

Health AI : Intelligence Healthcare Assistant

1. Introduction

- Project title : Health AI : Intelligence Healthcare Assistant
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2. Project Overview

- Purpose :

The purpose of Health AI: Intelligence Healthcare Assistant is to provide users with AI-driven healthcare support through a simple, interactive web application. The system uses IBM Granite large language models integrated with a Gradio-based interface to predict possible health conditions, suggest treatment plans, and maintain a history of user interactions. It also provides a secure login/signup system and includes medical disclaimers to ensure the information is treated as guidance, not a substitute for professional advice.

- Features:

Login & Signup System

Key Point: Secure authentication

Functionality: Allows users to create accounts and log in before accessing healthcare features.

Disease Prediction

Key Point: Symptom-based AI analysis

Functionality: Suggests possible medical conditions based on user-provided symptoms.

Treatment Plan Generator

Key Point: Personalized suggestions

Functionality: Creates a treatment plan using condition, age, gender, and medical history.

History Tracking

Key Point: Review past interactions

Functionality: Maintains a timestamped record of queries and responses for user reference.

Clear History Function

Key Point: Data management

Functionality: Users can clear stored interaction history.

Disclaimer Integration

Key Point: Safe use of information

Functionality: Displays disclaimers ensuring users understand it is for informational purposes only.

About Section

Key Point: Transparency

Functionality: Provides information on the project, technology stack, and limitations.

3. Architecture

Frontend (Gradio): Interactive UI with multiple tabs for login, signup, home, disease prediction, treatment plan, history, and about.

Core Logic (Python Functions): Manages authentication, symptom analysis, treatment plan generation, and history tracking.

LLM Integration (IBM Granite): Uses the Granite 3.2 2B Instruct model from Hugging Face for natural language understanding and text generation.

Deployment (Google Colab): Runs seamlessly on Google Colab with GPU support for faster model inference.

4. Setup Instructions

Prerequisites:

- o Python 3.9 or later
- o Hugging Face account for IBM Granite model access
- o Gradio framework
- o PyTorch installed
- o Google Colab access with GPU
- o Git for version control

Installation Process:

- o Open Google Colab and create a new notebook
- o Change runtime type to GPU (e.g., T4)

- o Run: !pip install transformers torch gradio -q
- o Load IBM Granite model using Hugging Face
- o Copy and paste the source code into Colab cells
- o Execute cells sequentially to launch the Gradio app
- o Access the generated link to interact with the assistant

5. Folder Structure

app/ – Core logic (authentication, disease prediction, treatment plan)
ui/ – Gradio UI components (login, signup, chatbot, tabs)
models/ – Model integration with IBM Granite
history.py – Handles user query and response history
app.py – Main application launcher

6. Running the Application

- Open Google Colab and upload the project code
- Install dependencies using pip
- Run notebook cells in order
- Gradio generates a shareable web link
- Login or Signup to access features
- Use Disease Prediction, Treatment Plan, and History tabs
- Clear history or log out when finished

7. API Documentation

POST /login – Authenticates user credentials
POST /signup – Registers a new user
POST /predict – Analyzes symptoms and predicts conditions
POST /treatment – Generates a treatment plan
GET /history – Retrieves past interactions
POST /clear-history – Clears stored history

8. Authentication

The application uses a simple username-password authentication system. Users must sign up before logging in. Incorrect credentials are rejected, and new users can register securely. Future upgrades may include encrypted storage, token-based authentication, and role-based access control.

9. User Interface

The Gradio-based interface includes:

- Login & Signup screens

- Home tab with instructions
- Disease Prediction tab with input box for symptoms and AI-generated output
- Treatment Plan tab with input fields for condition, age, gender, and history
- History tab to review past queries and clear records
- About tab with project details and disclaimers

