

HealthAI: Intelligent Healthcare Assistant Using IBM Granite

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INTRODUCTION

1.1 Project Overview

Health AI is an AI-driven web application that delivers smart and accessible healthcare services. It leverages the *IBM Granite 3B Instruct* model to provide interactive, real-time responses across four healthcare modules like AI Symptoms Identifier, Home Remedies Generator, Medication Info (General), Disease Encyclopedia, Patient Chat (Health Q&A with empathy).The application is built using Python and Gradio, integrated with the Model.The goal is to demonstrate how Generative AI can be used to Simplify health Care interactions, making them intelligent, personalized, and User – friendly.

1.2 Purpose

The primary purpose of **HealthAI** is to democratize access to reliable, AI-powered health information for users worldwide, regardless of their language. The assistant is intended for educational and informational purposes, aiming to:

- **Empower users** to better understand their symptoms and possible conditions.
- **Provide actionable guidance** on home remedies and medications.
- **Educate users** about diseases and general health topics.
- **Bridge language barriers** by supporting multilingual input.

2. IDEATION PHASE

2.1 Problem Statement

Many individuals experience common symptoms or have health questions but lack instant access to reliable medical guidance. The absence of early understanding can lead to panic or neglect.

2.2 Empathy Map Canvas



2.3 Brainstorming

Ideas explored:

- AI chatbot for basic health questions
- Natural language symptom-to-disease mapping
- Translation layer for input normalization
- Educational summaries of common diseases
- Simple UI (5-tabs Gradio layout)

- Voice support (future)
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3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

