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# **CAPSTONE PROJECT**

## **AI AGENT FOR CHRONIC DISEASE MONITORING**

**Presented By:**

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- 3. DEPARTMENT: CSE**

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# OUTLINE

- **Problem Statement**
- **Proposed System/Solution**
- **System Development Approach**
- **Algorithm & Deployment**
- **Result**
- **Conclusion**
- **Future Scope**
- **References**

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# PROBLEM STATEMENT

Chronic diseases such as diabetes, hypertension, and heart conditions require continuous, real-time monitoring and personalized care. Traditional healthcare systems often struggle to provide timely interventions due to a lack of resources, manual data tracking, and limited access to remote care. This leads to increased hospitalizations, poor adherence to medication, and reduced quality of life for patients. The challenge is to develop an intelligent AI agent that can autonomously monitor patient health data from wearables, medical records, and user input. The agent should analyze patterns using predictive analytics, detect early warning signs, and deliver personalized recommendations, medication reminders, and alerts. It must ensure patient engagement, adaptability, and multilingual interaction—empowering both patients and healthcare providers to proactively manage chronic conditions.

# PROPOSED SOLUTION

- The proposed system aims to support patients and healthcare providers in effectively managing chronic diseases such as diabetes, hypertension, and heart-related conditions. The AI agent leverages IBM Granite and IBM Cloud Lite services to deliver a smart, interactive assistant capable of real-time monitoring, personalized alerts, and adaptive health recommendations.
- Data Collection: The agent receives continuous health inputs from patient-reported symptoms, wearable sensors (e.g., heart rate, glucose levels), and medical history data. Future scope includes integration with electronic health records (EHR) and hospital databases.
- Data Preprocessing: Input data is standardized and filtered for relevance and quality. Health metrics are mapped to predefined risk levels using medically verified thresholds. Multilingual input handling is also supported to ensure accessibility.
- Agent Logic: A RAG-based (Retrieval-Augmented Generation) AI model is employed to ensure dynamic, trustworthy responses. The agent understands queries like “Why is my blood pressure fluctuating?” and responds with context-aware explanations, alerts, or lifestyle suggestions.
- Deployment: The agent is deployed using IBM Watsonx.ai Studio and IBM Cloud Lite services, accessible through a secure, web-based portal or mobile interface. It supports real-time interaction and can be extended to integrate with hospital networks or telemedicine platforms.
- Evaluation: The AI agent has been tested for response quality, accuracy of recommendations, and smooth interaction flow. It offers clear alerts, personalized insights, and medication reminders tailored to the user’s condition and health trends.

# SYSTEM APPROACH

## System Approach

The System Approach section describes the overall strategy and methodology for developing and implementing the AI-based Chronic Disease Monitoring Agent using IBM Watsonx.ai and Watson Assistant. It focuses on platform setup, tools used, and the core design of the AI agent's monitoring and interaction capabilities.

### System Requirements:

IBM Cloud account with access to Watsonx.ai and Watson Assistant.

### Library Required:

IBM Watson Assistant (Dialog Skill) for building the conversational interface and Watsonx.ai for AI model development.

# ALGORITHM & DEPLOYMENT

- This section outlines the logic used to deliver personalized health monitoring, alerts, and recommendations through IBM Watson Assistant and Watsonx.ai, based on patient data and predictive rules.

## Algorithm Selection:

- A hybrid approach combining rule-based logic with predictive analytics using Retrieval-Augmented Generation (RAG) in Watsonx.ai. Chosen for accurate, context-aware, and real-time responses.

## Data Input:

- Inputs include real-time wearable sensor data (heart rate, glucose levels), medical history, and user-reported symptoms. Data is standardized and mapped to risk categories.

## Response Generation:

- The conversational flow uses conditions and AI models to provide alerts, medication reminders, lifestyle advice, and explanations tailored to patient health status.

## Deployment:

- The agent is deployed on IBM Cloud Lite via Watson Assistant and Watsonx.ai services for secure, scalable, and accessible real-time interaction.

## Future Scope:

- Can be enhanced with integration of Electronic Health Records (EHR), more advanced ML models for early disease prediction, and expanded multilingual support.

