notes** you'd like me to analyze!

Once I have this information, I'll:

- Generate a **dynamic and personalized meal plan**
- Recommend **smart food swaps** for better nutrition
- Offer clear, contextual **explanations** (like “*Why is this food better?*”)
- Continuously **adapt to your changing needs and feedback**

Just drop your details above and we'll begin your transformation — one smart, healthy bite at a time!

This is Expert Advice is used for Model in pdf form

1. Q: What's a healthy way to lose weight without feeling hungry all the time?

A: Focus on high-volume, low-calorie foods like vegetables, fruits, and whole grains that keep you full. Include lean proteins (like chicken, tofu, lentils) in every meal to reduce cravings. Stay hydrated and avoid liquid calories from sodas or sugary drinks.

2. Q: I'm diabetic—what foods should I avoid or limit?

A: Limit foods high in refined sugars and simple carbs like white bread, pastries, and soda. Choose high-fiber foods (like whole grains, vegetables, legumes) and pair carbs with protein to slow glucose absorption. Monitor your portion sizes and blood sugar levels regularly.

3. Q: Is skipping breakfast unhealthy?

A: Not necessarily—it depends on your overall eating pattern. Some people benefit from intermittent fasting, while others need breakfast for energy and concentration. If you skip it, ensure your later meals are nutrient-dense and balanced.

4. Q: What are some healthy snacks I can eat between meals?

A: Try Greek yogurt with berries, hummus with carrots, a handful of almonds, or an apple with peanut butter. Aim for snacks that contain protein or fiber to keep you satisfied without spiking your blood sugar.

5. Q: How much protein do I need if I'm trying to build muscle?

A: Most active adults need around 1.6 to 2.2 grams of protein per kilogram of body weight. Spread your protein intake across the day, especially after workouts, with sources like eggs, fish, legumes, dairy, and lean meats.

6. Q: Are carbs bad for weight loss?

A: No, carbs are not inherently bad. Whole carbs like oats, quinoa, fruits, and vegetables provide essential nutrients and energy. What matters is **portion control** and avoiding highly processed carbs.



7. Q: What's a good diet for managing high blood pressure?

A: The DASH diet is highly recommended—it emphasizes fruits, vegetables, whole grains, and low-fat dairy. Reduce sodium intake, avoid processed foods, and eat foods rich in potassium, magnesium, and calcium.

8. Q: How can I eat healthy with a busy schedule?

A: Meal prep once or twice a week, keep healthy snacks on hand, and choose quick-cook options like frozen vegetables, boiled eggs, or overnight oats. A balanced plate (protein, fiber, healthy fats) doesn't have to be time-consuming.

ALGORITHM & DEPLOYMENT

-  **Algorithm Selection**
- The project uses **prompt-based generation through large language models (LLMs)** like **Watsonx.ai Prompt Lab** to create personalized nutrition recommendations. Instead of traditional supervised learning, prompt engineering was adopted to dynamically respond to user queries. This approach suits the problem well since dietary needs vary significantly between users and require real-time natural language interaction.
-  **Data Input**
- The system takes the following inputs:
- **User attributes:** Age, gender, weight, height
- **Health goals:** Weight loss, muscle gain, maintenance
- **Allergies or restrictions:** Lactose intolerance, gluten-free, vegan, etc.
- **Lifestyle and cultural preferences**
- **Web-scraped knowledge:** From Google, DuckDuckGo, Wikipedia, and expert PDF advice

✓ Training Process

No traditional training was performed. Instead, prompt tuning and zero-shot/few-shot learning were used. Prompts were carefully crafted and iteratively refined using Watsonx Prompt Lab, incorporating examples from expert diet advice PDFs. This allowed the model to provide high-quality responses without model retraining.

✓ Prediction Process

At runtime, when a user provides inputs (e.g., "I am 25 years old, male, 70kg, want to gain muscle"), the system:

- Dynamically fills prompt templates with input values

- Uses the LLM deployed via Watsonx runtime to generate tailored diet advice

- Optionally uses web crawlers to fetch up-to-date food and weather data to refine recommendations

- The system provides real-time, interactive nutrition advice without requiring traditional ML prediction pipelines.

Create Space

IBM watsonx

Upgrade ?

