SMARTBRIDGE
Let's Bridge the Gap

Generative AI Project using IBM Cloud – HEALTHAI

Project Documentation Format

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1. Introduction

- **Project Title: HEALTHAI: Intelligent Healthcare Assistant using IBM Granite (Generative AI with IBM Cloud)** **Team Members:**
    - **Koti Venkata Srinivasarao (Team Leader – Requirements gathering ,Interaction& Testing):**
      Contributed by assisting in prompt design, testing the AI model outputs across modules like Disease Prediction and Health Chat, and refining interactions with IBM Granite.
    - **Kesani Santhosh Kumar (Team Member - Development , Integration , Deployment & documentation):**
      Led the complete development of the HEALTHAI application, including IBMGranite integration, Streamlit-based UI design, module creation, and model API handling,project deployment
    - **Kambhampati Dharaneeswar (Team Member - UI Structuring , Feature Enhancement & Testing):**
      Supported in designing user flow, organizing the Streamlit interface across all modules, and suggesting improvements in user interaction and feature behavior.
    - **Kaja Bala Nithin Reddy (Team Member - Feature Enhancement ,Testing & documentation):**
      Supported in- Feature Enhancement of project, testing the project and helped in the documentation.

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2. Project Overview

- **Purpose:**
  To build a Generative AI-based healthcare assistant using IBM Granite, capable of answering health queries, predicting diseases, suggesting treatments, and displaying analytics.
- **Features:**
    - AI Health Chat using IBM Granite
    - Disease Prediction from user symptoms

- Treatment Plan Suggestions
- Health Analytics Dashboard
- Centralized shared model for performance optimization

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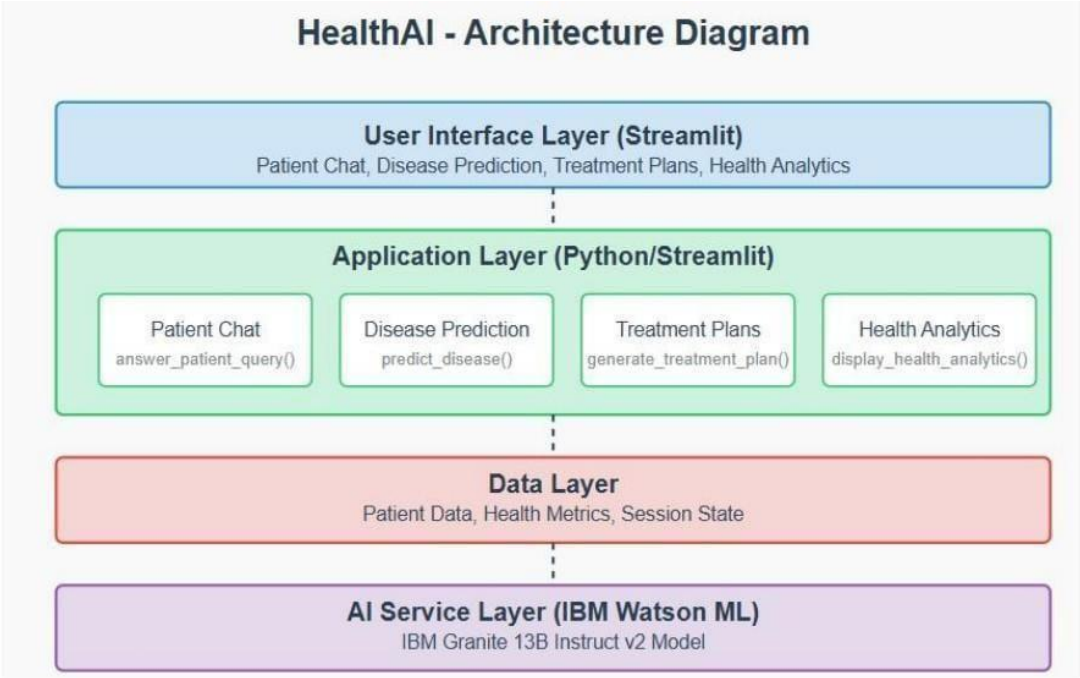
3. Architecture

- **Frontend:**
  Built using **Streamlit** for a clean and responsive web interface. Each feature is modularized for easy navigation via sidebar.
- **Backend & Model:**
  - No traditional backend. All logic handled in Streamlit using Python.
  - Uses **IBM Granite 3-2b Instruct model** from IBM Watsonx: ibm-granite/granite-3.2b-instruct
  - Supports both API and **local model loading** (granite/folder).
- **Shared Model Loader:**
  The shared_model.py file centrally loads and shares the AI model across modules to prevent memory crashes and redundancy.



