Health Al: Intelligent healthcare Assistant

Project Documentation

1.Introduction

Project title: Health Al:Intelligent healthcare Assistant

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2.project overview

Purpose:

Health AI: The purpose of a Intelligent Healthcare Assistant is an AI-driven platform designed to give people quick, reliable health support anytime and anywhere. It helps users describe symptoms and receive preliminary guidance, tracks personal health data such as blood pressure or glucose levels, and sends reminders for medication or lifestyle changes. The system can securely store electronic health records, schedule doctor appointments, and even connect with wearable devices for real-time monitoring. By offering 24/7 multilingual assistance, Health AI aims to improve early detection of health risks, reduce unnecessary hospital visits, and make quality healthcare more accessible and cost-effective, especially for those in remote or underserved areas.

Features:

Conversational Interface

Key Point: Natural language interaction

Functionality: Allows citizens and officials to ask questions, get updates, and receive guidance in plain language

Policy Summarization

Key Point: Simplified policy understanding

Functionality: Converts lengthy government documents into concise, actionable summaries.

- 1. User launches app → sees homepage / menu.
- 2. Selects disease prediction → inputs symptoms →
- 3. Selects treatment generator → gets suggestions.
- 4. Uses chat module for specific questions.
- Enters vital signs or health data into analytics module
 → sees charts, insights.

3. Features / Modules

Module	Input
Disease Prediction	User enters symptoms (free text or form)
Treatment Generator	Diagnosed (or predicted) condition + possibly user profile
Patient Chat Module	Free text queries (health questions)
Health Analytics Dashboard	Vital signs/history (BP, sug pulse, etc.)

4. Architecture & Tech Stack

- Programming Language: Python
- Frontend/UI Framework: Streamlit for quick web UI prototyping and dashboards Scribd +1
- AI / Model: IBM Granite (Granite-13b-instruct-v2) for generative inference. Scribd+1
- Data Handling: Pandas, NumPy for data manipulation;
 Matplotlib / Seaborn for visualization. Scribd +2
- Version Control & Hosting: GitHub; possible use of hosting platform (e.g. cloud services) for deployment.
- Folder / Code Structure (based on what's reported):

5. API / Model Interaction

 Model Endpoint: Either local model loading or via Hugging Face API. E.g., IBM Granite model endpoint.

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- Authentication: If using external API (like Hugging Face), use API tokens stored securely (e.g. via .env)
 and not committed in source. Studocu
- Input Format:
 - For disease prediction: symptoms in structured or free text form
 - For treatment plan: the condition name + possibly user profile or preferences
 - For chat: natural language questions
 - For analytics: numerical or historical data (vitals, time series)
- Output Format: Usually plain text / JSON (if API) + charts / visualization (for analytics)
- Error Handling: Deal with invalid inputs (missing fields, malformed symptoms), timeouts in model response, etc.



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Medical Al Assistant

Disease Production Treatment Plans

Disclaimer: This is for informational purposes only. Always consult healthcare professionals for medical advice.

Enter Symptoms

Analyze Symptoms

Possible Conditions & Recommendations

- A fever is typically a symptom of an underlying infection, informention, or immune response.

- Common causes include viral infections (e.g., cold, flu), bacterial infections (e.g., strep throat, pneumonia), and immune related disorders (e.g., lupus, rheumatoid arthritis).

- Potential Medical Conditions: 1. "Viral Infections (e.g., Common Cold, Influenza);"
- "General Recommendations."

 Hydration is essential. Drink plenty of fluids to prevent dehydration.

 Rest and maintain a balanced diet to support
- your instrume system.

 Over the counter (OTC) gain relievers like acetaminophen or ibuprofen can help alleviate symptoms (consult a doctor for appropriate
- dosage).

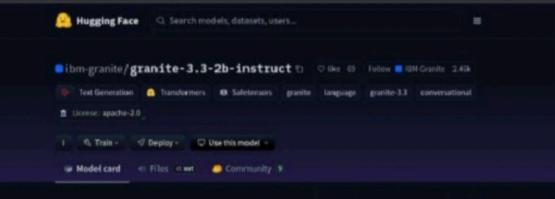
 Antihistamines may provide temperary relief
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Granite-3,3-2B-Instruct

Model Summary: Granite-3.3-2B-Instruct is a 2-billion parameter 128K context length language model fine-tuned for improved reasoning and instruction-following capabilities. Built on top of Granite-3.3-2B-Base, the model delivers significant gains on benchmarks for measuring generic performance including AlipacaEval-2.0 and Arena-Hard, and improvements in mathematics, coding, and instruction following. It supports structured reasoning through /response> tags, providing clear separation between internal thoughts and final outputs. The model has been trained on a carefully balanced combination of permissively licensed data and curated synthetic tasks.