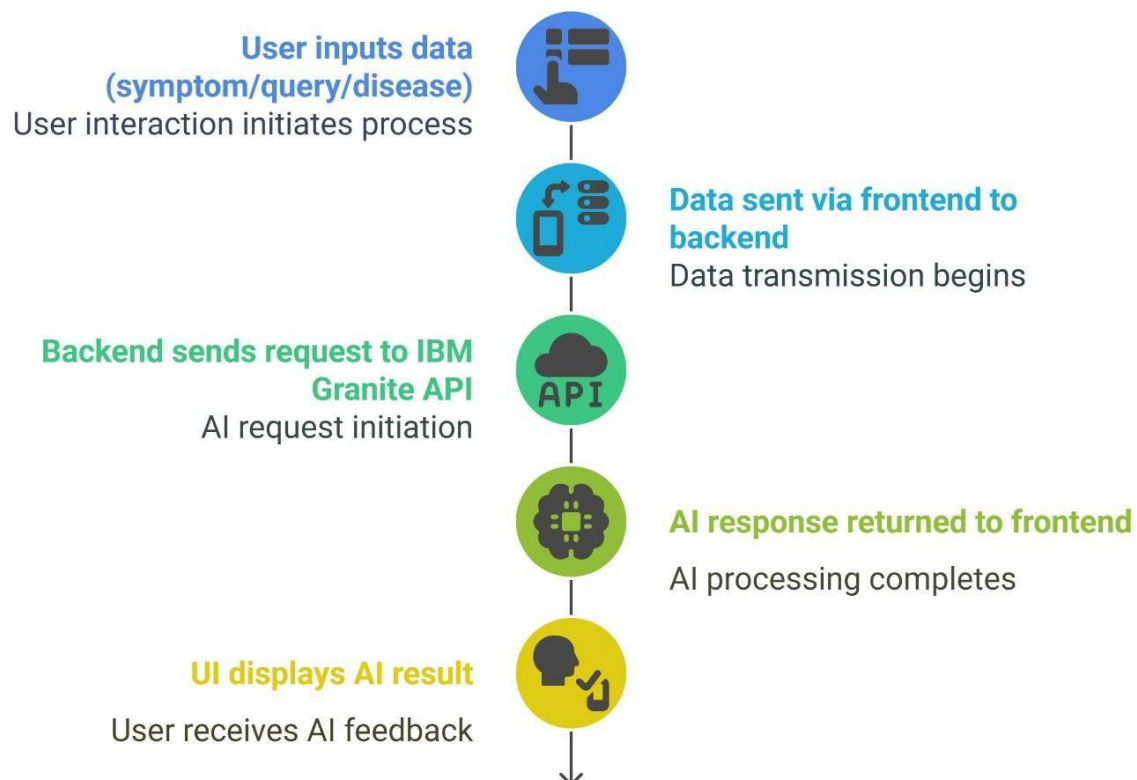


3.2 Solution Requirement

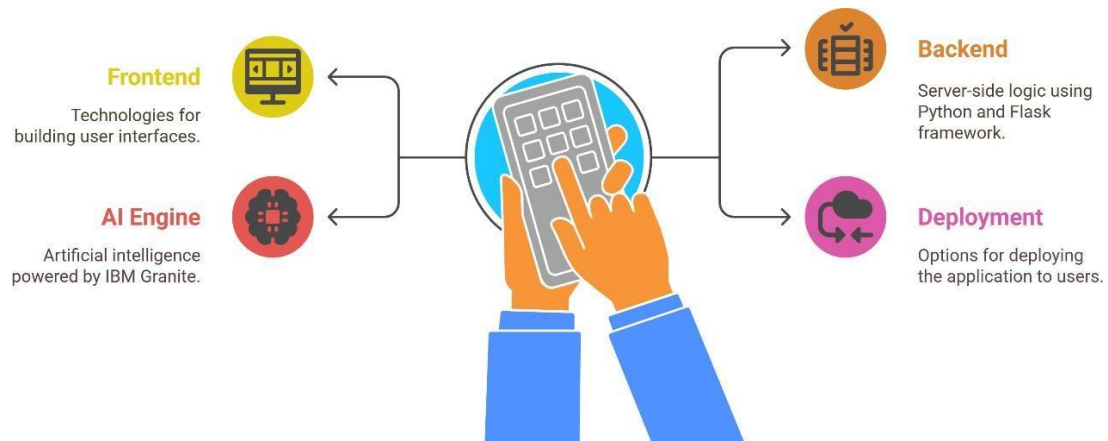
- **Functional Requirements:**

- Multilingual input support.
- Symptom analysis and condition identification.
- Home remedies and medication information.
- Detailed disease explanations.
- General health Q&A.
- User-friendly web interface.
- **Non-Functional Requirements:**
 - Fast response times.
 - Reliable translation.
 - Scalable architecture.
 - Secure data handling.

3.3 Data Flow Diagram



3.4 Technology Stack



Component	Technology
AI Model	IBM Granite 3.3B Instruct
UI	Gradio (Blocks + Tabs)
Input Handling	Python, translate module
Deployment	Google Colab, Streamlit
Language Support	translate (auto to EN)

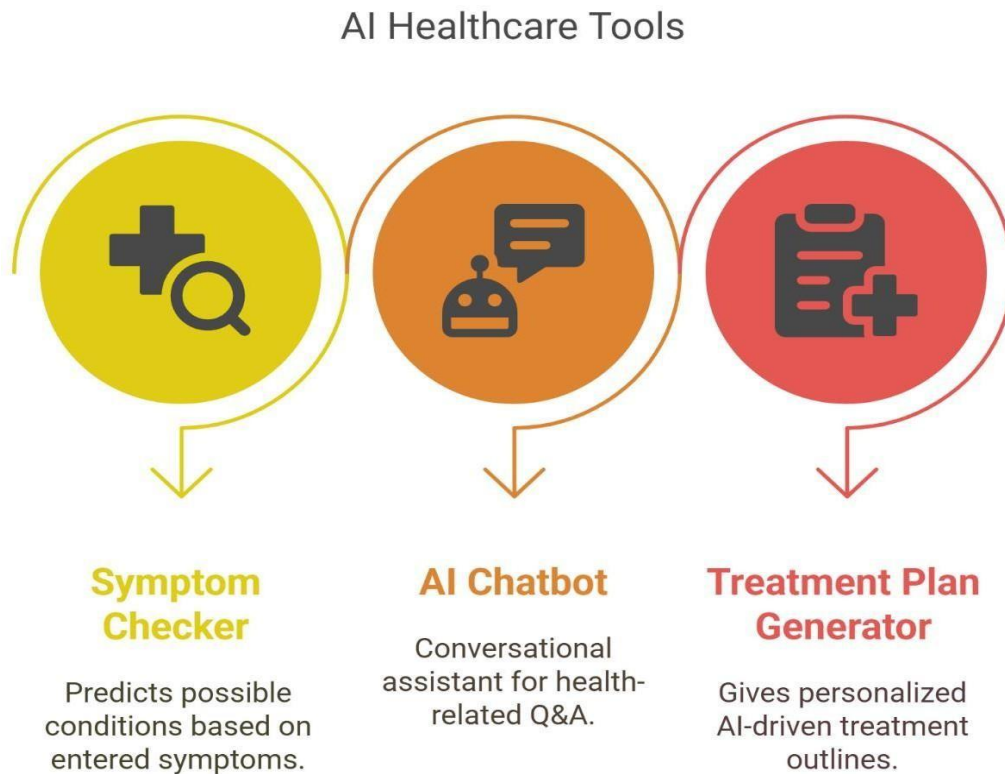
4. PROJECT DESIGN

4.1 Problem-Solution Fit

There is a rising demand for accessible, AI-based health assistants that do not require login, are easy to use, and provide instant answers. HealthAI uses prompt engineering with a trusted model to

answer relevant health questions in a safe and informed tone, with support for regional languages.

