Health AI Project Documentation

1. Introduction:

Project Title: Health AI

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Description:

Health AI is an AI-powered medical assistant that provides informational support by analyzing symptoms, suggesting possible conditions, and offering general treatment guidance. It also tracks user interaction history and provides a secure login/signup system.

2. Project Overview

Purpose:

To provide users with a reliable, AI-driven health information tool while emphasizing that professional consultation is always required.

Key Features:

User Authentication (Login & Signup)

Key Point: Secure access

Functionality: Allows new users to register and existing users to log in.

Disease Prediction

Key Point: Symptom-based analysis

Functionality: Accepts symptom inputs and suggests possible conditions with recommendations.

Treatment Plan Generation

Key Point: Personalized treatment guidance

Functionality: Creates general treatment suggestions based on condition, age, gender, and history.

History Tracking

Key Point: Query archiving

Functionality: Stores all user interactions (queries + AI responses) with timestamps.

History Management

Key Point: Data control

Functionality: Users can review or clear past interactions.

Informational Home & About Pages

Key Point: User guidance & transparency

Functionality: Provides instructions, disclaimers, and details about the technology stack.

Gradio UI

Key Point: Interactive interface

Functionality: Tabbed layout for easy navigation (Home, Disease Prediction, Treatment Plans, History, About).

3. Architecture

Frontend (Gradio): Interactive UI with tabs for different features.

Backend (Python): Authentication, history, and AI response handling.

Model Integration: IBM Granite LLM (ibm-granite/granite-3.2-2b-instruct).

Workflow:

1. User enters query

2. Tokenizer processes input

3. AI model generates output

4. Response is displayed & stored in history

4. Prerequisites:

1.Gradio Framework Knowledge: Gradio Documentation

2. IBM Granite Models (Hugging Face): IBM Granite models

3. Python Programming Proficiency: Python Documentation

4. Version Control with Git: Git Documentation

5. Google Collab’s T4 GPU Knowledge: Google collab

6. Setup Instructions

1. Install dependencies

```
pip install transformers torch gradio
```

2. Run the application:

```
python app.py
```

3. Open the Gradio URL in your browser.

6. Folder Structure

```
HealthAI/
 ├── app.py            # Main application file
 ├── requirements.txt    # Dependencies
 ├── /functions         # Helper functions
└── /users            # In-memory credentials
```

7. Running the Application

1. Launch python app.py.

2. Login (default: admin / 1234) or sign up.

3. Navigate tabs:

Home

Disease Prediction

Treatment Plans

History

About

8. API Documentation

Current: Gradio-only (no external APIs).

Future Planned Endpoints:

POST /predict-symptoms – Input: symptoms → Output: conditions

POST /treatment-plan – Input: patient details → Output: plan

GET /history – Returns user’s query history

9. Authentication

Current: Login/Signup system with default account (admin/1234).

Future Enhancements:

JWT authentication

OAuth2 login

Role-based access (Admin, User, Doctor)

10. User Interface

Tabs: Home, Disease Prediction, Treatment Plans, History, About.

Inputs: Textboxes for symptoms, conditions, and medical history.

Buttons: Login, Signup, Predict, Generate Plan, Clear History.

Outputs: AI responses in text form, formatted history display.

11. Testing

Unit Testing: Authentication & history.

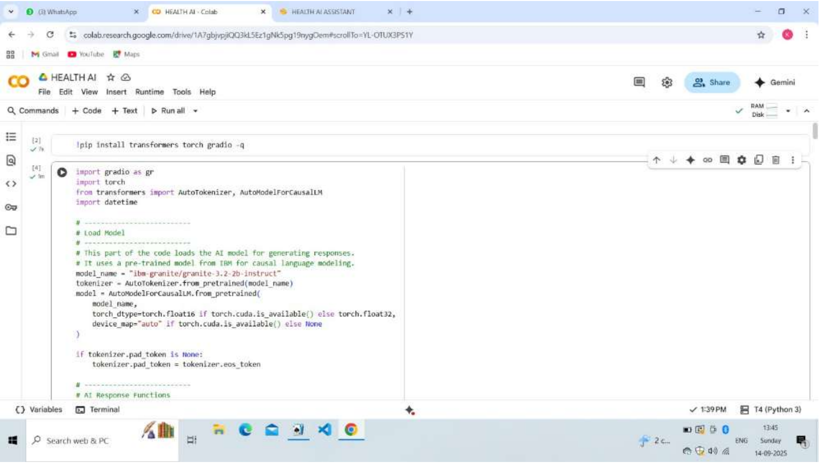
Functional Testing: Predictions & plans.

