

CAPSTONE PROJECT

GRANICARE: CHRONIC DISEASE TRACKER AGENT

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OUTLINE

- **Problem Statement**
- **Proposed Solution**
- **Technology used**
- **Wow factor**
- **End users**
- **Result**
- **Conclusion**
- **Git-hub Link**
- **Future scope**
- **IBM Certifications**

PROBLEM STATEMENT

An AI agent for chronic disease monitoring helps patients and healthcare providers manage long-term conditions effectively. It continuously analyzes health data from wearables, medical records, and patient inputs to detect early warning signs. Using AI and predictive analytics, it offers personalized insights, medication reminders, and lifestyle recommendations. The agent supports diseases like diabetes, hypertension, and heart conditions with real-time monitoring and alerts.

It enables proactive care, reduces hospital visits, and improves patient adherence to treatment plans. This intelligent assistant bridges the gap between patients and providers, enhancing chronic care outcomes.

PROPOSED SOLUTION

- Granicare proposes an intelligent, AI-powered healthcare assistant that leverages **RAG (Retrieval-Augmented Generation)** and **Granite Large Language Model (LLM) technology**, integrated with **IBM Cloud services**, to support patients with chronic diseases in a personalized and scalable way.
- The core of the solution lies in combining **agentic AI** with **real-time health data retrieval** to ensure that users receive precise, contextual, and clinically relevant responses — not generic outputs. By embedding **Granite LLM** with a curated medical knowledge base and integrating wearable health data inputs (e.g., heart rate, glucose levels, BP), the system becomes an always-available, interactive assistant that can help patients better manage their conditions.
- Key aspects of the proposed solution include:
 - **RAG-based Personalization:** Uses patient-specific data and dynamic health knowledge sources to answer queries with context-awareness and high accuracy.
 - **Granite LLM Integration:** Ensures the assistant understands complex medical queries and generates insightful, safe, and human-like responses.
 - **IBM Cloud Services:** Enables scalable deployment, real-time monitoring, and secure data handling through services like IBM Watsonx.ai, Cloud Object Storage, and App ID.
 - **Continuous Learning & Feedback:** The assistant evolves with patient interactions, improving over time through user feedback and updated health data.
 - **Agentic Workflow Automation:** Triggers alerts, reminders, or escalations based on symptom severity or abnormal data patterns, without human intervention.

TECHNOLOGY USED

- IBM Watsonx.ai Studio
- IBM Granite Foundation Model (LLM)
- IBM Watsonx.ai Runtime
- Vector Index for Retrieval-Augmented Generation
- NLP (Natural Language Processing)
- IBM Watsonx.ai + Granite FM

IBM CLOUD SERVICES USED

- IBM Cloud Object Storage
- IBM Watsonx.ai Studio
- IBM Granite Foundation Model (granite-3-3-8b-instruct)
- IBM Cloud Lite Account
- Vector Index (for data retrieval if extended)
- IBM Cloud IAM
- IBM Code Engine (Optional for deployment)
- IBM Cloud Agent Lab


WOW FACTORS





- **Contextual Agentic Responses** : Understands patient history, queries, and context for meaningful replies
- **Personalized Lifestyle Suggestions** : Tailors recommendations for diet, sleep, stress, and exercise
- **Always-On Healthcare Companion** : Available 24x7 to assist anytime, anywhere
- **Early Risk Detection** : Uses predictive analytics to warn about potential health risks
- **Medication Adherence Tracking** : Smart reminders based on prescription timelines
- **Wearable Integration Ready** : Connects with health devices for real-time vitals monitoring
- **Privacy-First Design** : Maintains strict patient data confidentiality
- **Granite LLM + RAG Powered** : Combines retrieval-based reasoning with robust AI for accurate answers
- **Multilingual Support** : Interacts in native/regional languages for wider accessibility
- **Human-in-the-Loop Support** : Escalates to real doctors when needed