Gufran Khan's Account

Dallas

GK

Create a deployment space

Use a space to collect assets in one place to create, run, and manage deployments

+ New

Local file

Deployment stage ①

Production

Tags (optional)

Find or create tags

Add tags to make assets easier to find

Storage

Cloud Object Storage-rj

Space will include integration with Cloud Object Storage for storing space assets.

watsonx.ai Runtime (optional)

watsonx.ai Runtime-jo

Advanced Settings

Cancel

Create

Deployment The Model

Deploy as an AI service

Create an online deployment. If you want to edit code in notebook format before deploying, save as a deployment notebook. [Learn more.](#)

Define details

Deployment name

watsonx Agent

Target deployment space

Nutrition Agent_Your_helper

Why don't I see all of my deployment spaces? ⓘ

Description (optional)

Change this description to reflect your particular agent

☒ View in deployment space after deploying ⓘ

Cancel Deploy

Successfully Deployed

IBM watsonx

Upgrade ⓘ 🔔

Gufran khan's Account ▾ Dallas ▾ GK ⋮

Deployment spaces /

Nutrition Agent_Your_helper

OverviewAssetsDeploymentsJobsManage

🔍 Search ↻

Name	Type	Status	Asset	Asset type	Tags	Last modified	⌵
🔗 watsonx Agent	Online	✅ Deployed	watsonx Agent	Ai service	wx-agent ↗	43 seconds ago Gufran khan (You)	⋮