# RESULT

IBM watsonx

Upgrade ? Bell Bindu Sundarapu's Account London BS

Projects / Agentic\_AI / AI for Chronic Disease Monitoring

Share feedback β Autosave on New agent + Deploy Lock Info

Build

AI Model: mistral-large ⚠

Setup Configuration Framework Architecture Instructions Knowledge Tools

LangGraph ReAct

Advanced configuration

You are a healthcare assistant trained to help users manage chronic diseases such as diabetes and hypertension. Use uploaded documents, health knowledge, and tools to give accurate, helpful responses. When greeted, say: "Hi, I'm your Chronic Care AI Assistant. How can I support your health today?"

Add a tool Create custom tool

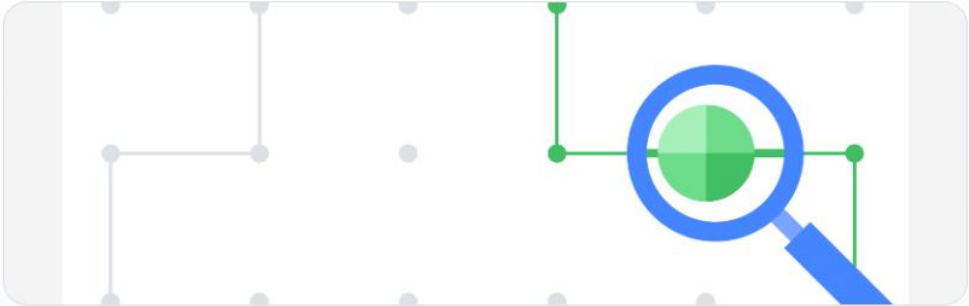
Added tools (6)

Agent preview

AI for Chronic Disease Monitoring 07:44 PM

Welcome to AI for Chronic Disease Monitoring

An AI-powered agent for monitoring and managing chronic diseases like diabetes and hypertension.



Type something...

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Share feedback β Unsaved 📁 New agent + Deploy 🚀

Build

AI Model: mistral-large ⚠️

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

Tools

Add a tool

Create custom tool

Added tools (5)

Google search

Retrieve information from the internet with the Google search engine.

Agent preview

BS You: 12:46 PM

What are early symptoms of Diabetes?

👤 watsonx Agent 12:46 PM

Here are some early symptoms of Diabetes:

- Frequent Urination:** One of the key indicators of diabetes is frequent urination.
- Extreme Thirst:** Feeling very thirsty and having a dry mouth.
- Fatigue:** Feeling very tired and hungry.
- Blurry Vision:** Vision problems can also be an early sign.
- Slow Wound Healing:** Slow healing of cuts and wounds.
- Yeast Infections:** Recurrent yeast infections can be a sign.
- Weight Loss:** Losing weight without trying.
- Presence of Ketones in the Urine:** This can be detected through a urine test.
- Nausea, Vomiting, or Stomach Pains:** These symptoms are more common in people with type 1 diabetes.

Sources:

- [WebMD](#)

Type something...

🔍



# RESULT

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Share feedback β Unsaved 📁 ▼ New agent + Deploy 🚀

Build

AI Model: mistral-large ⚠️ ▼ 🔗 <

Framework

LangGraph ▼

Architecture

ReAct ▼

Instructions

Advanced configuration

You are a helpful assistant that uses tools to answer questions in detail.  
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Knowledge

▼

Tools

^

Add a tool

Create custom tool

Added tools (5)

Google search

Retrieve information from the internet with the Google search engine.

⚙️ 🗑️

Agent preview

6. **Yeast Infections:** Recurrent yeast infections can be a sign.

7. **Weight Loss:** Losing weight without trying.

8. **Presence of Ketones in the Urine:** This can be detected through a urine test.

9. **Nausea, Vomiting, or Stomach Pains:** These symptoms are more common in people with type 1 diabetes.

Sources:

- [WebMD](#)
- [American Diabetes Association](#)
- [CDC](#)
- [OSF HealthCare](#)
- [Mayo Clinic](#)
- [Medical News Today](#)
- [Cleveland Clinic](#)


If you experience any of these symptoms, it's important to consult with a healthcare provider for proper diagnosis and treatment.




► How did I get this answer?

