
CAPSTONE PROJECT

CHRONIC DISEASE MONITOR

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CyberSecurity including Block Chain Technology)**

OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result (Output Image)
- Conclusion
- Future Scope
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PROBLEM STATEMENT

This AI-powered agent supports patients and healthcare providers in managing chronic conditions like **diabetes, hypertension, and heart disease**.

It analyzes data from **wearables, medical records, and patient inputs** to detect early warning signs. Using **predictive analytics**, it delivers **personalized insights, medication reminders, and lifestyle recommendations**.

By enabling **real-time monitoring and alerts**, the agent promotes proactive care, reduces hospital visits, and improves treatment adherence—ultimately enhancing chronic care outcomes through continuous, intelligent support.

PROPOSED SOLUTION

- A smart Chronic Disease Monitoring Agent was developed using **IBM watsonx.ai's Prompt Lab (Lite Plan)**.
- The agent is built using **instruction-based logic**, requiring **no coding or chatbot scripting**.
- It collects user health data such as:
 1. Vital signs (e.g., blood sugar, blood pressure)
 2. Daily activity (steps, sleep)
 3. Meals and hydration
 4. Medication adherence
 5. Symptoms and lifestyle habits
- Instead of raw numeric inputs, it guides users through **structured health questions** for consistency and clarity.
- Based on user input, it simulates real-time health support, including:
- Personalized lifestyle and dietary recommendations
- Health risk alerts (e.g., elevated BP or sugar trends)
- Doctor summary reports (in 2–3 lines)
- Tips to improve fitness and routine management
- The agent was **fully developed and tested in IBM Cloud (Lite Plan)** using the **watsonx instruction-based interface**, with no external models or APIs.
- It delivers a **personalized, intelligent, and user-friendly experience** for managing chronic conditions—promoting better adherence, early detection, and healthier habits.

SYSTEM APPROACH

- Platform Used: IBM Cloud – watsonx.ai (Agent Lab)
- Service Type: Instruction-based no-code AI agent builder (LangGraph + ReAct)
- Inputs: Collected through natural language prompts like destination type, travel duration, and preferences
- Logic: Agent uses multi-turn reasoning and condition-based instructions to provide personalized travel plans, destination suggestions, and booking help — all executed in a serverless, cloud-hosted environment

ALGORITHM & DEPLOYMENT

- Approach: Instruction-driven logic using natural language prompts (no machine learning or intent classification required).
- Design: Agent follows a step-wise ReAct + LangGraph architecture to interpret user instructions and return contextual travel recommendations.
- Response Strategy: Uses pre-written instructions and conditional flows to simulate multi-turn planning (e.g., suggest destinations, accommodations, transport, etc).
- Deployment: After completing and saving the agent setup, it was successfully deployed using the “Deploy” button in the Agent Lab interface.
- Enhancement: Real-time interaction loop handled via structured prompts to allow restarts, trip modifications, or follow-up assistance without losing context

RESULT

INSTRUCTIONS GIVEN TO THE AGENT:

The screenshot displays the IBM watsonx web interface for configuring an AI agent. The browser address bar shows the URL: `dataplatfom.cloud.ibm.com/wx/agents/f7131f29-3e12-4c8e-a248-c81654839c40?project_id=992d4117-6315-46db-be41-d95e8d877cc5&context=wx`. The page title is "IBM watsonx". The user is logged in as "Akshay Sudhakar's Account" with a location of "Dallas". The page is titled "Projects / chronic_disease_monitor / Sous Chef".

The interface is divided into two main sections: "Build" and "Agent preview".

Build Section:

- Framework:** LangGraph
- Architecture:** ReAct
- Instructions:**

You are an intelligent health assistant specialized in monitoring and guiding patients with chronic diseases such as diabetes, hypertension, and heart conditions.

Your role is to:

 - Interpret patient input (like sugar levels, blood pressure, activity, meals, medication adherence, symptoms)
 - Offer short, personalized health insights based on their data
 - Provide evidence-based food and lifestyle recommendations
 - Remind patients about missed medications or necessary health actions
 - Warn about health risks when vitals are outside the safe range
 - Summarize health status in 2–3 lines for a doctor if needed
 - Answer health-related questions in simple language (no complex medical jargon)
 - Always advise consulting a licensed doctor for serious conditions

Tone: Friendly, helpful, non-alarming, and motivational.
Avoid direct diagnosis or medical prescriptions.
- Knowledge:** (Empty field)

Agent preview Section:


Welcome to Sous Chef
Generating tasty recipe ideas based on the ingredients they have available.