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4. Setup Instructions

Prerequisites

- Python 3.10+
- pip
- IBM cloud account and Streamlit Community Cloud account
- Installed model files if using local (granite/ folder) **Installation**

git clone: https://github.com/KESANI-SANTHOSH-KUMAR/HealthCare_AI.git

cd Healthai

pip install -r requirements.txt

Environment Variables

Create a .env file in the root folder:

IBM watsonx_API_Key= ESdPIiW78JY8LM32Vp6ujw_EVP1dySvqb5ZQ5lc7K4wi

☑ .env file must be excluded in .gitignore.

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5. Folder Structure

Health-ai/

├— app.py # Main entry point

├— shared_model.py # Shared AI model instance

├— patient_chat.py # AI Health Chat module

├— disease_prediction.py # Disease Prediction logic

├— treatment_plans.py # Treatment Plan suggestions

├— health_analytics.py # Analytics module

├— requirements.txt # Python dependencies

├— .env # API token (not pushed to GitHub)

├— granite/ # [Optional] Local model folder

└— assets/ # Logos and screenshots

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6. Running the Application

For IBM watsonx API:

streamlit run app.py

For Local Model:

Ensure granite/ folder contains the downloaded model and tokenizer files.

In shared_model.py, update: model_path = "./granite"

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7. API Documentation

Endpoint: https://eu-de.ml.cloud.ibm.com/ml/v1/text/chat?version=2023-05-29

Headers:

{

"Authorization": "Bearer <IBM _API_Key>",

"Content-Type": "application/json"

}

Example Request:

{

"inputs": "What are the symptoms of diabetes?"

}

Example Response:

{

"generated_text": "Common symptoms of diabetes include frequent urination..."

}

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8. Authentication

- Streamlit cloud Secrets is securely stored the .env credentials.
- .env is excluded via .gitignore
- App is currently public and stateless (no user login)
- HuggingFace or Firebase Auth can be added in future

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9. User Interface

- Built entirely with **Streamlit**
- Sidebar for navigation
- Text/chat inputs for interaction
- Visual graphs and health tips in Analytics
- Centralized theme and branding

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10. Testing

- ☑ Manual testing across all modules
- ☑ Model tested with varied prompts and edge cases
- ☑ Handled errors for invalid inputs and model timeouts