UI Testing: Tab navigation.

Edge Cases: Empty inputs, invalid login.

Future: Automated CI/CD testing.

12. Screenshots



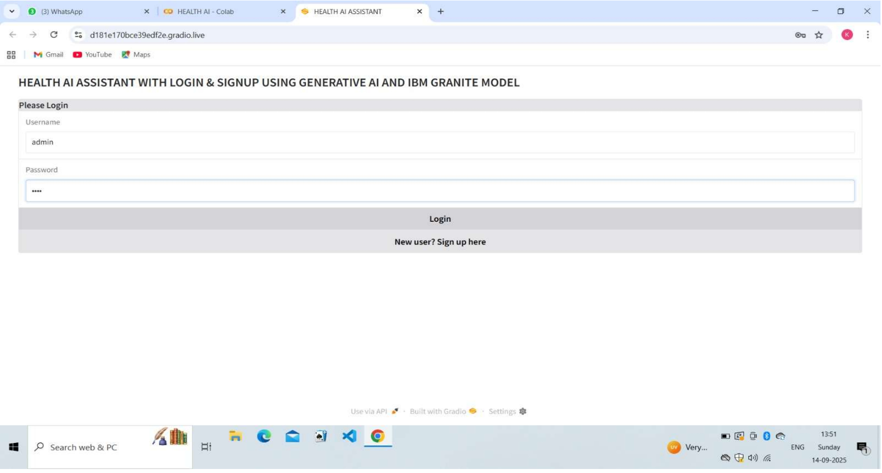
```
!pip install transformers torch gradio -q
```

```
import gradio as gr
import torch
from transformers import AutoTokenizer, AutoModelForCausalLM
import datetime

# -------------------------
# Load Model
# -------------------------
# This part of the code loads the AI model for generating responses.
# It uses a pre-trained model from IBM for causal language modeling.
model_name = "ibm-granite/granite-3.2-2b-instruct"
tokenizer = AutoTokenizer.from_pretrained(model_name)
model = AutoModelForCausalLM.from_pretrained(
    model_name,
    torch_dtype=torch.float16 if torch.cuda.is_available() else torch.float32,
    device_map="auto" if torch.cuda.is_available() else None
)

if tokenizer.pad_token is None:
    tokenizer.pad_token = tokenizer.eos_token

# -------------------------
# AI Response Functions
```