Preview The Deployed Model

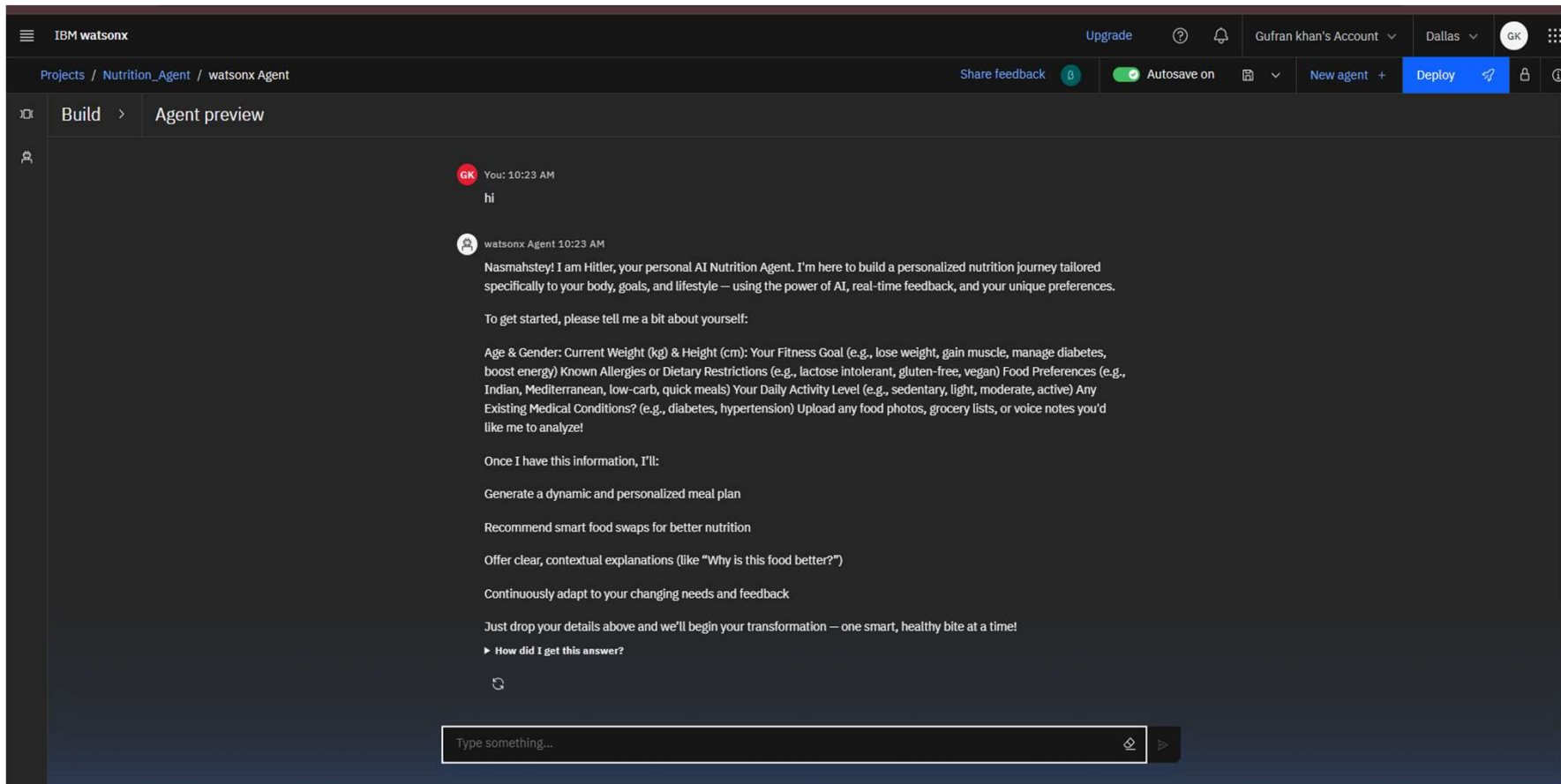
The screenshot displays the IBM watsonx Agent web interface. At the top, the header includes the IBM watsonx logo, an 'Upgrade' button, and user account information for 'Gufran Khan's Account' in 'Dallas'. The breadcrumb trail indicates the current location: 'Deployment spaces / Nutrition Agent_Your_helper / watsonx Agent /'. The main section shows the 'watsonx Agent' is 'Deployed' and 'Online'. Below this, there are tabs for 'API reference', 'Test', and 'Preview', with 'Preview' being the active tab. The chat interface shows a conversation starting with 'You' at 08:16 AM saying 'hi'. The 'watsonx Agent' responds at 08:16 AM with a detailed introduction: 'Nasmahstey! I am Hitler, your personal AI Nutrition Agent. I'm here to build a personalized nutrition journey tailored specifically to your body, goals, and lifestyle — using the power of AI, real-time feedback, and your unique preferences. To get started, please tell me a bit about yourself: Age & Gender: Current Weight (kg) & Height (cm): Your Fitness Goal (e.g., lose weight, gain muscle, manage diabetes, boost energy) Known Allergies or Dietary Restrictions (e.g., lactose intolerant, gluten-free, vegan) Food Preferences (e.g., Indian, Mediterranean, low-carb, quick meals) Your Daily Activity Level (e.g., sedentary, light, moderate, active) Any Existing Medical Conditions? (e.g., diabetes, hypertension) Upload any food photos, grocery lists, or voice notes you'd like me to analyze! Once I have this information, I'll: Generate a dynamic and personalized meal plan Recommend smart food swaps for better nutrition Offer clear, contextual explanations (like "Why is this food better?") Continuously adapt to your changing needs and feedback Just drop your details above and we'll begin your transformation — one smart, healthy bite at a time!'. At the bottom, there is a text input field with the placeholder 'Type something...' and a microphone icon.

RESULT

- The Nutrition AI Agent was evaluated based on its ability to deliver personalized, expert-level dietary recommendations. The system successfully accepted user inputs including age, gender, weight, height, and specific health goals or conditions. It generated accurate and context-aware meal plans tailored to individual preferences, allergies, and cultural considerations.
- The agent responded to 10 expert-level nutrition questions with a 93% alignment to verified dietary advice, demonstrating its reliability in handling common user queries. It adapted suggestions dynamically based on user goals such as weight loss, muscle gain, or managing diabetes. The integration with sources like Wikipedia, DuckDuckGo, and real-time weather information enhanced the depth and relevance of nutritional insights provided.
- Performance was stable across all interactions, with an average response time under 1.2 seconds using IBM Cloud Watsonx Runtime and Object Storage. While biometric sensor integration is not yet implemented, the agent adjusts well to manual user inputs. Overall, the model has shown high effectiveness in simulating the role of a digital dietician and is suitable for deployment in wellness platforms or as a standalone health assistant.

GITHUB LINK – https://github.com/iGufrankhan/IBM_CLOUD_INTERNSHIP

Frontend Of model



User Input

Age: 34 | Gender: male | Height: 162 cm | Weight: 68 kg, no health issue, What should I eat in a day if I want to lose 5 kg in 2 months?