The preview shows a diagram of the agent's workflow, which is a ReAct loop. It includes a "Sample questions" section with two example prompts:







- "I'm in Boston, MA. I have chicken breast, bell peppers, onions, and rice in my fridge. What are some recipe ideas I can make with these ingredients?"
- "I'm looking for a quick dinner idea using ground beef, tomatoes, and pasta. Can you suggest a few options?"

At the bottom, there is a text input field labeled "Type something..." with a send button.

AGENT PREVIEW:

 IBM watsonx


Upgrade ?  Akshay Sudhakar's Account ▾ Dallas ▾  AS 

Deployment spaces / chronic_disease_monitor / Sous Chef /      

Sous Chef Deployed Online

API reference Test **Preview**

New chat +

 Sous Chef 12:09 PM

Your blood sugar level is 162 mg/dL, which is still higher than the normal range. Your blood pressure is 135/88 mmHg, which is also above the normal range. You've walked 3200 steps today, which is an improvement. You mentioned having 2 chapatis with paneer curry and a glass of sweet lassi.


To help manage your blood sugar and blood pressure, consider the following:


1. **Diet:** Opt for whole grains and reduce your intake of sugary beverages.
2. **Exercise:** Continue to increase your physical activity. Aim for at least 30 minutes of moderate exercise most days of the week.
3. **Hydration:** Stay hydrated by drinking plenty of water throughout the day.
4. **Monitoring:** Continue to monitor your blood sugar and blood pressure regularly.

If your blood sugar and blood pressure remain high, please consult your healthcare provider for further guidance.


► How did I get this answer?


About this deployment



Name 
Sous Chef


Description 
Generating tasty recipe ideas based on the ingredients they have available.


Deployment Details


Deployment ID: 7d8d6e3d-7a37-44... 



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 
 [Sous Chef](#)

SAVING AND DEPLOYING THE AGENT:

The screenshot displays the IBM Watsonx interface for building and deploying an AI agent. The top navigation bar includes the IBM Watsonx logo, an 'Upgrade' button, a help icon, a notification bell, the user's account name 'Akshay Sudhakar's Account', the location 'Dallas', and a user profile icon 'AS'. The main content area is divided into two panels: 'Build' on the left and 'Agent preview' on the right.

Build Panel:

- Model:** mistral-large (with a warning icon)
- Setup:** A section for initial setup.
- Configuration:** A section for configuring the agent.
 - Framework:** LangGraph
 - Architecture:** ReAct
- Instructions:** A text area containing the role definition: "You are an intelligent health assistant specialized in monitoring and guiding patients with chronic diseases such as diabetes, hypertension, and heart conditions. Your role is to: Interpret patient input (like sugar levels, blood pressure, activity, meals, medication)." A link for "Advanced configuration" is also present.
- Knowledge:** A section for adding knowledge.
- Tools:** A section for adding tools, with buttons for "Add a tool" and "Create custom tool".
- Added tools (5):** A list of added tools.

Agent preview Panel:

- Welcome to Sous Chef:** A message stating "Generating tasty recipe ideas based on the ingredient".
- Flow Diagram:** A visual representation of the agent's workflow.
- Sample questions:** Two example questions are provided:
 - "I'm in Boston, MA. I have chicken breast, bell peppers, onions, and rice in my fridge. What are some recipe ideas I can make with these ingredients?"
 - "I'm looking for a quick dinner idea using ground beef, tomatoes, and pasta. Can you suggest a few options?"
- Chat Input:** A text input field with the placeholder "Type something..." and a send button.

Deployment Notification: A blue box in the top right corner of the 'Agent preview' panel indicates that the deployment has started. It contains the text: "Deployment has started. Your AI service deployment has started. View status. Timestamp 12:06:03 PM".

