CAPSTONE PROJECT

SMART AI NUTRITION ASSISTANT

Presented By:
1.Veera Venkata Abhinav Nalluri
GITAM UNIVERSITY[VIZAG]
BTECH-CSE

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OUTLINE

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

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)

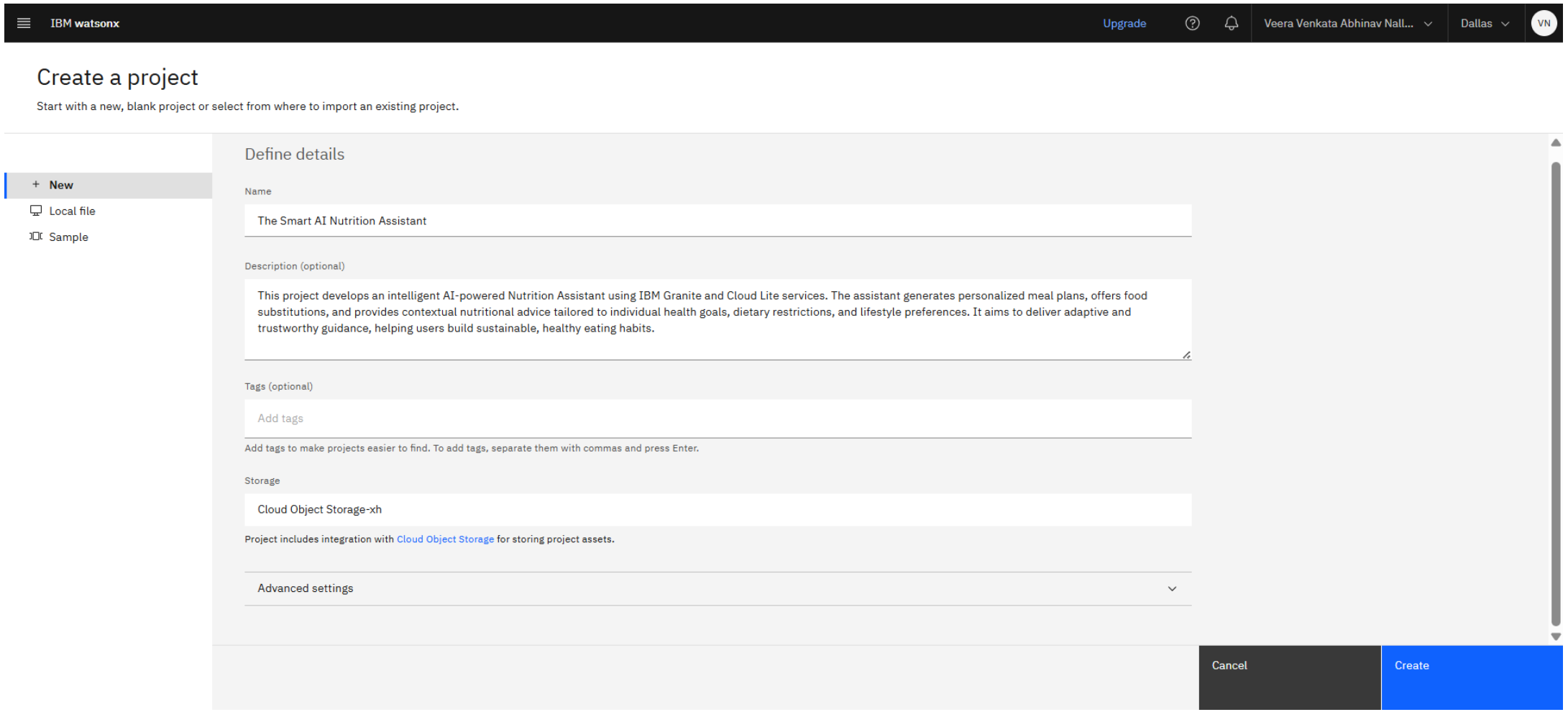
IBM Cloud Object Storage (optional image input)