10. Testing

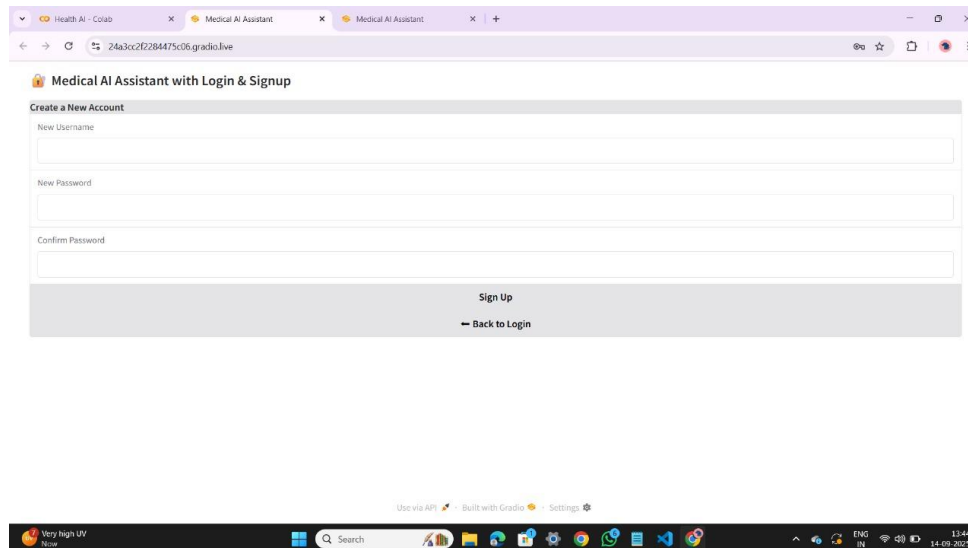
Testing was carried out in multiple phases:

- Unit Testing – Validated individual functions for login, signup, prediction, and treatment
- Functional Testing – Verified interaction between Gradio UI and backend logic
- Manual Testing – Tested full workflow in Colab (login → predict → treatment → history)
- Edge Case Testing – Empty inputs, invalid credentials, mismatched passwords

11. Screenshots

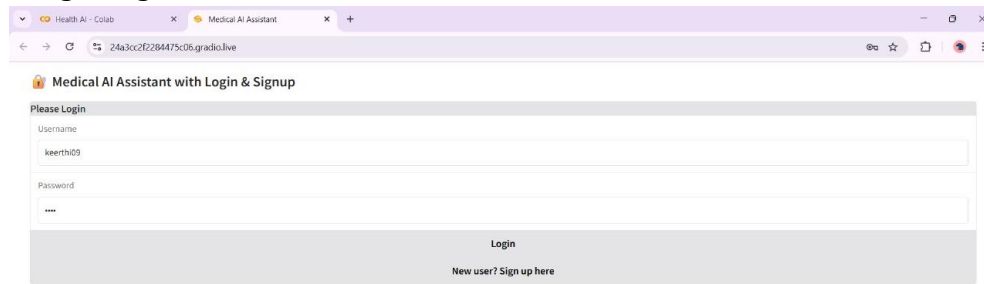
The following screenshots demonstrate the user interface:

• Signup Page –



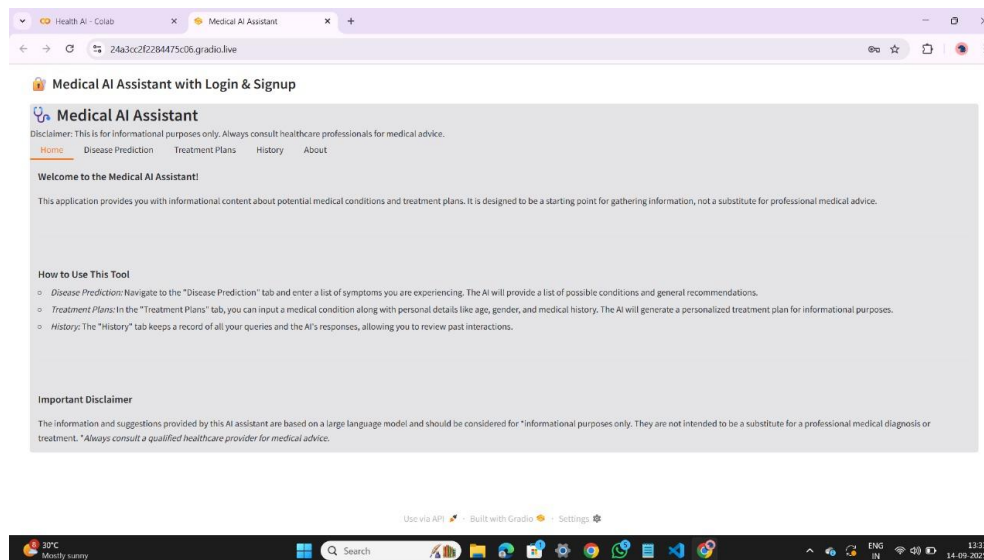
The screenshot shows a web browser window with the title "Medical AI Assistant with Login & Signup". The page is titled "Create a New Account" and contains three input fields: "New Username", "New Password", and "Confirm Password". Below these fields are two buttons: "Sign Up" and "Back to Login". The browser's address bar shows the URL "24a3cc2f2284475c06.gradio.live". The Windows taskbar at the bottom shows the system clock as 13:44 on 14-09-2023.