🔄


Type something... 🔍 ▶

# RESULT [DEPLOYED AI AGENT]

 IBM watsonx


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Deployment spaces / ChronicCare AI Assistant / ChronicCare AI Assistant /


ChronicCare AI Assistant  Deployed Online

API reference Test **Preview**

New chat +

 You 03:27 PM

Can chronic diseases be reversed?


 ChronicCare AI Assistant 03:27 PM


While some chronic diseases can be managed effectively, reversing them entirely is often not possible. However, with proper care, lifestyle changes, and medication, many people can significantly improve their health and quality of life.


For example:

- **Diabetes:** While there's no cure, managing blood sugar levels through diet, exercise, and medication can help prevent complications.
- **Hypertension:** Lifestyle changes like reducing salt intake, exercising regularly, and taking prescribed medication can help control blood pressure.
- **Asthma:** Proper management with inhalers and avoiding triggers can reduce symptoms and improve lung function.


Regular monitoring, a healthy lifestyle, and adherence to medication are key to managing any chronic disease. If you have specific questions about a particular condition, feel free to ask!

Type something... 

About this deployment 

Name 


ChronicCare AI Assistant

Description 


An AI agent to assist patients and doctors with chronic disease awareness, prevention, and care.


Deployment Details


Deployment ID: 5ce469e3-71c1-4f...

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 

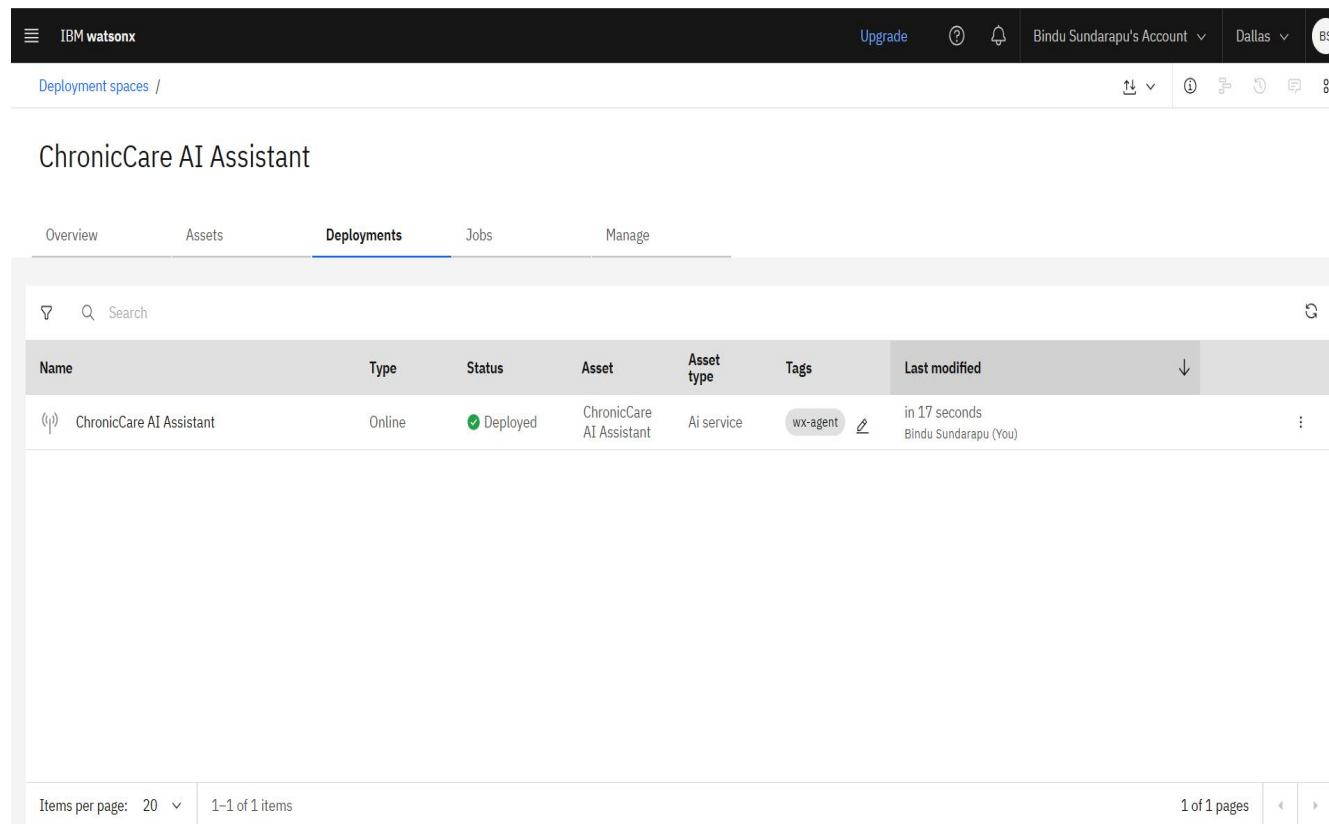
 [ChronicCare AI Assistant](#)