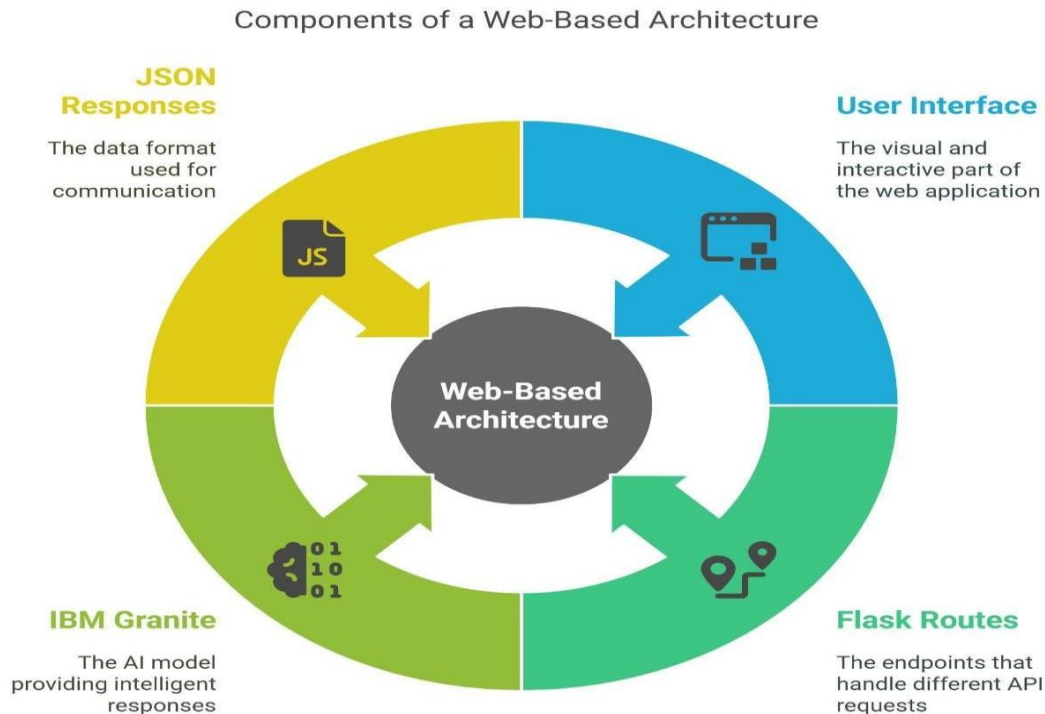
4.2 Proposed Solution



A Gradio-based tabbed application where each tab maps to a specific healthcare need:

- Analyze symptoms
- Suggest natural home remedies
- Educate users on common medicines
- Explain diseases
- Chat about health concerns

4.3 Solution Architecture



- **Frontend:** Gradio-based web interface.
 - **Backend:** Python scripts handling translation and model inference.
 - **Model:** IBM Granite 3.3 instruct model for text generation.
 - **Translation Layer:** translate library for multilingual support.
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5. PROJECT PLANNING & SCHEDULING

Project Planning

Phase	Tasks	Timeline
Ideation	Problem definition, empathy mapping, brainstorming	1 week

Phase	Tasks	Timeline
Requirements	Customer journey, functional & non-functional requirements, tech stack	1 week
Design	Solution architecture, UI/UX design	1 week
Development	Coding, integration, testing	2 weeks
Deployment	Hosting, user testing, feedback collection	1 week

6. FUNCTIONAL PERFORMANCE TESTING

6.1 Performance Testing

- **Functional Testing:**
 - Verify all functions (symptom analysis, remedies, etc.) work as intended.
 - Test multilingual input and output.
 - **Performance Testing:**
 - Measure response times for model inference.
 - Test scalability with multiple concurrent users.
 - Ensure translation accuracy and speed.
-