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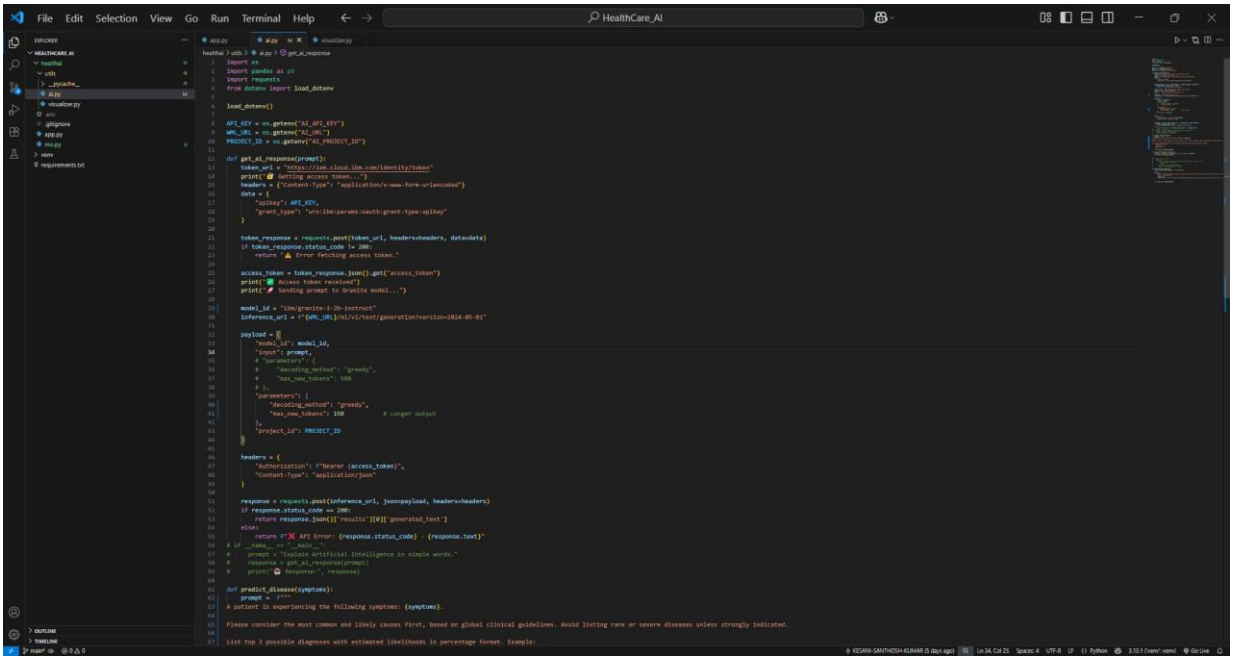
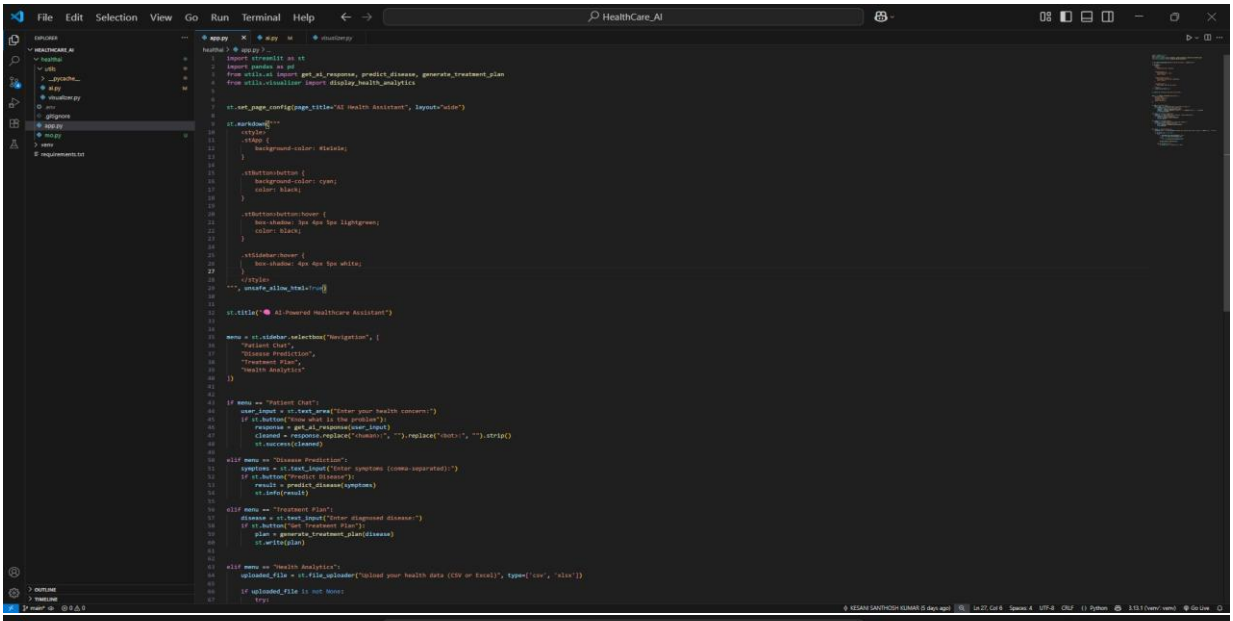