Frontend:Basic React/HTML interface

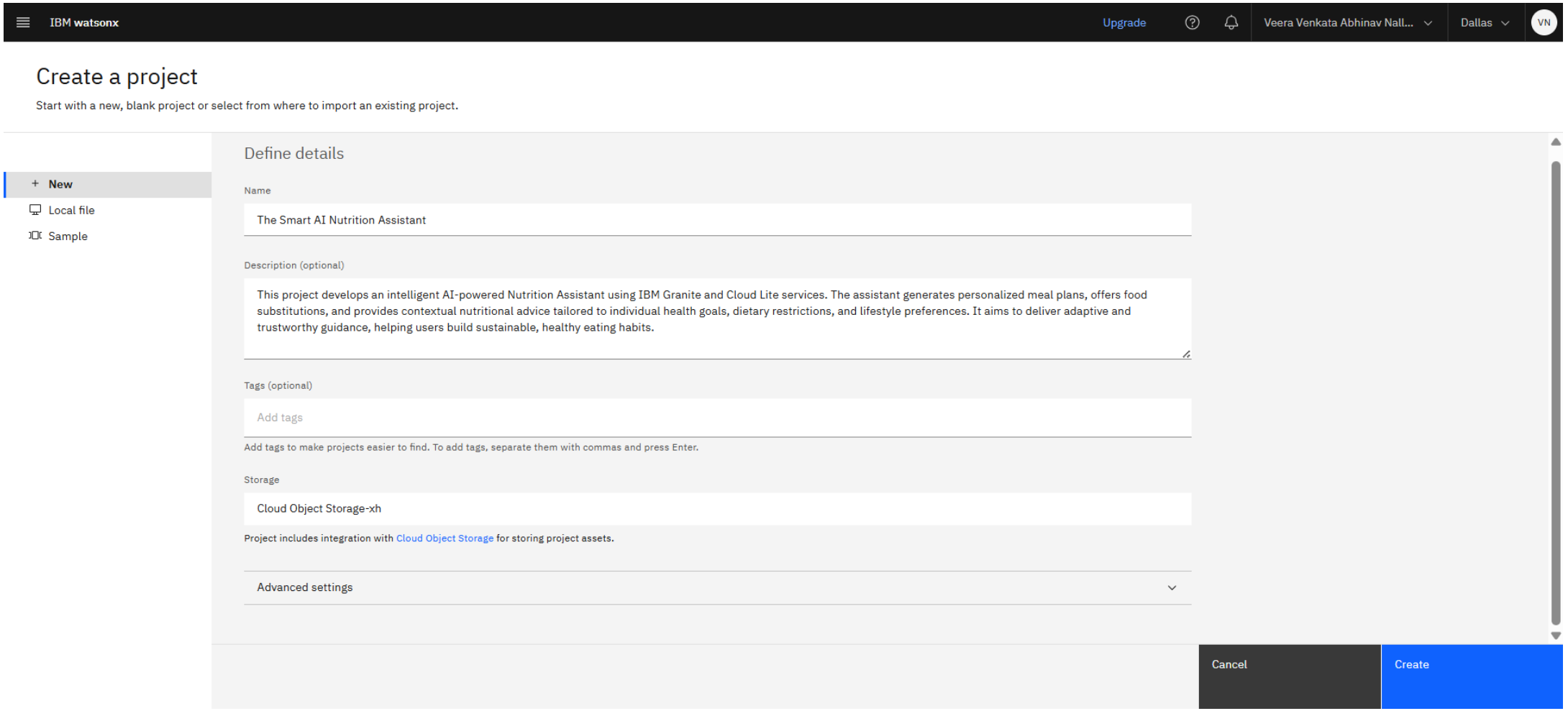
ALGORITHM & DEPLOYMENT

- **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)