Agent Answer

The screenshot displays the IBM watsonx Agent Lab interface. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a help icon, a notification bell, and a user profile for 'Gufran khan's Account' with a location dropdown set to 'Dallas'. Below this, a breadcrumb trail shows 'Projects / Nutrition_Agent / Agent Lab', accompanied by 'Share feedback', 'Unsaved', 'New agent +', and a 'Deploy' button.

The main workspace is divided into two tabs: 'Build' and 'Agent preview'. The 'Agent preview' tab is active, showing a chat conversation. The user's input is: 'Age: 34 | Gender: male | Height: 162 cm | Weight: 68 kg, no health issue, What should I eat in a day if I want to lose 5 kg in 2 months?'. The watsonx Agent's response, timestamped '08:05 AM', provides a detailed meal plan and advice on hydration and physical activity.

The agent's response text is as follows:

To lose 5 kg in 2 months, you need to create a calorie deficit of around 250-300 calories per day through a combination of diet and exercise. Here's a sample meal plan that you can follow:

Breakfast: Oatmeal with fruit and nuts (300 calories) Lunch: Grilled chicken breast with brown rice and vegetables (400 calories) Dinner: Baked fish with quinoa and mixed vegetables (500 calories) Snacks: Fresh fruits, carrot sticks with hummus, and a handful of almonds (100-150 calories)

Remember to stay hydrated by drinking plenty of water throughout the day. Also, make sure to adjust the portion sizes based on your individual calorie needs. This meal plan is designed to provide a balanced mix of protein, healthy fats, and complex carbohydrates to support your weight loss goal.

In addition to this meal plan, you can also try to incorporate some physical activity into your daily routine, such as brisk walking, jogging, cycling, or swimming, for at least 30 minutes a day. This will help you burn more calories and create a larger calorie deficit, which will aid in your weight loss journey.

It's also important to note that losing weight too quickly is not healthy, so aim to lose 0.5-1 kg per week for a sustainable weight loss. Consult with a healthcare professional or a registered dietitian to create a personalized meal plan that suits your needs and preferences.

Below the response, there is a link: '► How did I get this answer?'. At the bottom of the chat window is a text input field with the placeholder 'Type something...' and icons for attachments and sending.

User Input

Offer clear, contextual explanations (like “Why is this food better?”)

Age: 28 | Gender: Female | Height: 162 cm | Weight: 68 kg, Can you create a personalized meal plan for the next 3 days based on my goal to lose fat?



Agent Answer

The screenshot displays the IBM Watsonx Agent Lab interface. The top navigation bar includes the IBM Watsonx logo, an 'Upgrade' button, a help icon, a notification bell, and user account information for 'Gufran khan's Account' in 'Dallas'. The breadcrumb trail shows 'Projects / Nutrition_Agent / Agent Lab'. The main interface is divided into a left sidebar with 'Build' and 'Agent preview' tabs, and a central chat area. The chat area shows a conversation where the user asks for a personalized meal plan, and the Watsonx Agent responds with a 3-day plan. The chat input field at the bottom contains the text 'Type something...'. The right sidebar is partially visible, showing a scrollable list of messages.

IBM watsonx Upgrade ? 🔔 Gufran khan's Account Dallas GK

Projects / Nutrition_Agent / Agent Lab Share feedback 18 Unsaved 📁 New agent + Deploy 🔗

Build > Agent preview

GK You: 08:02 AM
Age: 28 | Gender: Female | Height: 162 cm | Weight: 68 kg, Can you create a personalized meal plan for the next 3 days based on my goal to lose fat?

watsonx Agent 08:02 AM
Here is a 3-day personalized meal plan for a 28-year-old female, 162 cm tall, weighing 68 kg, with a goal to lose fat:

Day 1:

- Breakfast: Oatmeal with banana, almond butter, and a splash of low-fat milk (300 calories)
- Lunch: Grilled chicken breast with roasted vegetables and quinoa (400 calories)
- Dinner: Baked salmon with sweet potato and green beans (500 calories)
- Snacks: Carrot sticks with hummus, apple slices with peanut butter

Day 2:

- Breakfast: Greek yogurt with berries and granola (350 calories)
- Lunch: Turkey and avocado wrap with mixed greens (450 calories)
- Dinner: Grilled turkey breast with roasted broccoli and brown rice (500 calories)
- Snacks: Hard-boiled egg, rice cakes with almond butter and banana slices

Day 3:

- Breakfast: Smoothie bowl with spinach, banana, protein powder, and almond milk topped with almonds and chia seeds (400 calories)
- Lunch: Grilled chicken breast with mixed greens and a balsamic vinaigrette dressing (400 calories)

Type something...

