

Problem Statement No.27

AI AGENT FOR CHRONIC DISEASE MONITORING

Presented By:

1. Namrata Ghosh- Government College of Engineering & Textile Technology, Serampore – Computer Science & Engineering

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

- Chronic diseases such as diabetes, hypertension, and cardiovascular conditions remain leading causes of global mortality. Despite advancements in healthcare, early detection and continuous monitoring of chronic symptoms remain a major challenge—especially in underserved and remote regions. Fragmented health data, limited availability of intelligent diagnostic tools, and the lack of personalized tracking contribute to delayed interventions and poor patient engagement. There is a pressing need for a scalable, AI-driven solution that empowers users to monitor health trends proactively and supports medical professionals in clinical decision-making.

PROPOSED SOLUTION

- To support the effective management of chronic diseases, we developed a cloud-based AI agent leveraging the **Mistral Large foundation model** on **IBM Watsonx.ai**. The agent is designed to assist users in tracking symptoms, receiving medication reminders, and accessing lifestyle suggestions tailored to conditions like diabetes, hypertension, and heart disease.
- Key features:
- **Generative AI Support** using Mistral Large for understanding and responding to user health queries
- **Deployment on IBM Cloud Lite** for scalability and accessibility without complex infrastructure
- **Tool Integration** including Wikipedia and Google Search to provide real-time health insights and education
- **Conversational Flow** configured using LangGraph and ReAct architecture for dynamic user interaction
- **No training or data storage**, ensuring a lightweight setup focused on knowledge-based assistance
- This solution bridges the gap between patients and health information, promoting awareness and adherence without requiring custom datasets or local processing

SYSTEM APPROACH

- The System Approach outlines the strategy and methodology for developing the chronic disease monitoring AI agent using IBM Cloud services.

System Requirements

- **IBM Cloud Lite** account with access to Watsonx.ai platform
- **Internet connectivity** for cloud-based interactions and real-time data access
- **Web browser** for deploying and interacting with the AI agent
- **No local infrastructure or datasets needed**, ensuring simplicity and lightweight design

Libraries & Technologies Used

- **Watsonx.ai** – for deploying and managing the Mistral Large model
- **LangChain / LangGraph** – to define conversation flow and ReAct framework
- **Granite AI Model (Mistral Large)** – to generate responses and understand health-related queries
- **Tool Integrations** – Wikipedia and Google Search for real-time health education

ALGORITHM & DEPLOYMENT

Algorithm Selection

- I utilized the **Granite Mistral Large model**, a foundation-level generative AI algorithm, to provide intelligent responses to user health queries. This model was chosen for its high accuracy in understanding medical terminology and its compatibility with **cloud-based deployment** via **Watsonx.ai**, without requiring custom model training or dataset ingestion.
- **Data Input**
- The AI agent interacts using **real-time queries** from users (e.g., symptoms, lifestyle concerns, medication timing). I do **not** use personal health records or local data files, ensuring user privacy and a lightweight infrastructure.
- **Training Process**
- This project does **not include model training**. Instead, I leverage the **pre-trained capabilities** of Mistral Large to provide answers using integrated tools like **Wikipedia** and **Google Search** for additional medical context and education.



Prediction Process

- When a user enters a question about their health condition, I use ReAct + LangGraph logic to:
- Interpret the query context
- Use Mistral Large to generate an insightful response
- Call external tools if required for detailed or up-to-date information
- The result is a fluid, informative, and medically relevant output, accessible to users through a browser-based frontend deployed on **IBM Cloud Lite**.





RESULT


I have create a project named as ChronicCare_AI and configured with LangGraph framework and ReAct architecture.


Projects / ChronicCare_AI / Agent Lab



Share feedback β | Unsaved   | New agent +

Build

Model: No model selected    


Setup 

Configuration 


Framework LangGraph  Architecture ReAct 

Instructions [Advanced configuration](#)

You are a helpful assistant that uses tools to answer questions in detail.
When greeted, say "Hi, I am watsonx.ai agent. How can I help you?"