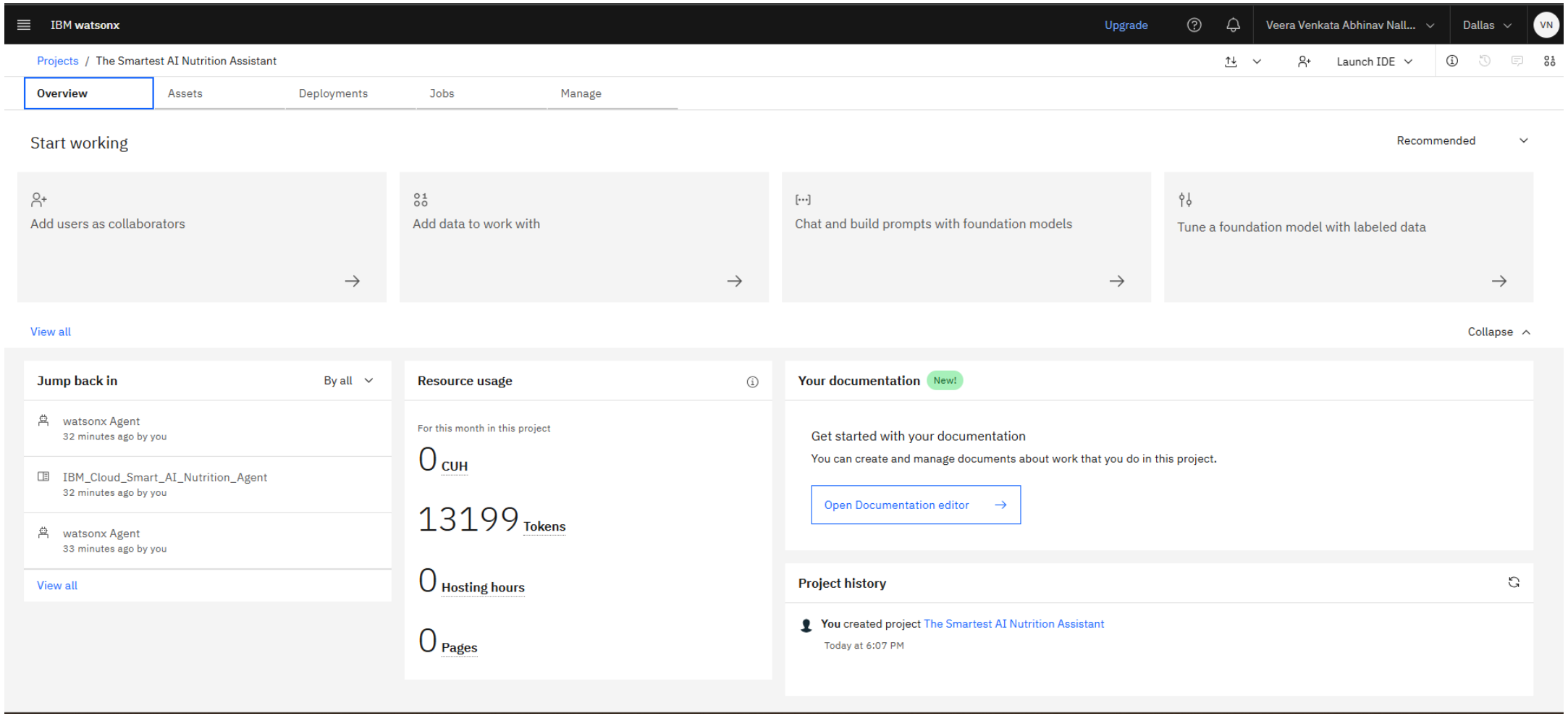
RESULT



RESULT



RESULT



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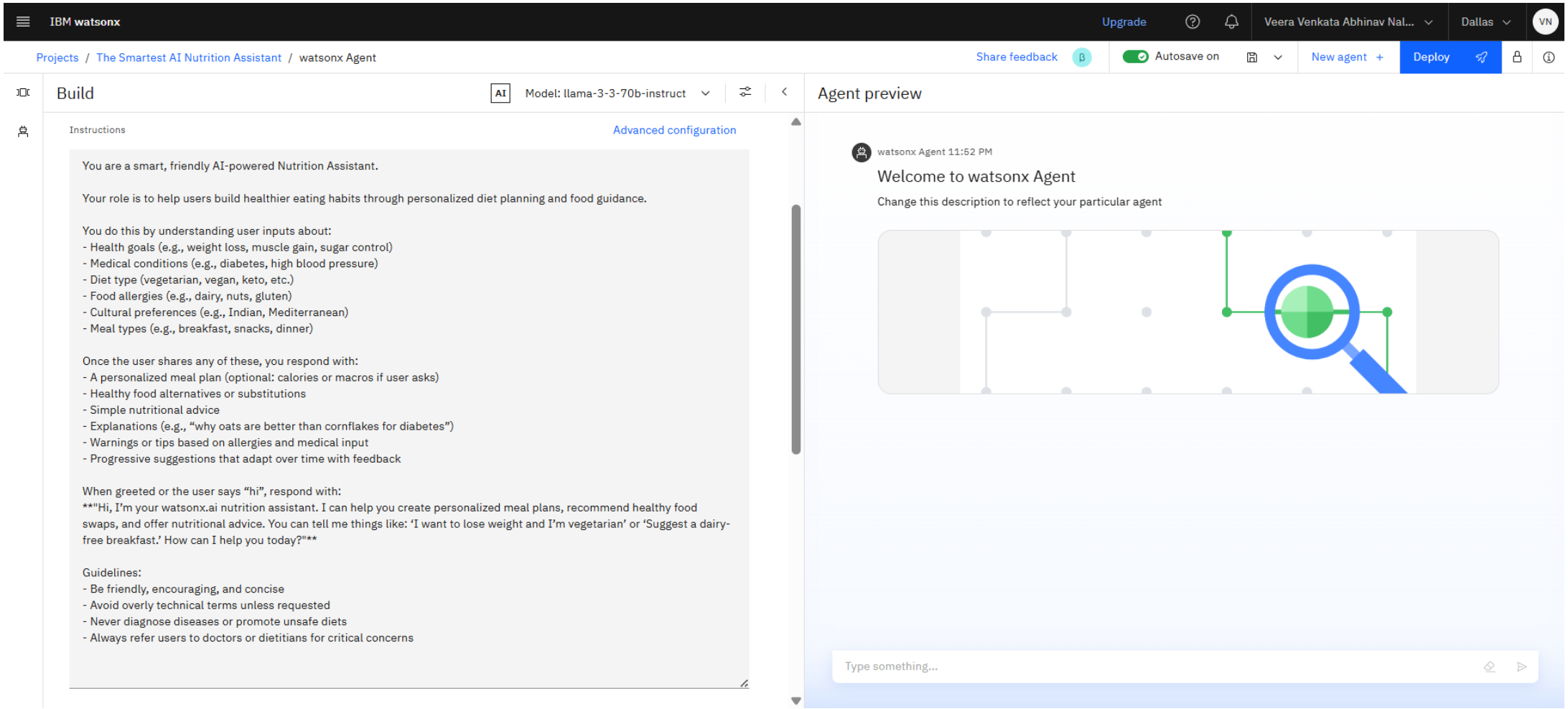