HEALTH AI ASSISTANT WITH LOGIN & SIGNUP USING GENERATIVE AI AND IBM GRANITE MODEL

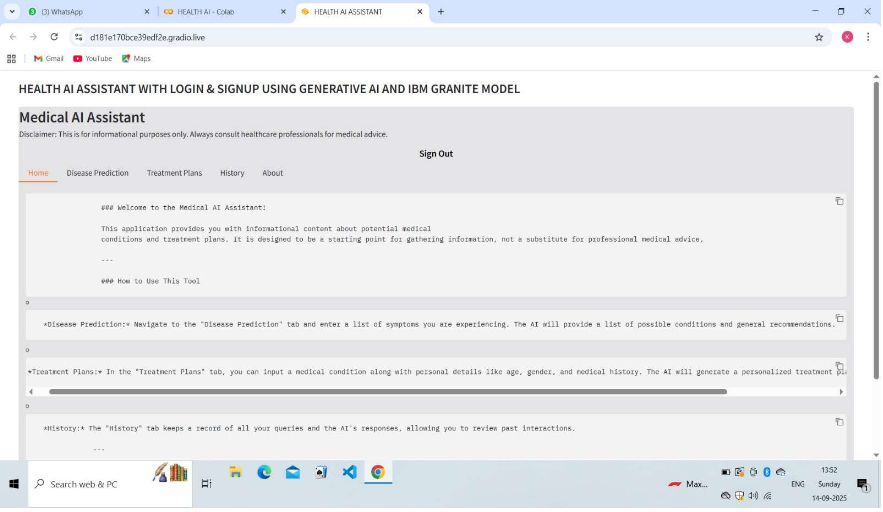
Please Login

Username: admin

Password: ••••

Login

New user? Sign up here



HEALTH AI ASSISTANT WITH LOGIN & SIGNUP USING GENERATIVE AI AND IBM GRANITE MODEL

Medical AI Assistant

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

```
            ### Welcome to the Medical AI Assistant!

            This application provides you with informational content about potential medical
            conditions and treatment plans. It is designed to be a starting point for gathering information, not a substitute for professional medical advice.

            ---

            ### How to Use This Tool
```

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```
  *Disease Prediction:* Navigate to the "Disease Prediction" tab and enter a list of symptoms you are experiencing. The AI will provide a list of possible conditions and general recommendations.
```

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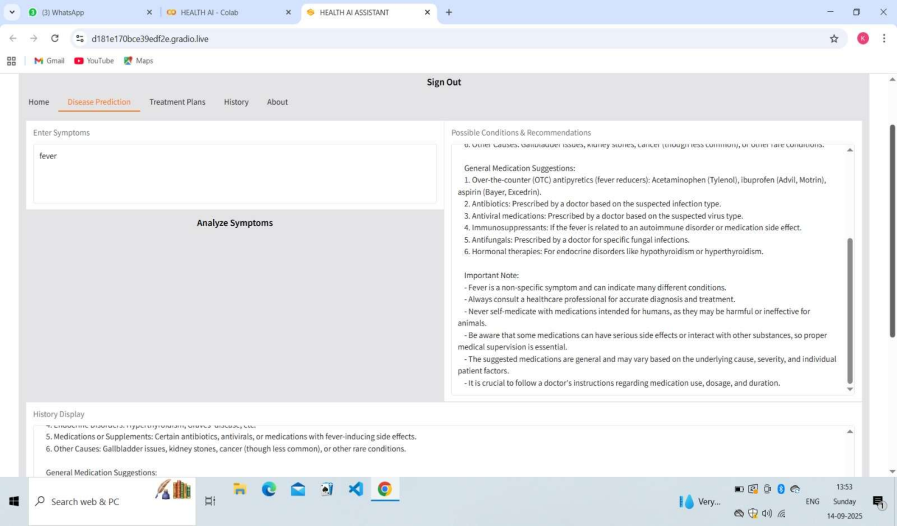
```
*Treatment Plans:* In the "Treatment Plans" tab, you can input a medical condition along with personal details like age, gender, and medical history. The AI will generate a personalized treatment pl
```

o

```
  *History:* The "History" tab keeps a record of all your queries and the AI's responses, allowing you to review past interactions.