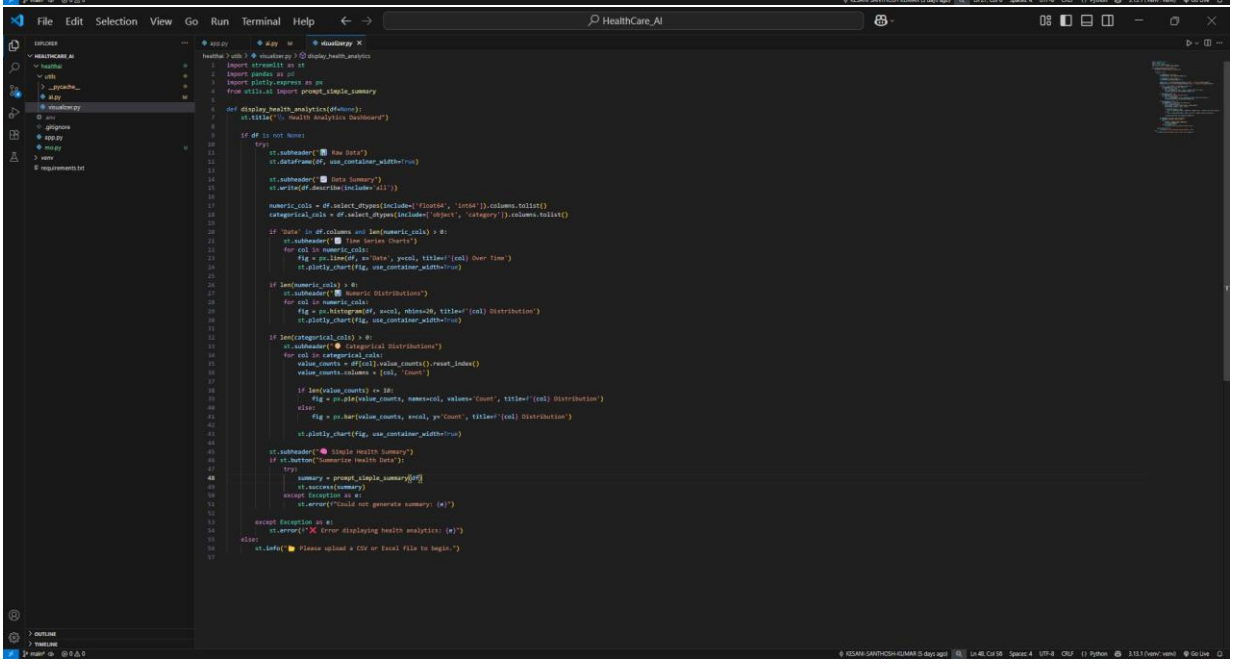
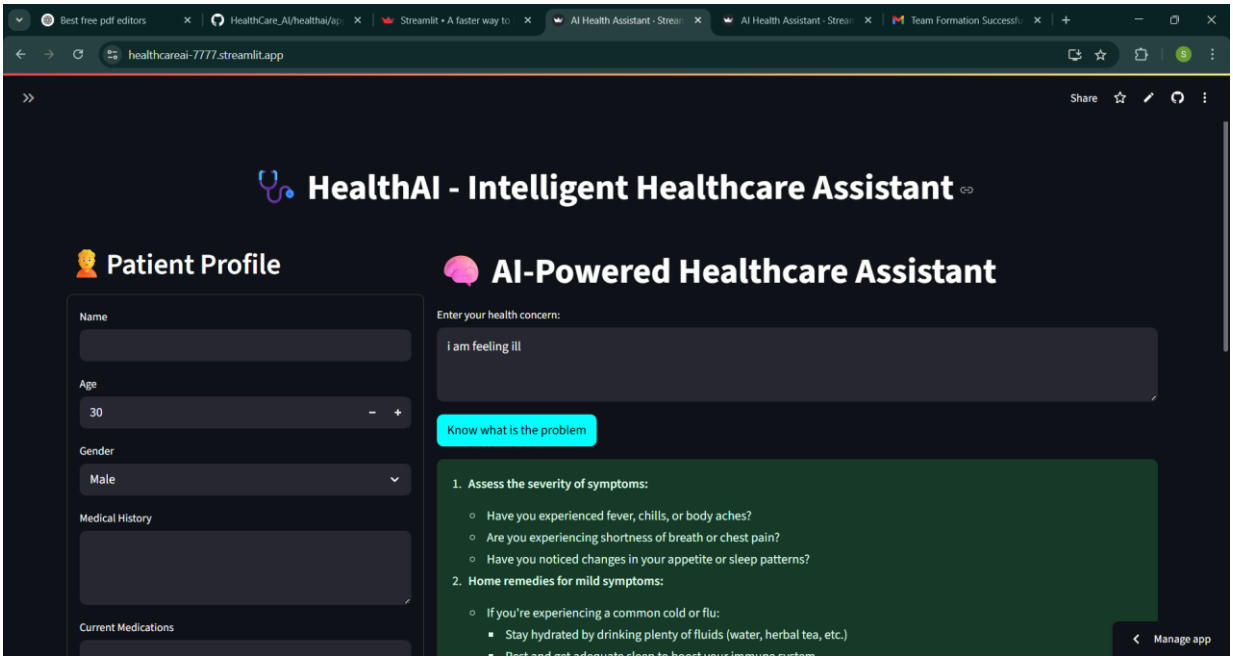
11. Screenshots or Demo