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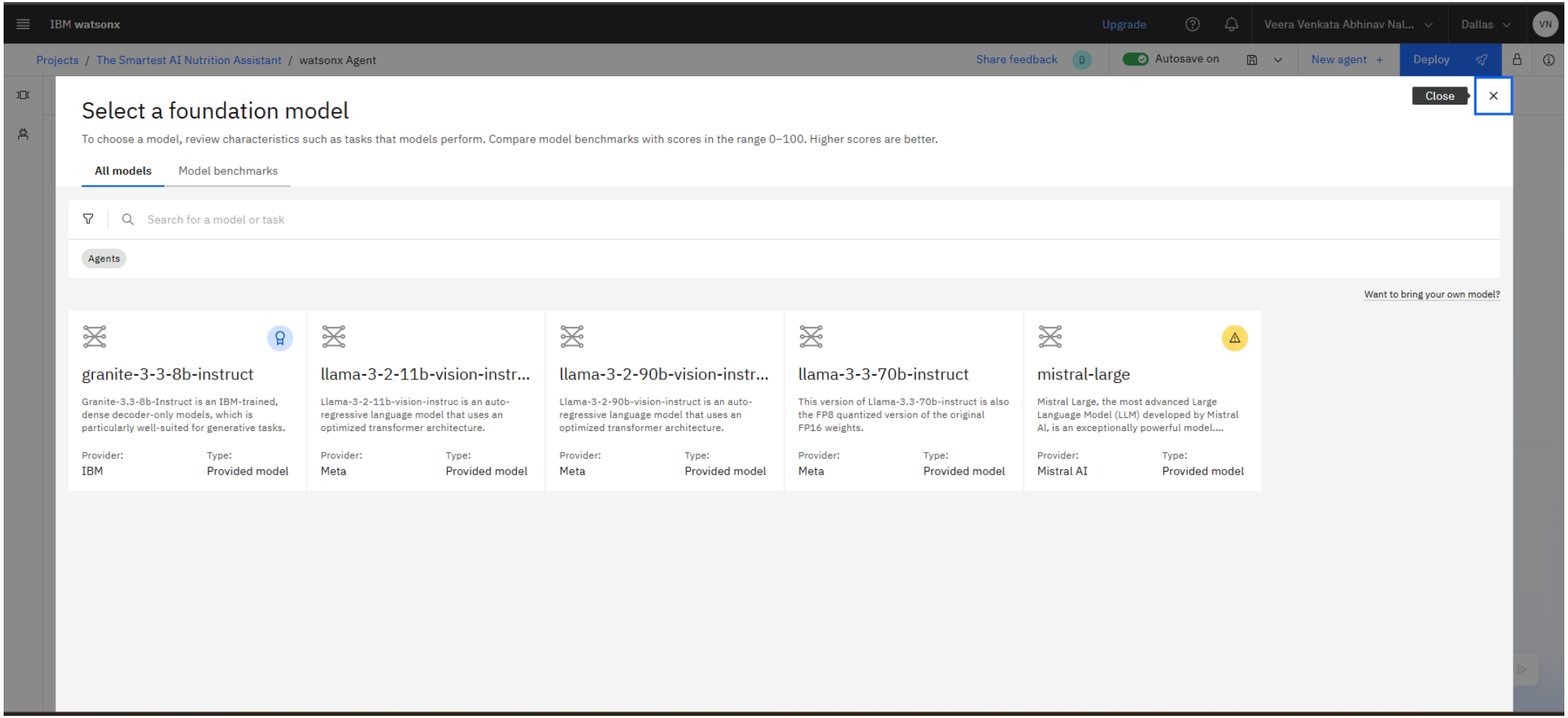