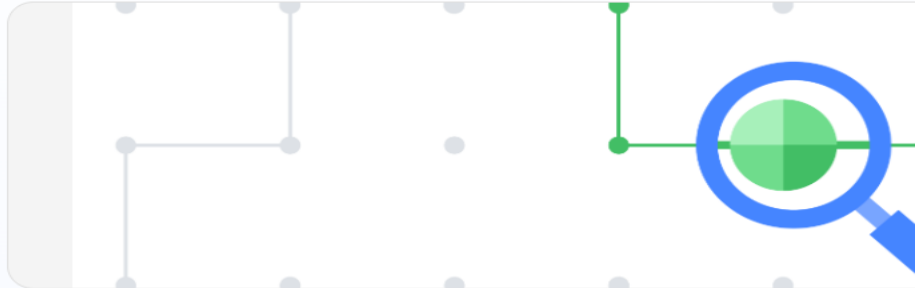
Knowledge 

Agent preview

 watsonx Agent 07:40 AM

Welcome to watsonx Agent

Change this description to reflect your particular agent



RESULT

I have selected the model as Mistral-large

The screenshot displays the IBM watsonx Agent Build interface. The top navigation bar includes the IBM watsonx logo, an Upgrade button, a help icon, a notification bell, and user account information (Namrata Ghosh's Account, Dallas, NG). Below the navigation bar, the breadcrumb trail shows 'Projects / ChronicCare_AI / watsonx Agent'. The main interface is divided into three sections: 'Saved agents', 'Build', and 'Agent preview'.

Saved agents: This section lists two agents: 'Sous Chef' (Generating tasty recipe ideas based on the ingredients they...) and 'watsonx Agent' (Change this description to reflect your particular agent).

Build: This section is for configuring the 'watsonx Agent'. It shows the 'Model' set to 'mistral-large'. The 'Framework' is 'LangGraph' and the 'Architecture' is 'ReAct'. The 'Instructions' section contains the text: 'You are a helpful assistant that uses tools to answer questions in detail. When greeted, say "Hi, I am watsonx.ai agent. How can I help you?"'. There are buttons for 'Add a tool' and 'Create custom tool'. The 'Added tools (5)' section is visible at the bottom.

Agent preview: This section shows a preview of the agent's interface. It includes a header 'Welcome to watsonx Agent' and a prompt 'Change this description to reflect your particular agent'. Below this is a diagram of a workflow with nodes and edges. A magnifying glass icon is overlaid on the diagram. At the bottom, there is a text input field labeled 'Type something...' and a send button.

RESULT

Added tools like Google Search, DuckDuckGo Search, Wikipedia Search, Webcrawler, Weather

The screenshot displays the IBM watsonx web application interface. At the top, a dark navigation bar includes the 'IBM watsonx' logo, an 'Upgrade' button, a help icon, a notification bell, and a user profile for 'Namrata Ghosh's Account' with a location dropdown set to 'Dallas'. Below this, a breadcrumb trail shows 'Projects / ChronicCare_AI / watsonx Agent', accompanied by a 'Share feedback' link and a 'beta' badge. The main interface is divided into three panels. The left panel, titled 'Saved agents', lists two agents: 'Sous Chef' (Generating tasty recipe ideas based on the ingredients they...) and 'watsonx Agent' (Change this description to reflect your particular agent). The central 'Build' panel is for configuring the 'watsonx Agent' using the 'mistral-large' model. It features a 'Tools' section with buttons to 'Add a tool' or 'Create custom tool'. Below, a list of five added tools is shown: '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.), and 'Weather' (Retrieve the weather of a city.). Each tool entry includes a settings icon and a delete icon. The right panel, 'Agent preview', shows a chat window with a timestamp of 09:20 AM. The message reads: 'Welcome to watsonx Agent' followed by 'Change this description to reflect your particular agent'. Below the text is a visual representation of the agent's workflow, depicted as a graph with nodes and a prominent magnifying glass icon. At the bottom of the preview is a text input field with the placeholder 'Type something...' and a send button.

RESULT

Then I deployed my project named the deployment space to ChronicCare_AI_Deployment and after creating API key successfully my project deployed .

IBM watsonx

Upgrade

?