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edunet  
foundation

# CONCLUSION

- **Summary & Effectiveness**
- The AI Agent for Chronic Disease Monitoring successfully provides personalized health support by analyzing user inputs such as wearable data, symptoms, and medical history.
- The system effectively delivers timely alerts, medication reminders, and lifestyle recommendations, enhancing patient engagement and proactive care.
- **Challenges**
- Integrating real-time health data required careful preprocessing and standardization. Ensuring accurate, context-aware responses depended on fine-tuning dialog flow and AI logic.
- Scalability and dynamic adaptability can further improve with deeper EHR integration and advanced ML models.



The screenshot shows the IBM watsonx user interface. At the top, there's a navigation bar with the IBM watsonx logo, an 'Upgrade' button, and user account information for Bindu Sundarapu. Below this, a breadcrumb trail shows 'Deployment spaces /'. The main heading is 'ChronicCare AI Assistant'. There are five tabs: 'Overview', 'Assets', 'Deployments' (which is active), 'Jobs', and 'Manage'. Below the tabs is a search bar. A table lists the deployment details:

| Name   | Type   | Status   | Asset                    | Asset type | Tags   | Last modified                          |
|--|--------|--|--------------------------|------------|--|--|
|  ChronicCare AI Assistant | Online |  Deployed | ChronicCare AI Assistant | AI service | wx-agent  | in 17 seconds<br>Bindu Sundarapu (You) |

At the bottom, there's a footer with 'Items per page: 20', '1-1 of 1 items', and '1 of 1 pages'.

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## GITHUB LINK

<https://github.com/BinduSundarapu/Chronic-Disease-Monitoring-AI-Agent>

# FUTURE SCOPE

- The current AI-based health monitoring agent can be enhanced to improve its intelligence, adaptability, and patient engagement across various platforms.

## Planned Enhancements

- **ML Integration:** Use Jupyter + AutoAI to predict potential health risks based on trends in wearable data, symptoms, and medical history.
- **EHR Integration:** Connect with hospital Electronic Health Records for more comprehensive and accurate monitoring.

## User Experience Expansion

- **Multilingual Support:** Enable communication in regional languages to assist diverse patient populations.
- **WhatsApp/Email Integration:** Send alerts, reminders, and health tips directly through Twilio API to ensure timely communication and patient follow-up.

# REFERENCES

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<https://cloud.ibm.com/docs/watson-assistant>
- IBM Watsonx.ai Studio Overview  
<https://cloud.ibm.com/docs/watsonx-ai>
- IBM Cloud Object Storage Guide  
<https://cloud.ibm.com/docs/cloud-object-storage>
- IBM Developer Tutorials – Building Health Monitoring Systems with AI  
<https://developer.ibm.com/tutorials>
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Jiang, F., Jiang, Y., Zhi, H. et al. Journal of Biomedical Informatics, 2017.
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T. Nguyen, H. Nguyen. IEEE Access, 2021.
- Wearable Technology for Chronic Disease Management: A Review  
K. Patel, A. Thakur. International Journal of Medical Informatics, 2020.
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<https://www.coursera.org/specializations/ai-for-medicine>

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professional excellence



## Bindu Sundarapu

Has successfully satisfied the requirements for:

### Getting Started with Artificial Intelligence



Issued on: Jul 16, 2025  
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### Journey to Cloud: Envisioning Your Solution



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Issued by: IBM SkillsBuild

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# IBM CERTIFICATIONS

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Bindu Sundarapu

for the completion of

**Lab: Retrieval Augmented Generation with  
LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

**Completion date:** 17 Jul 2025 (GMT)

**Learning hours:** 20 mins



**THANK YOU**