• Login Page–



The screenshot shows a web browser window with two tabs: "Health AI - Colab" and "Medical AI Assistant". The address bar displays the URL "24a3cc2f2284475c06.gradio.live". The page title is "Medical AI Assistant with Login & Signup". The main content area is titled "Please Login" and contains a form with two input fields: "Username" (with the text "keerthi09") and "Password" (with masked characters "****"). Below the password field is a "Login" button. At the bottom of the form, there is a link that says "New user? Sign up here".

• Home Tab –



The screenshot shows the "Home" tab of the "Medical AI Assistant" application. The page has a navigation bar with links: "Home", "Disease Prediction", "Treatment Plans", "History", and "About". The main content area includes a disclaimer, a welcome message, and instructions on how to use the tool.

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

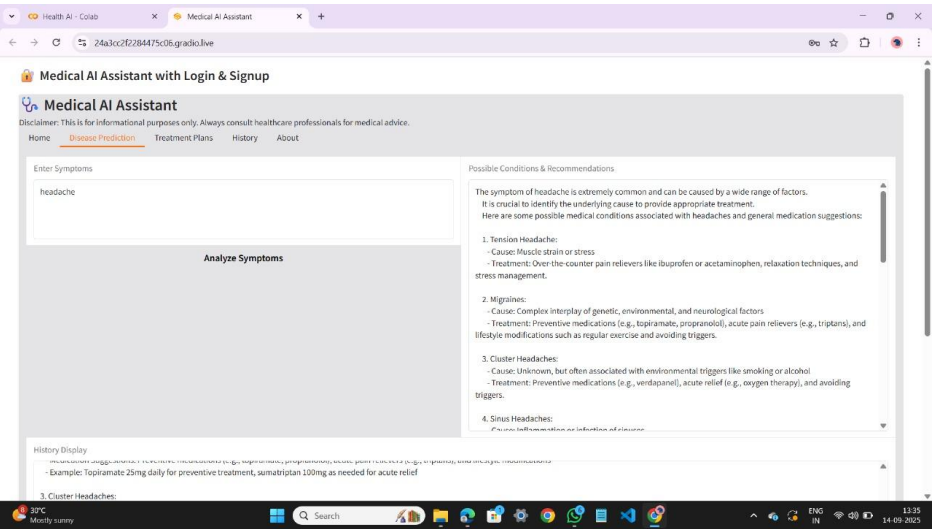
Welcome to the Medical AI Assistant!
This application provides you with informational content about potential medical conditions and treatment plans. It is designed to be a starting point for gathering information, not a substitute for professional medical advice.

