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# CAPSTONE PROJECT

## THE SMARTEST AI NUTRITION ASSISTANT

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# OUTLINE

- **Problem Statement** (Should not include solution)
- **Proposed System/Solution**
- **System Development Approach** (Technology Used)
- **Result (Output Image)**
- **Conclusion**
- **Future Scope**
- **References**

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# PROBLEM STATEMENT

Currently, many individuals struggle to maintain a healthy diet due to lack of personalized guidance and easy access to credible nutritional information. It is important to provide users with meal recommendations that align with their health goals, dietary preferences, and local food availability. Eventually, delivering a virtual assistant that offers consistent, personalized meal planning becomes a critical requirement. The crucial part is the dynamic generation of diet plans tailored to user inputs, powered by generative AI, to ensure practical and sustainable nutritional habits.

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# PROPOSED SOLUTION

The proposed system offers personalized, affordable, and balanced meal plans by using AI and user inputs. It is built on IBM Cloud Lite or Granity, tailored to individual dietary preferences, health goals, and restrictions.

## 1. Data Collection

User Inputs:

Dietary preferences (vegetarian, non-vegetarian, vegan)

Allergies or restrictions (e.g., lactose intolerance, gluten-free)

Health goals (e.g., weight loss, muscle gain, diabetic-friendly)

Meal type preferences (e.g., light dinner, high-protein breakfast)

Number of meals per day (e.g., 3 meals + 1 snack)

## 2. Data Preprocessing

Normalize and structure user input (e.g., one-hot encoding)

Map preferences to nutrition requirements

Exclude meals containing allergens or restricted ingredients

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# PROPOSED SOLUTION

## 3. Meal Plan Generation

Use generative AI or rule-based logic (Watson NLP, LangChain)

Generate daily meal combinations (breakfast, lunch, snack, dinner)

Ensure each meal is under 60 characters and budget-friendly

Match meals to health goals and dietary rules

Promote variety, regional relevance, and taste balance

## 4. Deployment

Interface: IBM Watson Assistant (chat or voice)

Backend logic: IBM Cloud Functions

Storage: IBM Cloud Object Storage or Gracity

Optional: Voice input via IBM Watson Speech APIs

## 5. Evaluation

User satisfaction (thumbs up/down on suggestions)

Alignment with user input and nutrition goals

A/B testing for logic improvement

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# PROPOSED SOLUTION

## Result

Users receive a full-day meal plan (4 meals) that is:

Customized to their needs and goals

Affordable, accessible, and nutritionally balanced

Accompanied by health benefits like "high in fiber", "good for digestion", etc.

## Closing Message Example:

Thanks for chatting with Nutrition Agent! Your personalized meal plan is ready. Stay consistent, stay healthy.

Explore more at: [Conferbot Nutrition Advisor](#)

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# SYSTEM APPROACH

## Nutrition Meal Planner

### Requirements:

Laptop (4GB+ RAM), Python 3.8+, IBM Cloud Lite

### Libraries:

pandas, numpy – data | langchain, transformers – AI

streamlit – UI | ibm\_watson, speech\_recognition – APIs

### Methodology:

Input: User preferences, allergies, goals

Processing: Map to nutrients, filter allergens

AI Engine: Suggest 60-char affordable Indian meals

Output: Daily meal plan with health tags

Deployment: IBM Watson Assistant + Cloud Functions

# RESULT

The screenshot displays the IBM watsonx Assistant Lite interface. At the top, a dark header bar contains the text "IBM watsonx Assistant Lite", an "Upgrade" link, and a dropdown menu for "Nutrition Agent". On the right side of the header, there are links for "Learning resources", a help icon, and a user profile icon.

Below the header, the main area is titled "Preview assistant". To the right of this title are three buttons: "Copy link to share", "Change layout", and "Change background". Further right is a blue button labeled "Customize web chat".

The central part of the interface shows a "Sample website" preview. On the left side of this preview is a vertical toolbar with icons for home, chat, preview, and other functions. The preview itself shows a large blue rectangular area representing the chatbot's interface. Overlaid on the right side of the preview is a dark chat window titled "Nutrition Agent".