END USERS



- **Chronic Disease Patients**
 - 24x7 virtual health assistant for non-emergency queries
 - Personalized tips on diet, meds, and wellness
 - Symptom tracking and reminders
 - Multilingual, privacy-focused support
- **Doctors / Caregivers**
 - AI-powered patient summaries and alerts
 - Handles routine queries, improves efficiency
 - Supports remote monitoring and follow-ups
 - Easy integration with EHR systems
- **Health-Tech Researchers**
 - Real-world Agentic AI healthcare application
 - Built with RAG + IBM Granite LLM
 - Extensible for experiments, model testing, and innovation
 - Ideal for research, ethical AI, and digital health prototypes

RESULTS

 IBM watsonx


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Granicare  Deployed 


API reference Test **Preview**

New chat +


 Granicare 02:28 PM

Welcome to Granicare

GraniCare: AI-powered assistant for real-time chronic disease monitoring



Quick start samples


Type something... 

RESULTS


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Agent preview


 You: 01:53 PM

hii


 Granicare 01:53 PM

Hello! It's great to hear from you. How can I assist you with your health and wellness today?

► [How did I get this answer?](#)

 You: 01:54 PM

BP: 150/100 Heart Rate: 102 Blood Sugar: 168 Medication taken: No Symptoms: Headache and dizziness

 Granicare 01:54 PM


I'm GraniCare, your health assistant. I see you're experiencing elevated blood pressure (150/100), a higher-than-normal heart rate (102 bpm), and higher-than-normal blood sugar (168 mg/dL). You've also reported a headache and dizziness, and mentioned not taking your medication.





It's important to take your medication as prescribed by your healthcare provider. For now, please rest and stay hydrated. If your symptoms persist or worsen, seek medical attention promptly. These readings could indicate a need for professional evaluation. Remember, I'm here to support your health journey, but I can't replace the advice of a healthcare professional.







► [How did I get this answer?](#)



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RESULTS

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S You 02:30 PM

What is the normal range for heart rate and how can I monitor it?


 Granicare 02:30 PM


A normal resting heart rate for adults typically ranges from 60 to 100 beats per minute. However, for well-trained athletes, a normal resting heart rate can be as low as 40 bpm.

To monitor your heart rate, you can place two fingers on your wrist or neck to feel for the pulse. Count the number of beats in 15 seconds and then multiply by 4 to get your beats per minute. Alternatively, many fitness trackers and smartwatches have built-in heart rate monitors for continuous tracking.

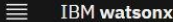


Remember, if your heart rate is consistently above 100 bpm at rest or you notice any irregularities, it's important to consult with a healthcare professional.







► How did I get this answer?



Type something... 

RESULTS


 Upgrade ?  Shalini Verma's Account ▾ Dallas ▾ 

Deployment spaces / Granicare / Granicare /      


Granicare Deployed Online

API reference Test **Preview**

New chat +

 You 02:31 PM


How do medications like beta blockers affect my vitals?

 Granicare 02:31 PM

Beta blockers are often used to manage conditions like high blood pressure and heart-related issues. They work by blocking the effects of certain hormones on your heart, which can lead to several effects on your vital signs:

- Heart Rate:** Beta blockers typically slow down your heart rate. This can be beneficial if you have a rapid or irregular heartbeat.
- Blood Pressure:** They can lower your blood pressure by reducing the force and rate of heart contractions.
- Exercise Tolerance:** Some people may notice reduced exercise tolerance or fatigue as beta blockers can limit the increase in heart rate that exercise normally causes.

It's crucial to follow your healthcare provider's instructions when taking beta blockers and to report any significant changes in your vital signs or unusual symptoms. They can provide personalized advice based on your health status.



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CONCLUSION

- Granicare offers intelligent, 24x7 support for chronic disease management.
- Uses RAG and Granite LLM to provide personalized healthcare assistance.
- Promotes proactive care through real-time monitoring and AI-driven insights.
- Enhances patient-doctor communication and treatment adherence.
- Scalable for integration with future technologies like wearables and multilingual support.
- A reliable solution for patients, caregivers, and health-tech researchers.

