HealthAI–AI-Powered Medical Assistant

Project Report

Team id:LTVIP2025TMID32144

Submitted by: Rudru Hemanth, Pirakala Amarnadh, Penneru

sushmika,Polagani venkata sai

Technology Stack: Gradio, Hugging Face, Python, Google Colab

Project Description:

HealthAI is an intelligent healthcare assistant designed to simplify access to basic medical guidance. Developed using Python, Gradio, and Hugging Face models, the application provides three core functionalities: AI-powered health chat, disease prediction from symptoms, and treatment plan suggestions. It aims to democratize medical information for users without requiring heavy backend infrastructure. HealthAI runs seamlessly in Google Colab, making it lightweight and easily accessible.

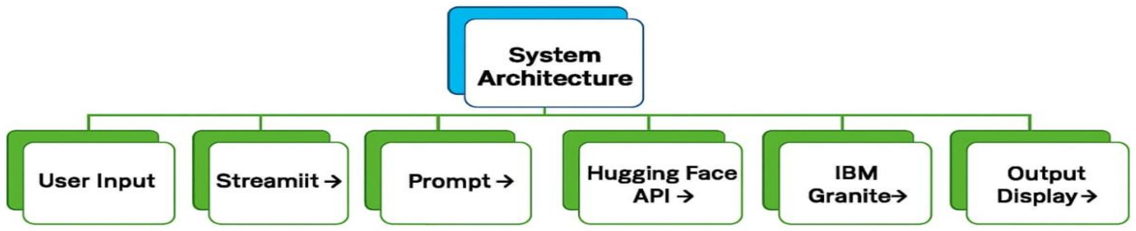
Scenarios:

Scenario 1 – Chat with AI Doctor:
Users can enter medical queries and get intelligent, AI-generated responses using Hugging Face models.

Scenario 2 – Disease Predictor:
Users enter symptoms (e.g., "fever and cough"), and the system predicts likely conditions like "Flu".

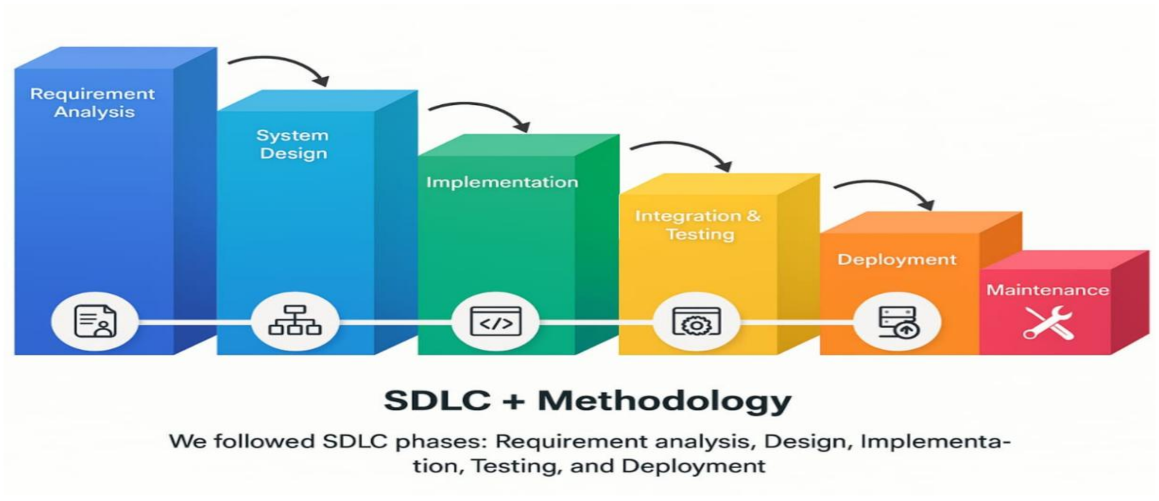
Scenario 3 – Treatment Plan Generator:
The user provides a disease name (e.g., "Malaria"), and the system generates a simple treatment outline.

Technical Architecture:



Frontend: Built using Gradio Blocks with tabbed navigation (Chat, Predict, Treatment).
Backend: Python logic executed in Google Colab notebooks.
Model: Hugging Face text2text model (e.g., flan-t5-base) using InferenceClient or transformers pipeline.
Hosting: Google Colab + Hugging Face API.

Project Workflow Activities:



Activity 1: Model Selection and Architecture
 - 1.1: Chose Hugging Face model (flan-t5-base) suitable for fast text generation.
 - 1.2: Defined architecture: Gradio frontend with AI backend in Colab.

- 1.3: Installed libraries and dependencies in Colab.