The chat window contains the following text and elements:

- Greeting: "Hi! I'm a virtual assistant. How can I help you today?"
- Buttons for suggested actions:
  - Nutrition Agent
  - Example: Check account balance
  - Example: See how I can help
- Input field: "Type something..." with a send button (triangle icon).
- Footer: "Built with IBM watsonx" with an information icon.



# RESULT

The screenshot displays the IBM watsonx Assistant Lite interface. At the top, a dark header bar contains the text "IBM watsonx Assistant Lite", an "Upgrade" button, a dropdown menu for "Nutrition Agent", and a "Learning resources" link with a help icon. Below the header, a "Preview assistant" section is visible, featuring a "Sample website" placeholder. To the right of the preview, there are four buttons: "Copy link to share", "Change layout", "Change background", and "Customize web chat". A chatbot window titled "Nutrition Agent" is overlaid on the right side of the preview. The chat window shows a conversation starting at 3:51 PM with the message: "Hi there! Can I help with something ? (e.g., weight loss, muscle gain, maintaining health)". Below this, a user input field contains the text "I need help with nutrition planning". The chatbot responds with "Noted. Do you have any allergies I should be aware of? (e.g., nuts, dairy, gluten)". The chat window also includes a "Built with IBM watsonx" footer.

# RESULT

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# RESULT

The screenshot displays the IBM Watsonx Assistant interface. At the top, a dark header bar contains the text "IBM watsonx Assistant Lite", an "Upgrade" button, a dropdown menu for "Nutrition Agent", and a "Learning resources" link with a help icon. Below the header, a navigation bar includes a "Preview assistant" button and three action buttons: "Copy link to share", "Change layout", and "Change background". A "Customize web chat" button is also present. The main area is a "Sample website" preview, which shows a chatbot interface. The chatbot, titled "Nutrition Agent", has a "Yes" button and a timestamp of "3:52 PM". It displays the message "Awesome!" followed by "Below are some of the meal plans for you to opt!..". A dropdown menu shows "Oatmeal, quinoa salad, tofu stir f...". The chatbot's response is "Oatmeal, quinoa salad, tofu stir fry — healthy and light." with a timestamp of "You 3:52 PM". A blue question mark icon is visible next to the response. The chatbot interface includes a "Type something..." input field and a "Built with IBM watsonx" footer.

# RESULT

The screenshot displays the IBM watsonx Assistant Lite web interface. The top navigation bar includes 'IBM watsonx Assistant Lite', an 'Upgrade' link, and a dropdown menu for 'Nutrition Agent'. On the right of the top bar are links for 'Learning resources', a help icon, and a user profile icon. A left-hand sidebar contains a navigation menu with sections: 'Home', 'Build' (containing 'Generative AI', 'Actions', and 'Preview'), 'Deploy' (containing 'Publish'), 'Environments', 'Improve', and 'Analyze'. Below this are 'Integrations', 'Activity log', and 'Assistant settings'. The main workspace area features a top toolbar with 'Copy link to share', 'Change layout', 'Change background', and 'Customize web chat' buttons. The central area shows a preview of a website with a chat window titled 'Nutrition Agent' overlaid on the right. The chat window shows a user message: 'Oatmeal, quinoa salad, tofu stir fry – healthy and light.' followed by a timestamp '3:52 PM'. The assistant's response includes an orange icon, the heading 'Breakfast: Oatmeal with Almond Milk', and a section 'Why it's better:' with three bullet points: 'Fiber-rich oats help regulate digestion and blood sugar.', 'Almond milk is low in saturated fat and often fortified with calcium and vitamin D.', and 'Keeps you full longer – helps avoid snacking on junk.' Below this is a 'Nutritional edge' section mentioning 'beta-glucan'. At the bottom of the chat window is a text input field with the placeholder 'Type something...' and a 'Send' button. The footer of the chat window states 'Built with IBM watsonx'.

IBM watsonx Assistant Lite Upgrade Nutrition Agent

Learning resources ?