FUTURE SCOPE

- **Multilingual support** : Enable conversation in regional and global languages for wider reach
- **Integration with wearable devices** : Real-time monitoring from smartwatches, fitness bands, etc.
- **Emergency alert system** : Instant alerts to caregivers, doctors, or emergency services
- **Hospital Information System (HIS) integration** : Seamless sync with hospital databases and patient records
- **Advanced predictive analytics** : Use AI to forecast chronic illness flare-ups and health trends
- **Genetic risk analysis** : Incorporate genetic data to assess personalized health risks
- **Voice assistant interface** : Voice-enabled interaction for accessibility and ease of use

IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Shalini Verma

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



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Document player for: Getting Started with Artificial Intelligence

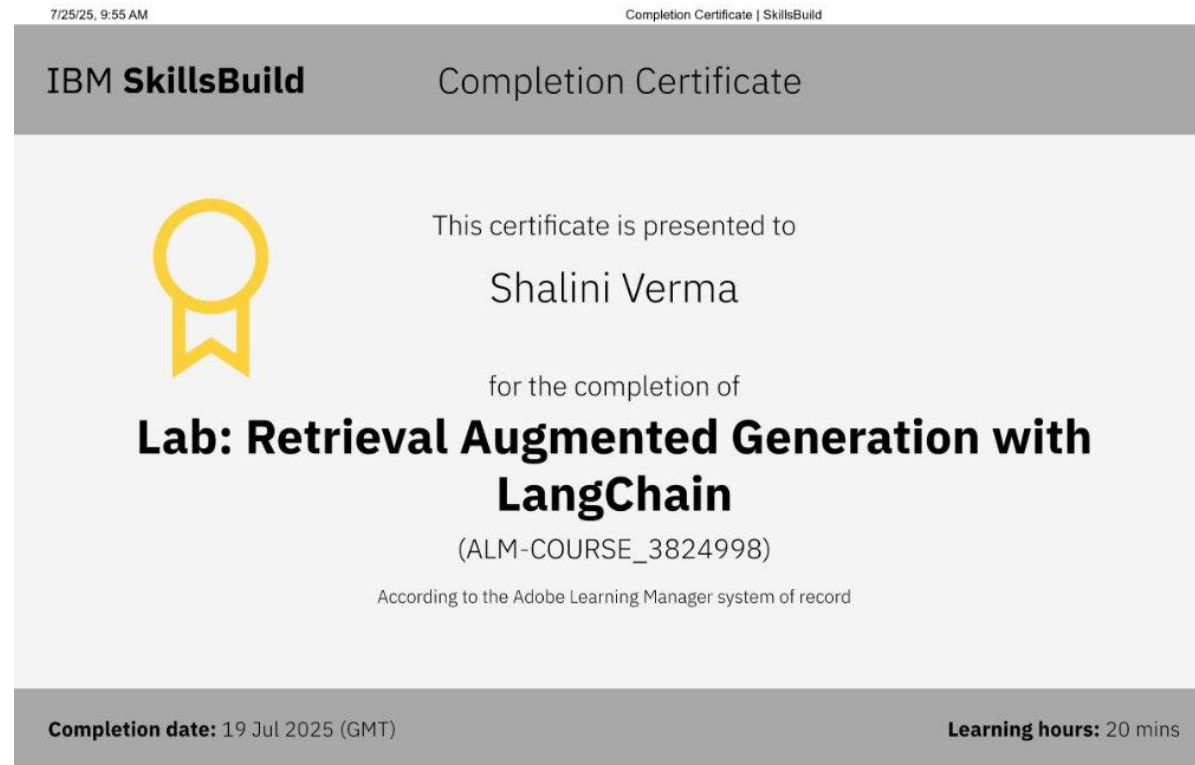
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GITHUB LINK

- GitHub link :

<https://github.com/Panthomathic-girl/Granicare-chronic-disease-tracker-ai-agent>



THANK YOU