7. RESULTS

7.1 Output Screenshots

Include screenshots of:

Homepage of the HealthAI

HealthAI - Your Intelligent Healthcare Assistant

[Symptoms Identifier](#) [Home Remedies](#) [Medication Info](#) [Disease Encyclopedia](#) [Patient Chat](#)

Enter symptoms (any language)

Possible condition

Analyze

HealthAI - Your Intelligent Healthcare Assistant

[Symptoms Identifier](#) [Home Remedies](#) [Medication Info](#) [Disease Encyclopedia](#) [Patient Chat](#)

Enter symptoms (any language)

cough, fever

Possible condition

The user's symptoms of cough and fever could indicate several possible conditions, including common viral illnesses like the common cold, flu (influenza), or COVID-19. Other possibilities include bronchitis, pneumonia, or even more serious conditions like tuberculosis, depending on the severity and duration of the symptoms.






However, since the user hasn't provided any information regarding their recent travel history, potential exposure to sick individuals, or other relevant medical history, it's essential to consider a broad range of possibilities.

Here's a suggested course of action:

1. Stay home and avoid close contact with others to prevent the spread of any potential infection.
2. Rest and stay hydrated to support your body's natural defenses.
3. Monitor your symptoms closely and keep track of any changes or worsening of symptoms.
4. Consider

Analyze

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 Symptoms Identifier  **Home Remedies**  Medication Info  Disease Encyclopedia  Patient Chat

Enter disease (any language)

Natural Remedies

Get Remedies

HealthAI - Your Intelligent Healthcare Assistant

 Symptoms Identifier  **Home Remedies**  Medication Info  Disease Encyclopedia  Patient Chat

Enter disease (any language)

cold

Natural Remedies

1. **Herbal Teas:** Drink warm, soothing herbal teas like peppermint, chamomile, or ginger. These have anti-inflammatory properties and can help clear nasal congestion. Add honey if you're not allergic to it for its antibacterial properties.
2. **Garlic:** Garlic has antiviral and immune-boosting properties. Include it in your meals or make garlic tea by steeping crushed garlic in hot water.
3. **Ginger:** Ginger aids digestion and has anti-inflammatory effects. You can consume ginger in tea, soups, or as a fresh root.
4. **Hydration:** Stay well-hydrated by drinking plenty of fluids. Water, herbal teas, and clear broths are excellent choices. De

Get Remedies

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[Symptoms Identifier](#)[Home Remedies](#)[Medication Info](#)[Disease Encyclopedia](#)[Patient Chat](#)

Enter disease (any language)

Medication Info

Get Info

HealthAI - Your Intelligent Healthcare Assistant

[Symptoms Identifier](#)[Home Remedies](#)[Medication Info](#)[Disease Encyclopedia](#)[Patient Chat](#)

Enter disease (any language)

Migraine

Medication Info

Migraine is a complex neurological disorder characterized by recurrent moderate to severe headaches, often accompanied by symptoms such as nausea, vomiting, and sensitivity to light and sound. Treatment for migraines aims to alleviate these symptoms and prevent future attacks. Here are some commonly used medications for Migraine, both over-the-counter (OTC) and prescribed:

1. Nonsteroidal Anti-Inflammatory Drugs (NSAIDs): NSAIDs like ibuprofen (Advil, Motrin) and naproxen (Aleve) can help reduce pain and inflammation associated with migraines. They are available over-the-counter and can be used for both acute and preventive treatment.
2. Triptans: These are prescription medications that specifically target serotonin

Get Info

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[Symptoms Identifier](#)[Home Remedies](#)[Medication Info](#)[Disease Encyclopedia](#)[Patient Chat](#)

Enter disease (any language)

Full Info

Explain Disease

HealthAI - Your Intelligent Healthcare Assistant

[Symptoms Identifier](#)[Home Remedies](#)[Medication Info](#)[Disease Encyclopedia](#)[Patient Chat](#)

Enter disease (any language)

Asthma

Full Info

Asthma is a chronic respiratory disease characterized by inflammation and narrowing of the airways, leading to breathing difficulties. It affects millions of people worldwide, with symptoms ranging from mild to severe. This article provides a comprehensive overview of asthma, including its causes, symptoms, prevention, and treatment.