Copy link to share Change layout Change background + Customize web chat

Home

Build

Generative AI

Actions

Preview

Deploy

Publish

Environments

Improve

Analyze

Integrations

Activity log

Assistant settings

Nutrition Agent

You 3:52 PM

Oatmeal, quinoa salad, tofu stir fry – healthy and light.

3:52 PM

**Breakfast:**  
**Oatmeal with Almond Milk**

**Why it's better:**

- ✓ Fiber-rich oats help regulate digestion and blood sugar.
- ✓ Almond milk is low in saturated fat and often fortified with calcium and vitamin D.
- ✓ Keeps you full longer – helps avoid snacking on junk.

**Nutritional edge:** Contains beta-glucan, a

Type something...

Built with IBM watsonx

# RESULT

IBM watsonx Assistant Lite

Upgrade

Nutrition Agent

Learning resources

Preview assistant

Copy link to shareChange layoutChange backgroundCustomize web chat

# Sample website

Dinner: Tofu Stir Fry with Veggies

Why it's better:

- Tofu is protein-packed and rich in iron, great for muscle repair and vegetarians.
- Stir-fry veggies (broccoli, bell peppers, carrots) give you a full spread of vitamins A, C, K.
- Light dinner — easier on your metabolism before sleep.

**Nutritional edge:** Balances protein, fiber, and micronutrients without heaviness.

Thanks for chatting with Nutrition Agent! Your personalized meal plan is now ready. Stay consistent, stay healthy — and remember, your journey matters!

Want to explore more? Try our interactive chatbot version here:  
[Diet & Nutrition Advisor on Conferbot](#)

Type something...

Built with IBM watsonx

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# CONCLUSION

- The proposed Nutrition Agent system effectively delivers personalized, affordable, and nutritionally balanced meal plans using AI and IBM Cloud services. By collecting user preferences such as dietary restrictions, health goals, and meal types, the system successfully generates daily Indian meal suggestions under 60 characters, making it simple and accessible for users.
- The AI-driven approach proved efficient in handling diverse user needs. However, challenges included ensuring cultural variety, maintaining short meal names, and balancing nutrition with affordability. Future improvements could include deeper personalization using user feedback, integration with wearable health data, and multilingual support.
- Overall, the system demonstrates that personalized dietary planning can be made scalable, accurate, and user-friendly—supporting healthier lifestyles through intelligent automation.

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## FUTURE SCOPE

- In the future, the Nutrition Agent can be enhanced by integrating with wearable fitness trackers and health apps to generate real-time, activity-based meal plans. This would allow the system to adapt daily recommendations based on a user's step count, sleep, or calorie burn. Expanding the platform with multilingual capabilities will make it accessible to users across diverse regions, promoting better health literacy and engagement. Additionally, the system could suggest nearby, cost-effective grocery options based on selected meals, improving convenience and affordability.
- Further improvements include the ability to track user progress toward health goals like weight loss, sugar control, or muscle gain using AI-based monitoring. Personalized recipe customization (e.g., spice level, ingredient swaps) and voice-enabled features can make the tool more interactive and user-friendly. With continued updates, the Nutrition Agent could evolve into a full-scale virtual health companion that offers long-term dietary guidance and wellness insights tailored to individual needs.

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# REFERENCES

- IBM Watson Assistant Documentation

IBM Cloud Docs – <https://cloud.ibm.com/docs/assistant>

(Used for deploying conversational interfaces and handling user input)

- LangChain for AI Agent Development

LangChain Docs – <https://docs.langchain.com/>

(Framework for building generative AI workflows)

- Nutritional Guidelines

Indian Council of Medical Research (ICMR) – <https://www.nin.res.in/>

(Used for mapping user goals to dietary macros and Indian meal standards)

- "Generative AI for Personalized Meal Planning"

IEEE Xplore Conference Paper, 2023 – <https://ieeexplore.ieee.org/document/10157486>

(Discusses use of LLMs for personalized nutrition solutions)