Namrata Ghosh's Account

Dallas

NG

Deployment spaces /

ChronicCare_AI_Deployment

OverviewAssetsDeploymentsJobsManage

Search

Name	Type	Status	Asset	Asset type	Tags	Last modified	
watsonx Agent	Online	Deployed	watsonx Agent	Ai service		54 minutes ago Namrata Ghosh (You)	

RESULT

After clicking watsonx Agent this page appears and clicking on Preview this is the final project and now we can ask here about chronic diseases.

The screenshot displays the IBM watsonx Agent deployment page. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, and user account information (Namrata Ghosh's Account, Dallas, NG). The breadcrumb trail shows 'Deployment spaces / ChronicCare_AI_Deployment / watsonx Agent /'. The main content area features the 'watsonx Agent' title with 'Deployed' and 'Online' status indicators. Below this are three tabs: 'API reference', 'Test', and 'Preview' (which is active). A 'New chat +' button is located to the right of the tabs. The chat interface shows a message from 'watsonx Agent' at 09:28 AM: 'Welcome to watsonx Agent' followed by 'Change this description to reflect your particular agent'. Below the message is a diagram of a neural network with a green circle and a blue magnifying glass. At the bottom is a text input field with the placeholder 'Type something...'. On the right side, a sidebar titled 'About this deployment' provides details: Name (watsonx Agent), Description (Change this description to reflect your particular agent), Deployment Details (Deployment ID: a1afd843-a44c-4c..., 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), and Associated asset (watsonx Agent, 03562df2-2217-4c96-9af1-94393ac79a95).

RESULT

Here I asked my ai agent that what are the common chronic diseases.

The screenshot displays the IBM Watsonx Agent web interface. At the top, a dark navigation bar contains the 'IBM watsonx' logo, an 'Upgrade' button, and icons for help, notifications, and user profile. Below this, a breadcrumb trail reads 'Deployment spaces / ChronicCare_AI_Deployment / watsonx Agent /'. The main header area shows 'watsonx Agent' with a green checkmark and 'Deployed' status, and a grey 'Online' button. Three tabs are visible: 'API reference', 'Test', and 'Preview', with 'Preview' being the active tab. On the right side of the preview area, there is a 'New chat' button. The chat history shows a user message at 09:31 AM asking 'what are common chronic diseases'. The agent's response, also at 09:31 AM, is displayed in a light grey box and includes a dropdown menu with '1: Thinking...' and a section titled 'Steps created by Agent'. At the bottom, there is a text input field with the placeholder 'Type something...' and a red circular icon with a white '@' symbol.

RESULT

It gives me answer like arthritis,asthma,cancer....

The screenshot displays the IBM watsonx Agent deployment interface. At the top, the navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a help icon, a notification bell, the user's account 'Namrata Ghosh's Account', the location 'Dallas', and a profile icon 'NG'. Below the navigation bar, the breadcrumb trail reads 'Deployment spaces / ChronicCare_AI_Deployment / watsonx Agent /'. The main content area is titled 'watsonx Agent' with a green 'Deployed' status and an 'Online' button. Below this, there are three tabs: 'API reference', 'Test', and 'Preview', with the 'Preview' tab currently selected. The chat preview shows a message from 'watsonx Agent' at 09:31 AM: 'Hi, I am watsonx.ai agent. How can I help you?'. Below this, it lists 'Here are some common chronic diseases:' followed by a numbered list of 10 conditions: 1. Arthritis, 2. Asthma, 3. Cancer, 4. Diabetes, 5. Heart Disease and Stroke, 6. Obesity and Overweight, 7. Depression, 8. Osteoporosis, 9. Chronic Obstructive Pulmonary Disease (COPD), and 10. Hypertension (High Blood Pressure). At the bottom of the chat preview, there is a text input field with the placeholder 'Type something...' and a send button. On the right side, a sidebar titled 'About this deployment' provides details about the deployment, including the name 'watsonx Agent', a description 'Change this description to reflect your particular agent', deployment details (ID, serving name, software specification, hardware specification, extra extra small, copies), tags (wx-agent), and the associated asset 'watsonx Agent' with its ID.

