

Project Documentation

1. Introduction

Project Title: Health AI: Intelligent Healthcare Assistant Using IBM

Granite

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2. Project Overview

Purpose:

The purpose of the Medical AI Assistant is to provide users with quick, AI-powered guidance related to health symptoms and medical conditions.

It improves healthcare awareness and accessibility while emphasizing the importance of professional consultation.

Features:

- Disease Prediction: Analyze symptoms and provide possible conditions with recommendations.
- Treatment Plan Generation: Personalized suggestions based on condition, age, gender, and medical history.
- User-Friendly Interface: Built with Gradio for easy interaction.
- AI-Powered Analysis: Uses IBM Granite LLM for natural language processing.

3. Architecture

Frontend (Gradio): Interactive web interface with tabs for disease prediction and treatment planning.

Backend (Python & Hugging Face): Handles model loading, prompts, and responses.

LLM Integration (IBM Granite): Uses ibm-granite/granite-3.2-2b-instruct for medical text generation.

4. Setup Instructions

Prerequisites:

- Python 3.9 or later
- pip and virtual environment tools
- Internet access for model downloads

Installation:

1. Clone the repository
2. Install dependencies from requirements.txt
3. Run: `python healthai.py`
4. Open the Gradio link in your browser

5. Folder Structure

project/

- ■ healthai.py # Main application script
- requirements.txt # Dependencies
- ■ README.md # Documentation

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6. Running the Application

1. Run python healthai.py
2. Open the Gradio link in browser
3. Navigate tabs:
 - Disease Prediction: Enter symptoms → Analyze
 - Treatment Plan: Enter details → Generate

7. API Documentation

Currently not applicable. Future versions may include REST APIs.

8. Authentication

Current version runs without authentication.

Future deployment may include:

- API key authentication
- Role-based access

9. User Interface

- Clean two-tab layout (Disease Prediction & Treatment Plans)
- Textbox input and detailed text output
- Disclaimer for medical safety

10. Testing

- Unit Testing: Prompt and response functions
- Manual Testing: Symptom entry and treatment plan generation
- Edge Cases: Empty or unusual inputs

11. Screenshots

Below are the screenshots of the Gradio interface of the Medical AI Assistant.

Health AI.ipynb

File Edit View Insert Runtime Tools Help

Share Gemini

Commands + Code + Text Run all

```
/usr/local/lib/python3.12/dist-packages/huggingface_hub/utils/_auth.py:94: UserWarning:
The secret `HF_TOKEN` does not exist in your Colab secrets.
To authenticate with the Hugging Face Hub, create a token in your settings tab (https://huggingface.co/settings/tokens), set it as secret in your Google Colab and restart your session.
You will be able to reuse this secret in all of your notebooks.
Please note that authentication is recommended but still optional to access public models or datasets.
warnings.warn(

tokenizer_config.json: 8.88k/? [00:00<00:00, 157kB/s]

vocab.json: 777k/? [00:00<00:00, 8.70MB/s]

merges.txt: 442k/? [00:00<00:00, 6.75MB/s]

tokenizer.json: 3.48M/? [00:00<00:00, 10.6MB/s]

added_tokens.json: 100% [00:00<00:00, 2.45kB/s] 87.0/87.0

special_tokens_map.json: 100% [00:00<00:00, 19.9kB/s] 701/701

config.json: 100% [00:00<00:00, 38.1kB/s] 786/786

`torch_dtype` is deprecated! Use `dtype` instead!

model.safetensors.index.json: 29.8k/? [00:00<00:00, 1.45MB/s]

Fetching 2 files: 100% [02:17<00:00, 137.04s/it] 2/2

model-00002-of-00002.safetensors: 100% [00:03<00:00, 16.1MB/s] 67.1M/67.1M

model-00001-of-00002.safetensors: 100% [02:16<00:00, 136MB/s] 5.00G/5.00G

Loading checkpoint shards: 100% [00:18<00:00, 7.64s/it] 2/2

generation_config.json: 100% [00:00<00:00, 13.3kB/s] 137/137

Colab notebook detected. To show errors in colab notebook, set debug=True in launch()
* Running on public URL: https://e498a876ca85de936f.gradio.live
```

RAM
Disk

Variables Terminal 12:32 T4 (Python 3)

Medical AI Assistant

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

Disease Prediction

Treatment Plans

Enter Symptoms

fever, cough and headache

Analyze Symptoms

Possible Conditions & Recommendations

1. Fever: A symptom that can be caused by various infections, including viral (e.g., common cold, flu), bacterial, and parasitic infections.
2. Cough: Can be a sign of many respiratory tract infections, such as the common cold, influenza, bronchitis, or pneumonia.
3. Headache: May accompany various illnesses, including viral infections (e.g., cold, flu), dehydration, or migraines.

Based on these symptoms, the following conditions might be possible:

1. Viral upper respiratory infection (e.g., common cold, flu): This is a common cause of fever, cough, and headache, often accompanied by other symptoms like sore throat or body aches.
 - General recommendations: Rest, hydrate with fluids, over-the-counter (OTC) pain relievers (e.g., acetaminophen or ibuprofen) for headache and fever, and nasal decongestants if needed.
2. Bacterial infection (e.g., bronchitis, pneumonia): While less common causes of these symptoms in healthy individuals, especially with fever, it's still worth considering. Bacterial infections usually require antibiotics.
 - Consult a doctor for a proper evaluation and appropriate antibiotics if needed.
3. Allergic reaction or sinusitis: In some cases, these symptoms might be due to allergies or an inflammation of the sinuses, particularly if they are accompanied by nasal congestion or post-nasal drip.
 - Seek medical consultation as over-the-counter antihistamines might be recommended in addition to nasal drip.

Use via API

Built with Gradio

Settings

Medical AI Assistant

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Disease Prediction

Treatment Plans

Medical Condition

diabetes

Age

38

Gender

Female

Medical History

medication

Generate Treatment Plan

Personalized Treatment Plan

1. "Medication Management"
 - Oral Hypoglycemic Agents: Based on her age, gender, and medical history, a suitable medication could be Metformin (1000-1500mg daily). This medication is often the first choice for type 2 diabetes due to its affordability, effectiveness, and low risk of hypoglycemia.
 - Monitoring: Regularly check blood glucose levels using a home glucose monitor. Aim for HbA1c levels below 7%.
 - Diet and Exercise: Maintain a balanced diet low in saturated fats and added sugars, and engage in regular physical activity (30 minutes most days) to help manage blood sugar.
2. "Lifestyle Adjustments"
 - "Weight Management": If overweight, aim to lose 5-10% of body weight through a combination of calorie restriction and exercise. Excess weight can worsen insulin resistance.
 - "Portion Control": Be mindful of portion sizes, especially for carbohydrate-rich foods, to prevent spikes in blood sugar.
 - "Regular Sleep": Ensure 7-9 hours of quality sleep per night, as sleep deprivation can impact blood sugar control.
3. "Home Remedies and Complementary Therapies"
 - "Cinnamon": Some studies suggest cinnamon may help lower blood sugar levels, but more research is needed. Add 1/2 to 1 teaspoon of cinnamon per day to food or beverages.

Use via API

Built with Gradio

Settings

12. Known Issues

- Responses may vary with inputs
- No guaranteed medical accuracy
- Long symptom entries may be truncated

13. Future Enhancements

- Add API support for mobile apps
- Enable voice input/output
- Improve predictions with medical datasets
- Add data visualization features