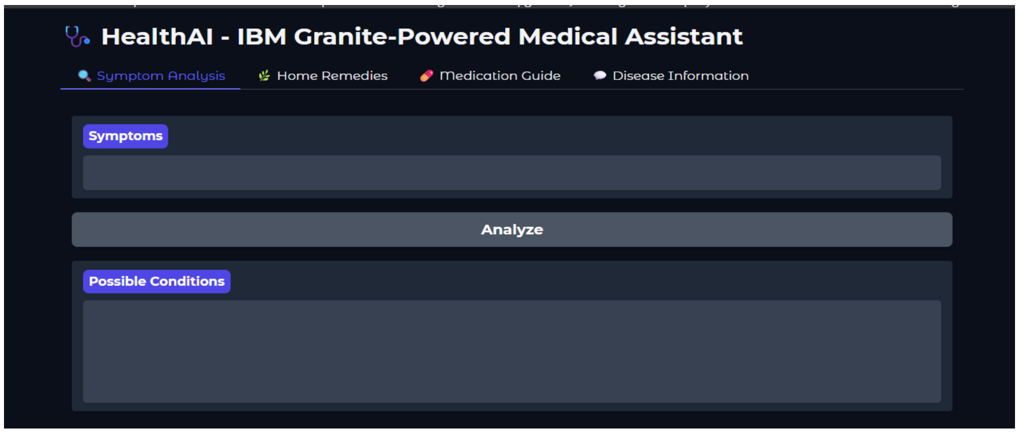
Activity 2: Core Functionalities Development
- 2.1: Developed chat, prediction, and treatment generators using Python functions.
- 2.2: Designed logic to handle user messages and responses.

Activity 3: Gradio UI Development
- 3.1: Built a tabbed interface using gr.Blocks for clean interaction.
- 3.2: Connected frontend inputs to backend logic in real-time.

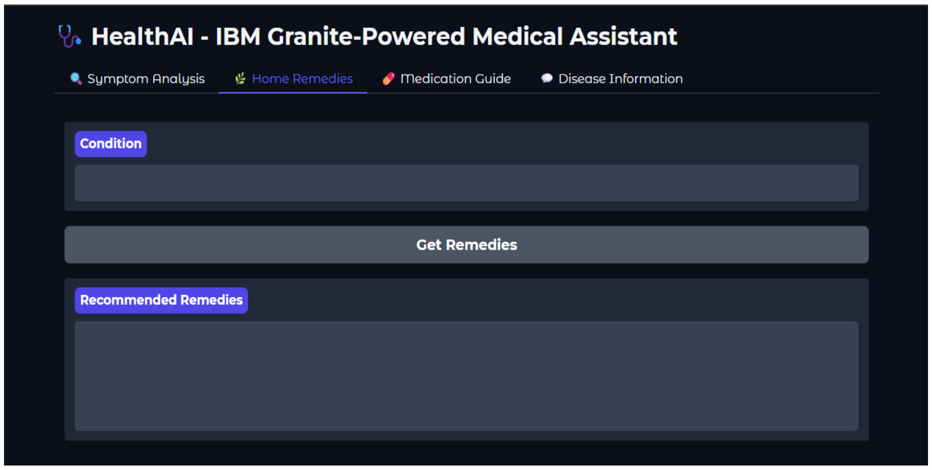
Activity 4: Deployment and Testing
- 4.1: Launched on Google Colab.
- 4.2: Integrated API key securely.
- 4.3: Captured screenshots for each feature.

Sample Screenshot – Disease Predictor:

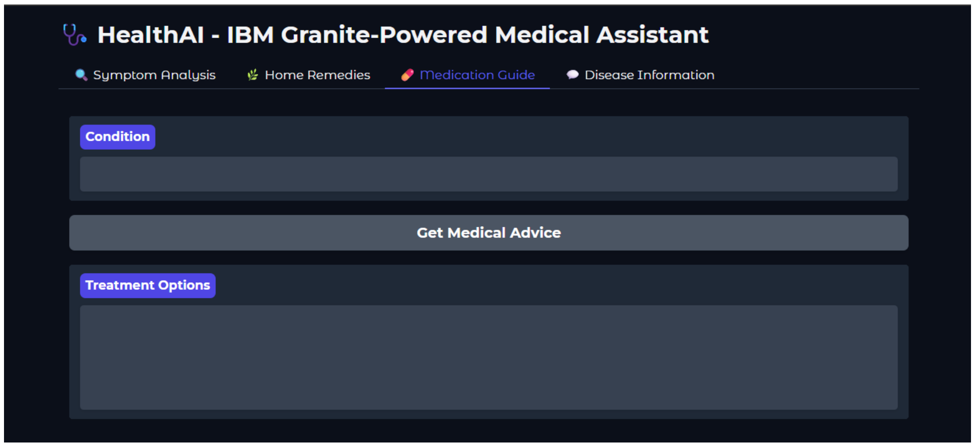
-SYMPTOM ANALYSIS AND DISEASE FINDER:



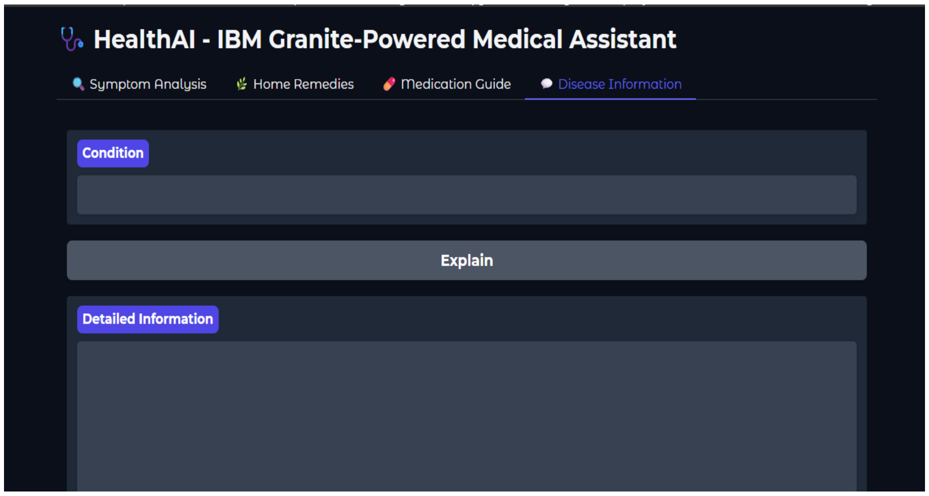
-HOME REMEDIES:



-TREEATMENT GENERATOR:



DISEASE INFORMATION :



Milestone Summary:

Milestone 1: Setup and Architecture
- Model selection, architecture design, and dependency installation.

Milestone 2: Core Features Implementation
- Coded chatbot, prediction logic, and treatment generator.

Milestone 3: UI and Interaction
- Created and connected a Gradio tab-based UI.

Milestone 4: Testing and Demonstration
 - Final testing, screenshots, and documentation creation.

Conclusion:

HealthAI demonstrates how modern AI tools like Hugging Face models and Gradio can be integrated to build intelligent, accessible healthcare assistants. By offering basic prediction, chat, and treatment features in a simple UI, the project showcases a practical use case of generative AI in health tech. Running fully in Google Colab, HealthAI serves as a minimal, no-server solution for intelligent health guidance.

Detailed Feature Breakdown:

1. SYMPTOM ANALYSIS :
   This feature allows users to type medical-related questions or concerns. Using Hugging Face's flan-t5-base model, the app interprets user input and returns a concise, context-aware answer. The goal is not to replace a professional diagnosis but to provide basic information and guide users to formal care when needed.

2. Disease Predictor:
   Users provide common symptoms (e.g., "fever and cough"), and the system performs rule-based matching to predict common conditions such as flu, COVID-19, or migraine. The logic can be extended using scikit-learn classifiers trained on real symptom-disease datasets for greater accuracy.

3.:TREEATMENT GENERATOR
   This feature uses the same generative model to output simple, general-purpose treatment guidance for common diseases. The generated response typically includes home remedies, dietary suggestions, and general steps. Users are explicitly informed that it is not a replacement for a prescription or diagnosis.

Technologies Used:

- Gradio: For building the web-based UI with tab navigation and real-time interaction.
- Hugging Face Transformers: For accessing and using the flan-t5-base model (or equivalent) to generate AI responses.
- Python: Core backend logic for connecting user input to model outputs.
- Google Colab: Cloud-based runtime environment to run the app without installing dependencies locally.
- InferenceClient: For secure interaction with hosted models using a Hugging Face API key.

Limitations and Future Work:

Limitations:
- The current disease prediction is rule-based and limited to a few symptoms.
- All responses are AI-generated and may lack medical accuracy.
- The model relies on internet connectivity and Hugging Face API limits.

Future Enhancements:
- Integrate machine learning classifiers trained on a real dataset like SymCat or WHO.
- Add health analytics dashboard using Plotly for time series visualizations.
- Implement session-based user history for persistent interaction.
- Deploy as a Hugging Face Space or Streamlit Cloud App.
- Add speech input or translation for multilingual support.