IBM watsonx Upgrade ? Bell Namrata Ghosh's Account Dallas NG

Deployment spaces / ChronicCare_AI_Deployment / watsonx Agent /

watsonx Agent Deployed Online

API reference Test **Preview**

New chat +

watsonx Agent 09:31 AM

Hi, I am watsonx.ai agent. How can I help you?

Here are some common chronic diseases:

1. **Arthritis:** A condition that causes inflammation and stiffness in the joints.
2. **Asthma:** A respiratory condition marked by spasms in the bronchi of the lungs, causing difficulty in breathing.
3. **Cancer:** A disease caused by the uncontrolled division of abnormal cells in a part of the body.
4. **Diabetes:** A metabolic disease that causes high blood sugar levels.
5. **Heart Disease and Stroke:** Conditions that affect the heart and blood vessels.
6. **Obesity and Overweight:** Conditions characterized by excessive body fat.
7. **Depression:** A mental health disorder characterized by persistently depressed mood or loss of interest in activities.
8. **Osteoporosis:** A condition that weakens bones, making them fragile and more likely to break.
9. **Chronic Obstructive Pulmonary Disease (COPD):** A lung disease that makes it hard to breathe.
10. **Hypertension (High Blood Pressure):** A condition in which the force of the blood against the artery walls is too high.

Type something...

About this deployment

Name watsonx Agent

Description Change this description to reflect your particular agent

Deployment Details

Deployment ID: a1afd843-a44c-4c...

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 watsonx Agent 03562df2-2217-4c96-9af1-94393ac79a95

CONCLUSION

- Through this capstone project, I successfully developed a cloud-based AI agent for chronic disease monitoring, using IBM Watsonx.ai and the Mistral Large model. The solution enables users to interact with the agent to receive symptom guidance, lifestyle suggestions, and educational information related to chronic health conditions like diabetes and hypertension.
- The implementation emphasized lightweight infrastructure, avoiding complex model training or local data handling. While integrating Wikipedia and Google Search tools, the agent provides enriched responses based on real-time health knowledge.
- Challenges included:
 - Initial limitations in enabling document search due to service constraints
 - Tool compatibility and filtering issues during model configuration in Agent Lab
- Despite these, the project showcased the effectiveness of generative AI in delivering accurate and accessible healthcare support. Moving forward, this system can be enhanced with multilingual capabilities, wearable device integration, and personalized medical datasets to support predictive diagnostics.

FUTURE SCOPE

- - Wearable Integration: Sync with smart devices for real-time health tracking.
- - Multilingual & Voice Support: Make it accessible in local languages and via speech.
- - Personalized Advice: Tailor responses using user history and preferences.
- - Medical API Access: Fetch latest clinical data from trusted sources.
- - AI Diagnostics: Predict risks and suggest tests based on symptoms.
- - Data Privacy: Implement secure data handling with user consent.
- - Telemedicine Linkage: Connect users with doctors for live consultations.

REFERENCES

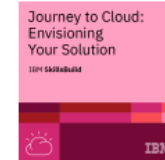
- IBM watsonx.ai Documentation – Leveraged for building and deploying AI agents:
<https://www.ibm.com/products/watsonx-ai>
- - Mistral Large Model – Used for generative tasks and health-related query resolution.
- - World Health Organization (WHO) – Reference for global health guidelines and chronic disease data.
- - MedlinePlus Health Topics – Source of patient-focused medical information:
<https://medlineplus.gov>
- - Wikipedia API – Used for dynamic knowledge sourcing in the AI agent.
- - Google Search Tool – Enabled the agent to provide real-time health insights via external content.

IBM CERTIFICATIONS



IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



NAMRATA GHOSH

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



Issued on: Jul 19, 2025
Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/2e316e6e-34a1-4d03-a76f-6a9fbb6d2d65>




IBM CERTIFICATIONS

7/25/25, 8:32 PM

Completion Certificate | SkillsBuild

IBM SkillsBuild

Completion Certificate



This certificate is presented to

NAMRATA GHOSH

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 25 Jul 2025 (GMT)

Learning hours: 20 mins



THANK YOU