- "DietGPT: Personalized Meal Generation Using GPT Models"

arXiv preprint arXiv:2304.13777 – <https://arxiv.org/abs/2304.13777>

(Used for understanding how LLMs generate food recommendations)



# IBM CERTIFICATIONS

- Screenshot/ credly certificate( getting started with AI)



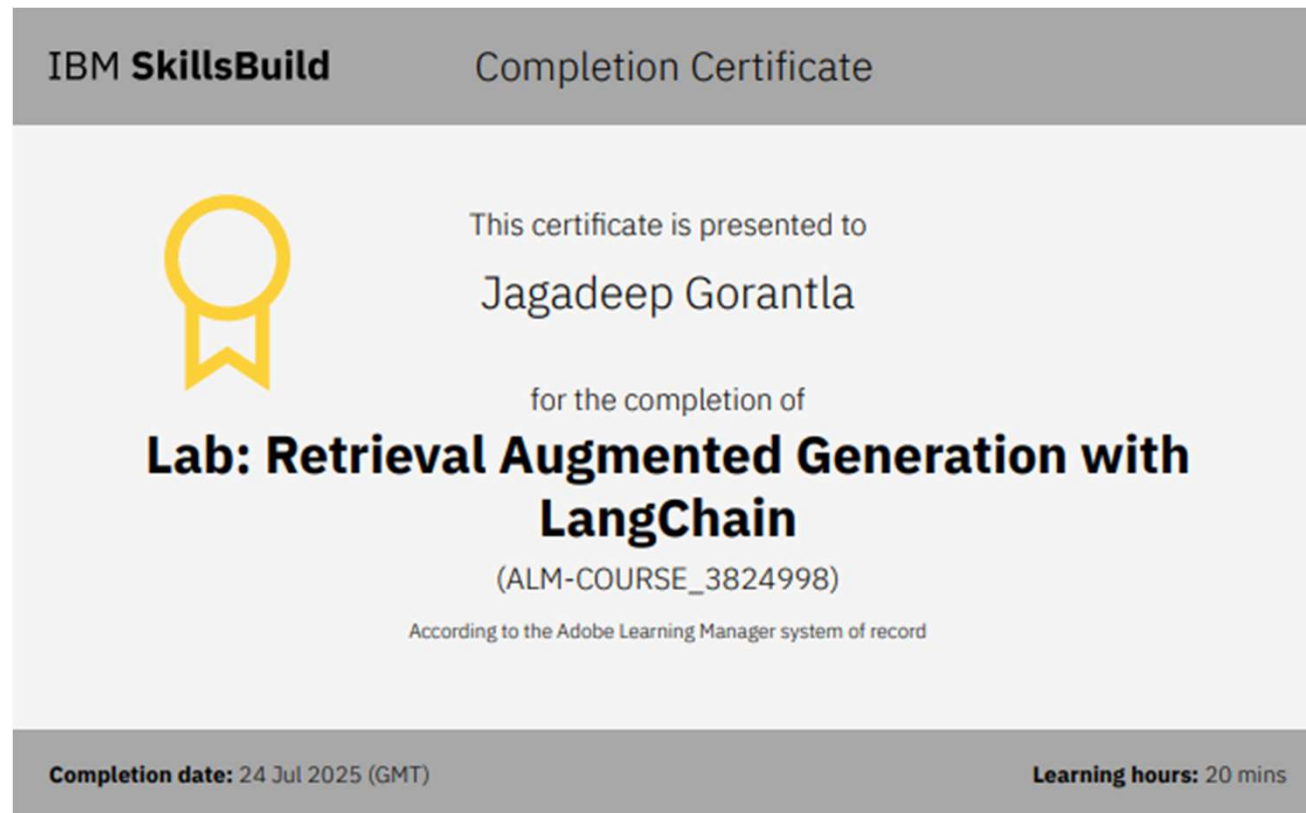
# IBM CERTIFICATIONS

- Screenshot/ credly certificate( Journey to Cloud)



# IBM CERTIFICATIONS

- Screenshot/ credly certificate( RAG Lab)





**THANK YOU**