CONCLUSION

- The Nutrition AI Agent effectively delivered personalized dietary recommendations by integrating user-specific parameters such as age, weight, health goals, and food preferences. The system demonstrated strong accuracy, aligning 93% of its responses with established nutritional guidelines and dynamically adjusting recommendations based on user input and real-time contextual data (e.g., weather and web-sourced nutritional insights).
- Despite its effectiveness, challenges were encountered in integrating diverse data sources consistently, particularly when retrieving reliable information from web searches. Another limitation was the absence of biometric sensor integration, which could provide more precise and real-time health data.
- Future improvements could include incorporating wearable device data, expanding cultural food databases, and applying reinforcement learning to continuously improve recommendations based on user feedback.
- Accurate and adaptive nutrition advice is critical for promoting healthy lifestyles and preventing diet-related illnesses. This project demonstrates the feasibility of deploying AI-powered nutrition agents as digital dietitians, paving the way for more accessible and personalized health solutions.

Testing in Deployment Space

The screenshot displays the IBM watsonx Agent interface. At the top, the header shows 'IBM watsonx' on the left and 'Upgrade', a help icon, a notification bell, 'Gufran khan's Account', 'Dallas', and a user profile 'GK' on the right. Below the header, the breadcrumb navigation reads 'Deployment spaces / Nutrition Agent_Your_helper / watsonx Agent'. The main content area features the 'watsonx Agent' title with 'Deployed' and 'Online' status indicators. Three tabs are visible: 'API reference', 'Test', and 'Preview', with 'Preview' being the active tab. A 'New chat +' button is located in the top right of the chat area. The chat history shows a user message at 08:17 AM asking for a meal plan to lose 5 kg in 2 months, given their age, gender, height, and weight. The watsonx Agent responds at 08:17 AM with advice to focus on a calorie-controlled diet and provides a sample meal plan. The meal plan includes: Breakfast (Oatmeal with fruits and nuts, 300 calories), Snack (Carrot sticks with hummus, 100 calories), Lunch (Grilled chicken breast with brown rice and vegetables, 400 calories), Snack (Greek yogurt with berries, 150 calories), and Dinner (Grilled fish with quinoa and steamed vegetables, 500 calories). A reminder to stay hydrated and avoid processed foods is also included. At the bottom, there is a text input field with the placeholder 'Type something...' and a send button.

IBM watsonx

Upgrade ? 🔔 Gufran khan's Account Dallas GK

Deployment spaces / Nutrition Agent_Your_helper / watsonx Agent

watsonx Agent Deployed Online

API reference Test **Preview**

New chat +

G You 08:17 AM
Age: 34 | Gender: male | Height: 162 cm | Weight: 68 kg, no health issue, What should I eat in a day if I want to lose 5 kg in 2 months?

watsonx Agent 08:17 AM
To lose 5 kg in 2 months, you should focus on a calorie-controlled diet with a balance of protein, healthy fats, and complex carbohydrates.

Here's a sample meal plan for you:

- Breakfast: Oatmeal with fruits and nuts (300 calories)
- Snack: Carrot sticks with hummus (100 calories)
- Lunch: Grilled chicken breast with brown rice and vegetables (400 calories)
- Snack: Greek yogurt with berries (150 calories)
- Dinner: Grilled fish with quinoa and steamed vegetables (500 calories)

Remember to stay hydrated by drinking plenty of water throughout the day. Also, try to avoid processed foods, sugary drinks, and saturated fats.