****Causes:****

Asthma's exact cause remains unknown, but it is believed to result from a combination of genetic predisposition and environmental triggers. Common factors contributing to asthma development include:

1. Genetic factors: A family history of asthma or allergic diseases increases the likelihood of developing the condition.
2. Viral infections: Early-life respiratory infections, particularly those caused by respiratory syncytial virus (RSV), influenza, or COVID-19

HealthAI - Your Intelligent Healthcare Assistant

[Symptoms Identifier](#)[Home Remedies](#)[Medication Info](#)[Disease Encyclopedia](#)[Patient Chat](#)

Ask any health-related question

Empathetic, factual answer

Ask

HealthAI - Your Intelligent Healthcare Assistant

[Symptoms Identifier](#)[Home Remedies](#)[Medication Info](#)[Disease Encyclopedia](#)[Patient Chat](#)

Ask any health-related question

Is turmeric good for pain?

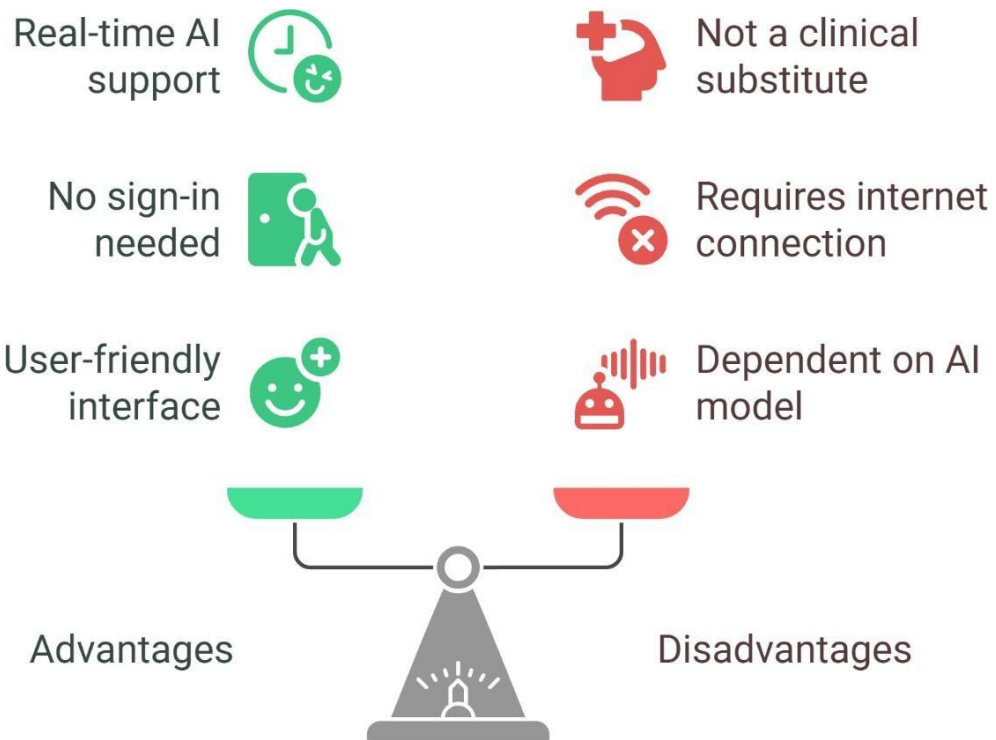
Empathetic, factual answer

Turmeric, a spice derived from the *Curcuma longa* plant, contains a bioactive compound called curcumin. Curcumin is known for its potential anti-inflammatory and analgesic (pain-relieving) properties. Many studies suggest that curcumin may help alleviate various types of pain, including osteoarthritis, rheumatoid arthritis, and even inflammatory bowel disease.

However, it's essential to acknowledge that individual responses to turmeric can vary, and the bioavailability of curcumin is relatively low when consumed orally. This means that the amount of curcumin that reaches the systemic circulation is significantly less than what's present in the spice itself. Therefore, the effectiveness of turmeric for pain management may not be as pronounced as research suggests due to these absorption and bioavailability challenges.

Ask

8. ADVANTAGES & DISADVANTAGES



9. CONCLUSION

HealthAI successfully addresses the need for accessible, reliable health information by leveraging advanced AI and multilingual support. The project demonstrates the potential of AI in making healthcare knowledge more inclusive and user-friendly, while highlighting the importance of responsible use and the limitations of AI in medical contexts.

10. FUTURE SCOPE

- Expand language support for output.
- Integrate with medical databases for more accurate, up-to-date information.
- Add user authentication and history tracking for personalized experiences.
- Incorporate voice input/output for greater accessibility.
- Develop mobile applications for wider reach.
- Collaborate with healthcare professionals to validate and improve responses.