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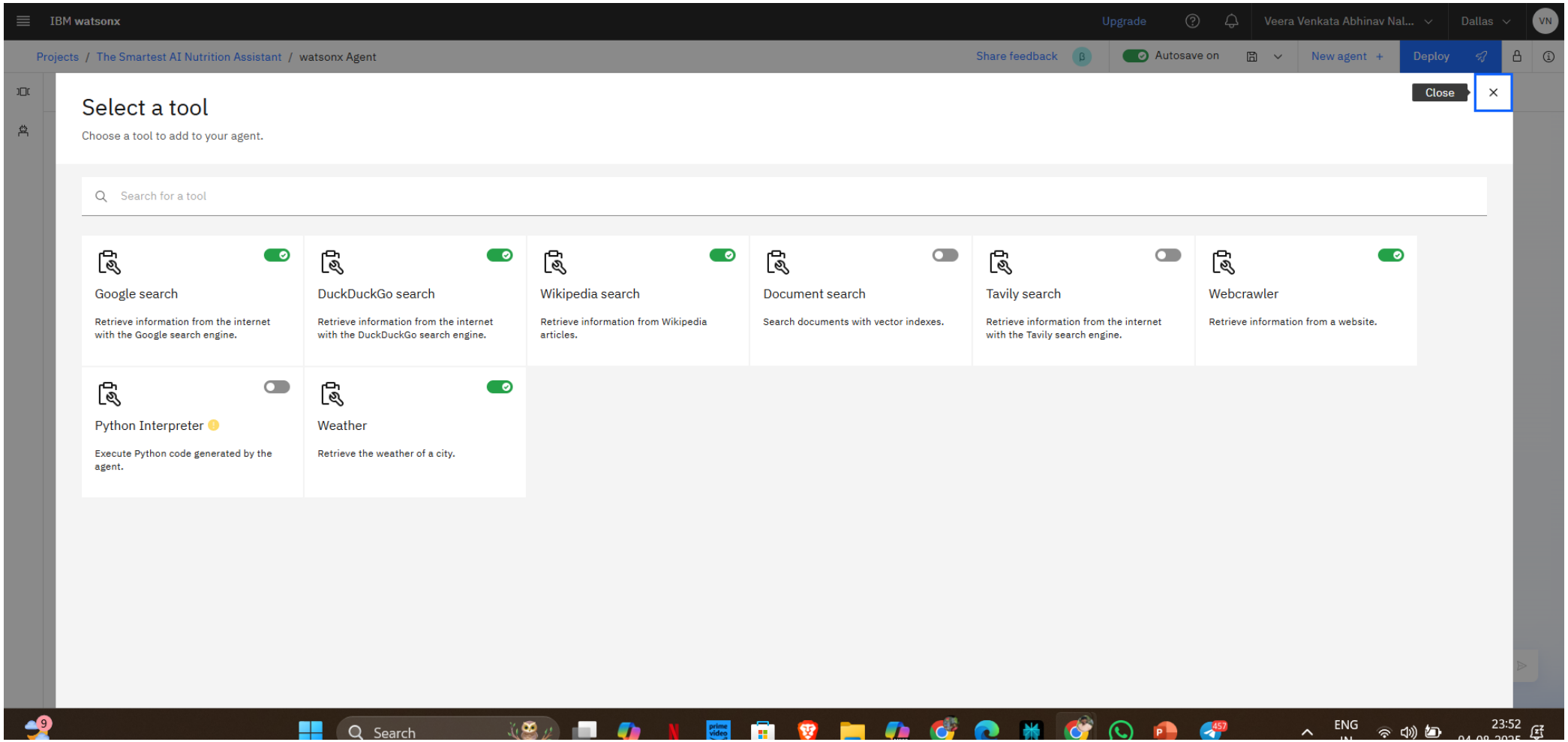