          ---
```



Enter Symptoms: fever

Possible Conditions & Recommendations

6. Other Causes: Gallbladder issues, kidney stones, cancer (though less common), or other rare conditions.

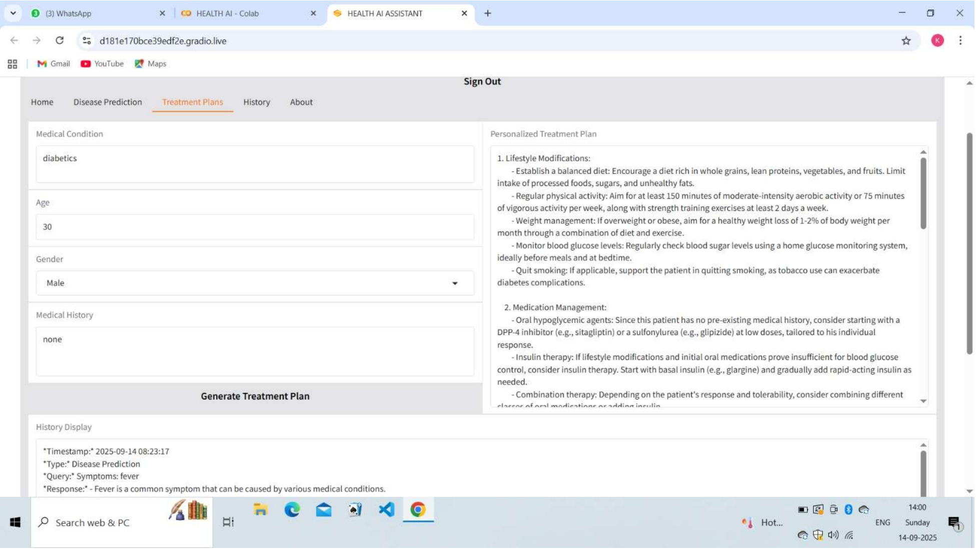
General Medication Suggestions:
1. Over-the-counter (OTC) antipyretics (fever reducers): Acetaminophen (Tylenol), ibuprofen (Advil, Motrin), aspirin (Bayer, Excedrin).
2. Antibiotics: Prescribed by a doctor based on the suspected infection type.
3. Antiviral medications: Prescribed by a doctor based on the suspected virus type.
4. Immunosuppressants: If the fever is related to an autoimmune disorder or medication side effect.
5. Antifungals: Prescribed by a doctor for specific fungal infections.
6. Hormonal therapies: For endocrine disorders like hypothyroidism or hyperthyroidism.

Important Note:
- Fever is a non-specific symptom and can indicate many different conditions.
- Always consult a healthcare professional for accurate diagnosis and treatment.
- Never self-medicate with medications intended for humans, as they may be harmful or ineffective for animals.
- Be aware that some medications can have serious side effects or interact with other substances, so proper medical supervision is essential.
- The suggested medications are general and may vary based on the underlying cause, severity, and individual patient factors.
- It is crucial to follow a doctor's instructions regarding medication use, dosage, and duration.

History Display

4. Endocrine Disorders: Hyperthyroidism, Graves' disease, etc.
5. Medications or Supplements: Certain antibiotics, antivirals, or medications with fever-inducing side effects.
6. Other Causes: Gallbladder issues, kidney stones, cancer (though less common), or other rare conditions.

General Medication Suggestions:



Medical Condition

diabetics

Age

30

Gender

Male

Medical History

none

Personalized Treatment Plan

1. Lifestyle Modifications:
   - Establish a balanced diet: Encourage a diet rich in whole grains, lean proteins, vegetables, and fruits. Limit intake of processed foods, sugars, and unhealthy fats.
   - Regular physical activity: Aim for at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous activity per week, along with strength training exercises at least 2 days a week.
   - Weight management: If overweight or obese, aim for a healthy weight loss of 1-2% of body weight per month through a combination of diet and exercise.
   - Monitor blood glucose levels: Regularly check blood sugar levels using a home glucose monitoring system, ideally before meals and at bedtime.
   - Quit smoking: If applicable, support the patient in quitting smoking, as tobacco use can exacerbate diabetes complications.

2. Medication Management:
   - Oral hypoglycemic agents: Since this patient has no pre-existing medical history, consider starting with a DPP-4 inhibitor (e.g., sitagliptin) or a sulfonylurea (e.g., glipizide) at low doses, tailored to his individual response.
   - Insulin therapy: If lifestyle modifications and initial oral medications prove insufficient for blood glucose control, consider insulin therapy. Start with basal insulin (e.g., glargine) and gradually add rapid-acting insulin as needed.
   - Combination therapy: Depending on the patient's response and tolerability, consider combining different classes of oral medications or adding insulin

History Display

Timestamp: 2025-09-14 08:23:17
Type: Disease Prediction
Query: Symptoms: fever
Response: - Fever is a common symptom that can be caused by various medical conditions.

13. Known Issues

Responses vary in accuracy.

No persistent database (history resets).

Internet required for model.

Slower on CPU.

14. Future Enhancements

Database integration

REST APIs

Cloud deployment

Mobile apps

Analytics dashboard

Multi-language support

Doctor portal