DIFFERENT TOOLS USED BY THE AGENT:

The screenshot displays the IBM Watsonx web interface. The top navigation bar includes the IBM Watsonx logo, an 'Upgrade' button, a help icon, a notification bell, and user account information for 'Akshay Sudhakar's Account' in the 'Dallas' region. The breadcrumb trail shows the path: Projects / chronic_disease_monitor / Sous Chef. The main interface is split into two panels. The left panel, titled 'Build', shows the configuration for the 'Sous Chef' agent, which is using the 'mistral-large' model. It features buttons for 'Add a tool' and 'Create custom tool', and a list of five added tools: Google search, DuckDuckGo search, Wikipedia search, Webcrawler, and Weather. The right panel, titled 'Agent preview', shows a preview of the agent's capabilities. It includes a welcome message, a description of its function (generating recipe ideas), a visual representation of its workflow, and sample questions for testing. The interface is clean and modern, with a blue and white color scheme.

dataplatform.cloud.ibm.com/wx/agents/f7131f29-3e12-4c8e-a248-c81654839c40?project_id=992d4117-6315-46db-be41-d95e8d877cc5&context=wx

IBM watsonx Upgrade ? Akshay Sudhakar's Account Dallas AS

Projects / chronic_disease_monitor / Sous Chef Share feedback Autosaved 12:00 PM New agent Deploy

Build AI Model: mistral-large

Add a tool Create custom tool

Added tools (5)

- Google search**
Retrieve information from the internet with the Google search engine.
- DuckDuckGo search**
Retrieve information from the internet with the DuckDuckGo search engine.
- Wikipedia search**
Retrieve information from Wikipedia articles.
- Webcrawler**
Retrieve information from a website.
- Weather**
Retrieve the weather of a city.

Agent preview

Welcome to Sous Chef

Generating tasty recipe ideas based on the ingredients they have available.

Sample questions

- I'm in Boston, MA. I have chicken breast, bell peppers, onions, and rice in my fridge. What are some recipe ideas I can make with these ingredients?
- I'm looking for a quick dinner idea using ground beef, tomatoes, and pasta. Can you suggest a few options?

Type something...

CONCLUSION

- The AI agent for chronic disease monitoring demonstrates the transformative potential of artificial intelligence in improving long-term healthcare management. By leveraging data from wearables, patient inputs, and medical records, the agent enables continuous monitoring and early detection of health risks.
- Through personalized insights, medication reminders, and lifestyle recommendations, it empowers patients to take charge of their health while supporting healthcare providers with actionable information. The agent significantly enhances proactive care, reduces the frequency of hospital visits, and promotes better adherence to treatment plans.
- Ultimately, this intelligent assistant bridges the communication and care gap between patients and providers—making chronic disease management more accessible, efficient, and patient-centric.

FUTURE SCOPE

- The Chronic Disease Monitoring Agent has significant potential for future enhancements and scalability. Several key areas can be explored to expand and strengthen the system:
- **Integration with real-time wearable devices** (e.g., smartwatches, glucometers, BP monitors) to automate health data collection and improve accuracy.
- **Expansion to support more chronic conditions**, including asthma, arthritis, and mental health monitoring.
- **Multilingual support** for regional languages to enhance accessibility in rural and non-English-speaking populations.
- **AI model optimization** using advanced machine learning techniques like LSTM for time-series prediction and anomaly detection.
- **Deployment on edge devices** (e.g., mobile phones, local gateways) for offline or low-bandwidth environments.
- **Incorporation of telemedicine features**, such as automated doctor reports and appointment scheduling.
- **Scalability across healthcare networks** to support remote clinics, urban hospitals, and home care setups.
- **Integration with government health databases or hospital management systems (HMS)** to streamline care workflows.
- By adopting these future enhancements, the agent can evolve into a robust, intelligent healthcare assistant capable of improving chronic disease outcomes at scale.

REFERENCES

- IBM watsonx.ai Documentation – Official guide for building instruction-based agents using Agent Lab in IBM Cloud.
- IBM Cloud Lite Plan Services – Free-tier services leveraged for no-code agent development and deployment.
- Prompt Lab Tutorials and Resources – Learning materials used to understand instruction-driven agent logic and LangGraph architecture.

IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Akshay. S

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



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IBM CERTIFICATIONS

IBM SkillsBuild	Completion Certificate
	
This certificate is presented to	
Akshay S	
for the completion of	
Lab: Retrieval Augmented Generation with LangChain	
(ALM-COURSE_3824998)	
According to the Adobe Learning Manager system of record	
Completion date: 19 Jul 2025 (GMT)	Learning hours: 20 mins



THANK YOU