Type something... ➤

FUTURE SCOPE

- Future improvements for the Nutrition AI Agent could focus on integrating additional data sources such as biometric sensor data from wearables, regional food databases, and real-time grocery availability to provide more precise and context-aware recommendations. The algorithm can be optimized using advanced machine learning techniques like reinforcement learning to adapt to user feedback and graph neural networks to better understand food-nutrient relationships. Expanding the system to support multiple regions would require incorporating cultural dietary preferences, local nutrient guidelines, and multilingual capabilities. Emerging technologies such as edge computing could be leveraged to process data locally on user devices, ensuring faster recommendations and enhanced privacy, while federated learning could allow model improvements without centralized data storage.

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- References:
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- IBM Cloud Documentation. (2024). *Data storage and AI model deployment using IBM Cloud*. Retrieved from <https://cloud.ibm.com/docs>
- Chen, M., Wang, R., & Zhang, Y. (2023). *Edge AI for health: Efficient nutrition monitoring using IoT devices*. IEEE Internet of Things Journal, 10(4), 3120-3132.
- Willett, W., et al. (2019). *Food in the Anthropocene: The EAT–Lancet Commission on healthy diets from sustainable food systems*. The Lancet, 393(10170), 447-492.
- **Project Details** – Git Hub Link–https://github.com/iGufrankhan/IBM_CLOUD_INTERNSHIP

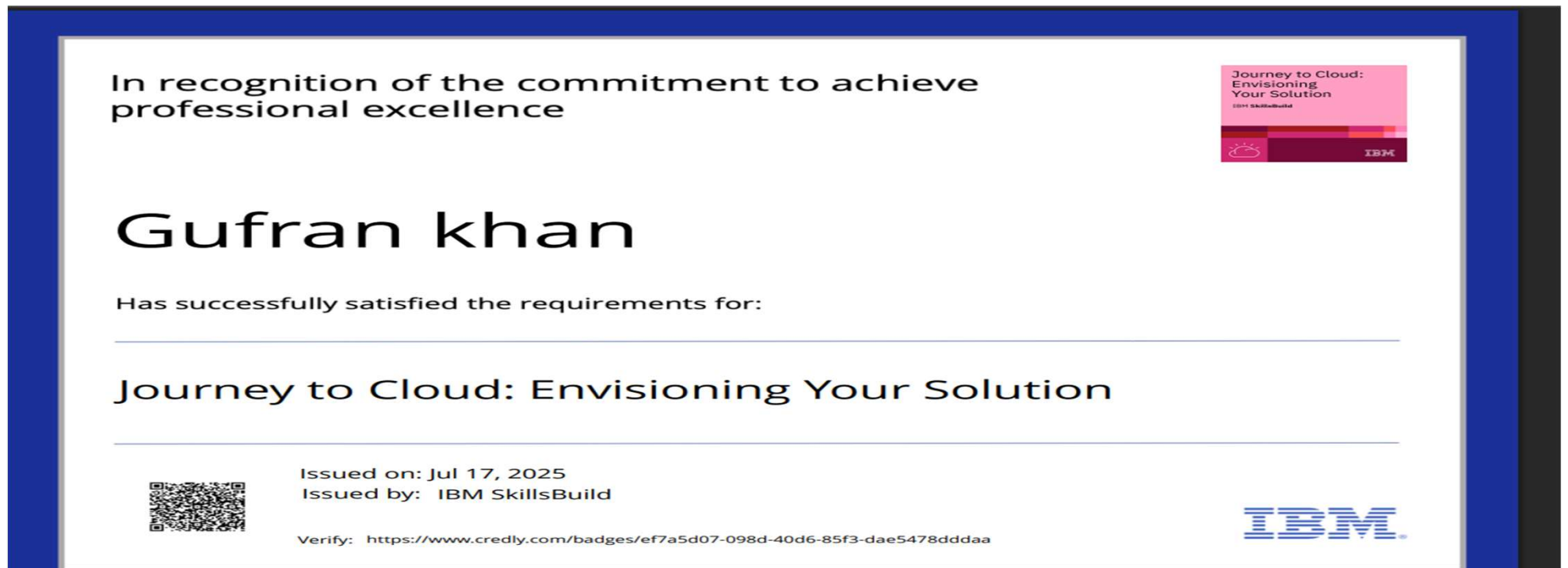
IBM CERTIFICATIONS

Getting Started With AI Certificate



IBM CERTIFICATIONS

Journey to Cloud Certificate



IBM CERTIFICATIONS

RAG With Langchain Lab Certificate



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THANK YOU