How to Use This Tool

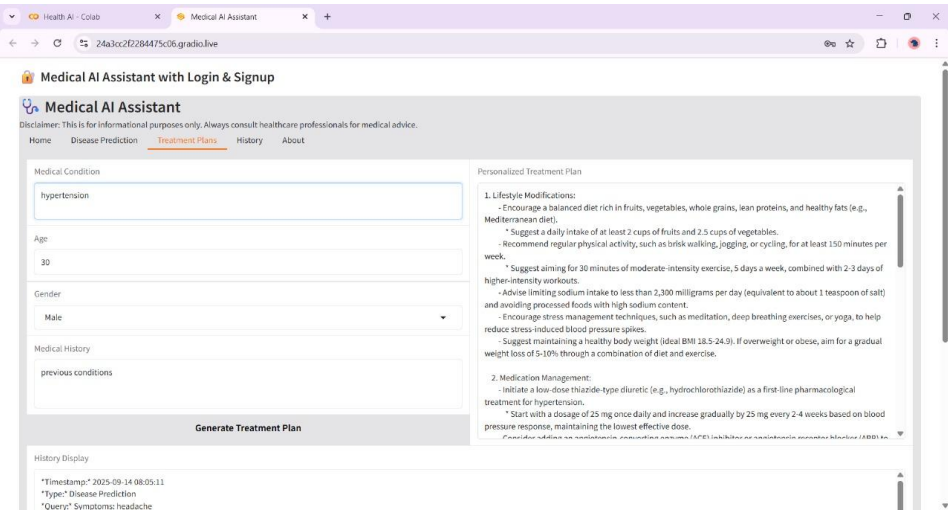
- **Disease Prediction:** Navigate to the "Disease Prediction" tab and enter a list of symptoms you are experiencing. The AI will provide a list of possible conditions and general recommendations.
- **Treatment Plans:** In the "Treatment Plans" tab, you can input a medical condition along with personal details like age, gender, and medical history. The AI will generate a personalized treatment plan for informational purposes.
- **History:** The "History" tab keeps a record of all your queries and the AI's responses, allowing you to review past interactions.

Important Disclaimer
The information and suggestions provided by this AI assistant are based on a large language model and should be considered for "informational purposes only. They are not intended to be a substitute for a professional medical diagnosis or treatment. *Always consult a qualified healthcare provider for medical advice.

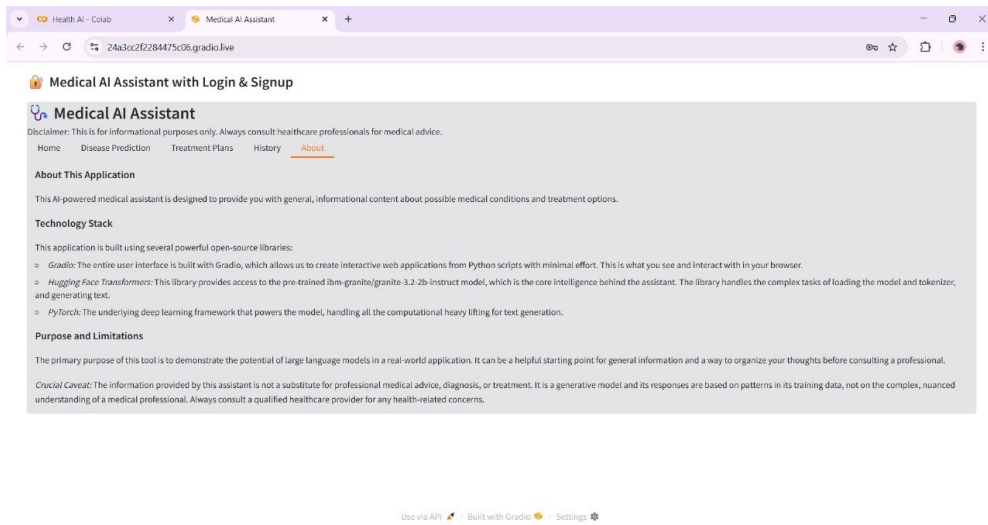
• Disease Prediction Tab –



• Treatment Plan Tab –



• About Tab –



12. Known Issues

- Predictions are AI-generated and not a replacement for medical advice
- Requires internet connectivity for Hugging Face model access
- No persistent storage of user accounts or history (session-based only)
- Basic authentication without encryption

13. Future Enhancements

- Database integration for persistent user data
- Enhanced authentication (e.g., JWT, OAuth2)
- Mobile app version for easier access
- Multi-language support for wider usability
- Integration with hospital/healthcare APIs for real-world applications