- . Developers: Granite Team, IBM
- GitHub Repository: <u>|bm-granite/granite-3.3-</u>
 |anguage-models
- . Website: Granite Docs
- · Release Date: April 16th, 2025
- . License: Apache 2.0

Supported Languages: English, German, Spanish, French, Japanese, Portuguese, Arabic, Czech, Italian, Korean, Dutch, and Chinese. However, users may finetune this Granite model for languages beyond these 12 languages.

Intended Use: This model is designed to handle general instruction-following tasks and can be integrated into AI assistants across various domains, including business applications.

Capabilities

- · Thinking
- Summarization
- Text classification
- Text extraction
- Question-answering
- · Retrieval Augmented Generation (RAG)
- · Code related tasks
- · Function-calling tasks
- Multilingual dialog use cases



6. Installation & Deployment

Requirements

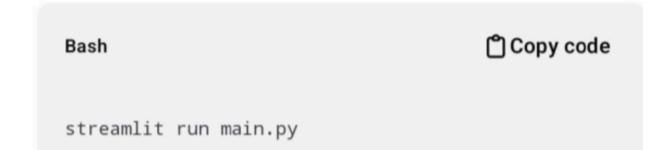
- Python 3.x
- Libraries: (as per requirements.txt) streamlit, pandas, numpy, matplotlib, model-inference related libs, etc. Scribd+1
- Possible external dependencies: Hugging Face account / token if using their model; IBM Granite access.

Setup Steps

- Clone repository from GitHub
- 2. Create virtual environment, install dependencies:



- 3. Set up API token / model files (.env)
- 4. Run locally:





7. Testing & Validation

- Unit Testing: For modules (disease prediction logic, treatment generator) to check expected outputs for given inputs.
- Prompt Testing: Use varied prompts/questions to ensure model responses are coherent, medically reasonable.
- Edge Cases: No symptoms, contradictory inputs, rare disease symptoms — ensure system handles these gracefully.
- User Acceptance: (If possible) feedback from medical professionals / domain experts.

8. Limitations, Risks & Ethical Considerations

- Non-clinical tool: HealthAl is for guidance, not diagnosis. Must include disclaimers.
- Bias & Data Quality: Model may reflect biases from training data; predictions may be inaccurate.
- Privacy & Security: If taking personal health data, ensure secure transmission, storage, user consent.



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Disease Prediction Treatment Plans

Disclaimer: This is for informational purposes only. Always consult healthcare professionals for medical advice.

Medical Condition Viral infection Female Medical History

Generate Treatment Plan

- urey or time treat are unuerrying course.

 Never self-administer antibiotics for viral infections, as they are ineffective and can lead to antibiotic resistance.
- 4. **When to Seek Medical Attention.**

- Severe headache or worsening confusion Shortness of breath or difficulty breathing Worsening symptoms after 7-10 days Underlying health conditions predisposing
- her to severe complications
- Young children, pregnant women, or immunocompromised individuals

Remember that this treatment plan is tailored to an individual with no known medical history. For someone with pre-existing conditions or specific risk factors, the recommendations might vary. Always consult a healthcare provider for personalized advice and treatment.

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9. Future Work & Enhancements

- Real-time health monitoring (e.g. wearable integrations)
- Enhanced chatbot with better context memory + multilingual support
- More modules: image analysis, lab reports, etc.
- Backend improvements: more robust REST/API interface, user authentication, logging / audit trails
- Regulatory compliance, clinical validation studies

10. References & Glossary

References

- Original project documentation / academic write-up (if any) Studocu +1
- IBM Granite model documentation
- Literature on AI in health applications

Female

Medical History

No records

Generate Treatment Plan

Personalized Treatment Plan

o. support groups.

Consider joining a support group for individuals dealing with cluster headaches. This can provide emotional support, practical advice, and a sense of community.

7. **Nutritional Considerations:**

Maintain a balanced diet rich in fruits, vegetables, lean proteins, and whole grains. Opt for foods containing omega-3 fatty acids (salmon, walnuts, flaxseeds), vitamin B12, and magnesium, as these nutrients are believed to help manage cluster headaches and overall well-being.

Remember, individual responses to treatments vary greatly, and this plan should be adjusted according to the patient's progress and tolerability. Always consult a healthcare provider before starting any new treatment regimen.

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