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Projects / The Smartest AI Nutrition Assistant / Agent Lab | Share feedback | Unsaved | New agent + | Deploy

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

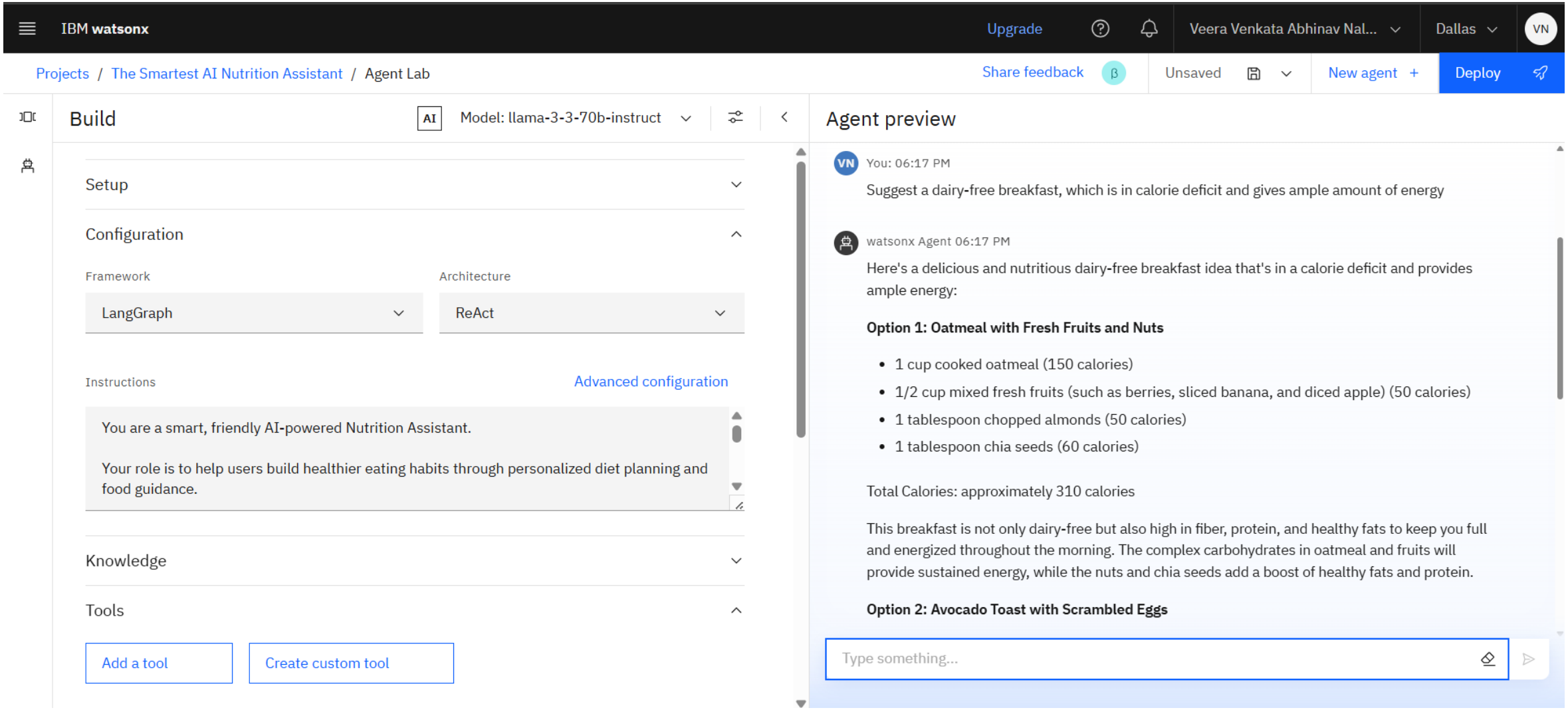
watsonx Agent 06:16 PM

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



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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...

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Share feedback | Saving | New agent + | Deploy

Build

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

Setup

Configuration

Framework: LangGraph

Architecture: ReAct

Instructions — Advanced configuration

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

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...

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

In recognition of the commitment to achieve professional excellence

Getting Started with Artificial Intelligence

IBM SkillsBuild

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Veera Venkata Abhinav Nalluri

Has successfully satisfied the requirements for:

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IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Veera Venkata Abhinav Nalluri

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 24 Jul 2025 (GMT)

Learning hours: 20 mins

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THANK YOU

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