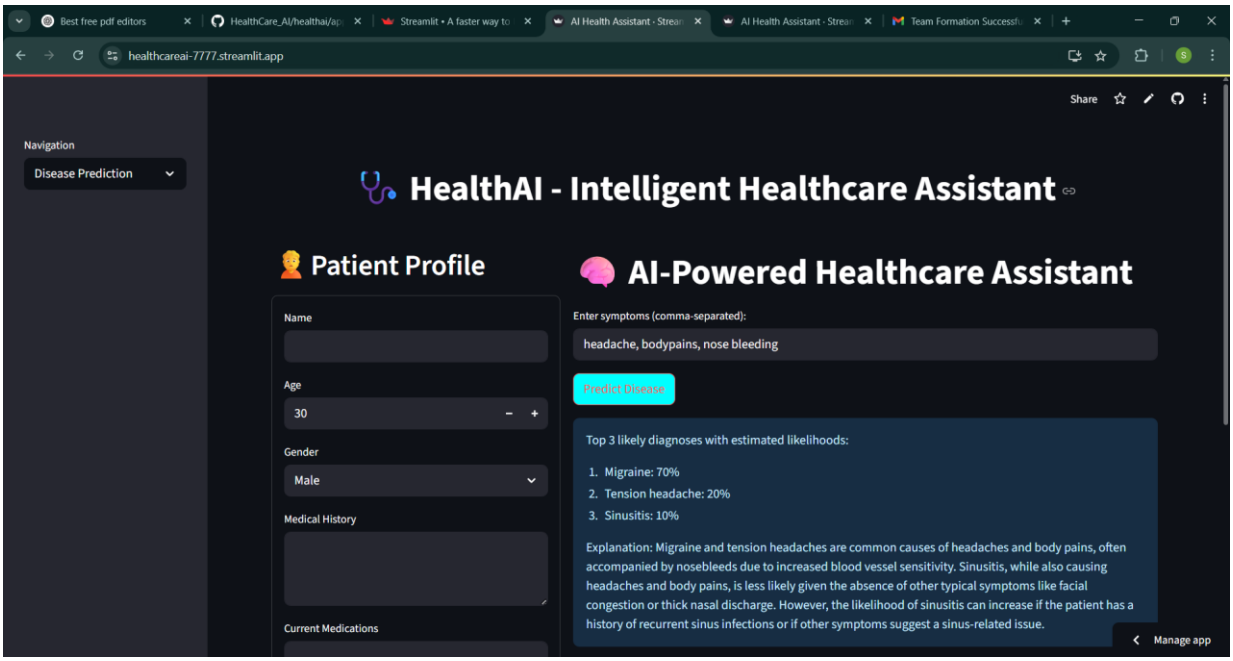






- **OUTPUT :**


healthcareai-7777.streamlit.app
Share
HealthAI - Intelligent Healthcare Assistant
Patient Profile
AI-Powered Healthcare Assistant
Name
Age
30
Gender
Male
Medical History
Current Medications
Enter your health concern:
i am feeling ill
Know what is the problem
1. Assess the severity of symptoms:
Have you experienced fever, chills, or body aches?
Are you experiencing shortness of breath or chest pain?
Have you noticed changes in your appetite or sleep patterns?
2. Home remedies for mild symptoms:
If you're experiencing a common cold or flu:
Stay hydrated by drinking plenty of fluids (water, herbal tea, etc.)
Manage app


healthcareai-7777.streamlit.app
Share
Navigation
Disease Prediction
HealthAI - Intelligent Healthcare Assistant
Patient Profile
AI-Powered Healthcare Assistant
Name
Age
30
Gender
Male
Medical History
Current Medications
Enter symptoms (comma-separated):
headache, bodypains, nose bleeding
Predict Disease
Top 3 likely diagnoses with estimated likelihoods:
1. Migraine: 70%
2. Tension headache: 20%
3. Sinusitis: 10%
Explanation: Migraine and tension headaches are common causes of headaches and body pains, often accompanied by nosebleeds due to increased blood vessel sensitivity. Sinusitis, while also causing headaches and body pains, is less likely given the absence of other typical symptoms like facial congestion or thick nasal discharge. However, the likelihood of sinusitis can increase if the patient has a history of recurrent sinus infections or if other symptoms suggest a sinus-related issue.
Manage app

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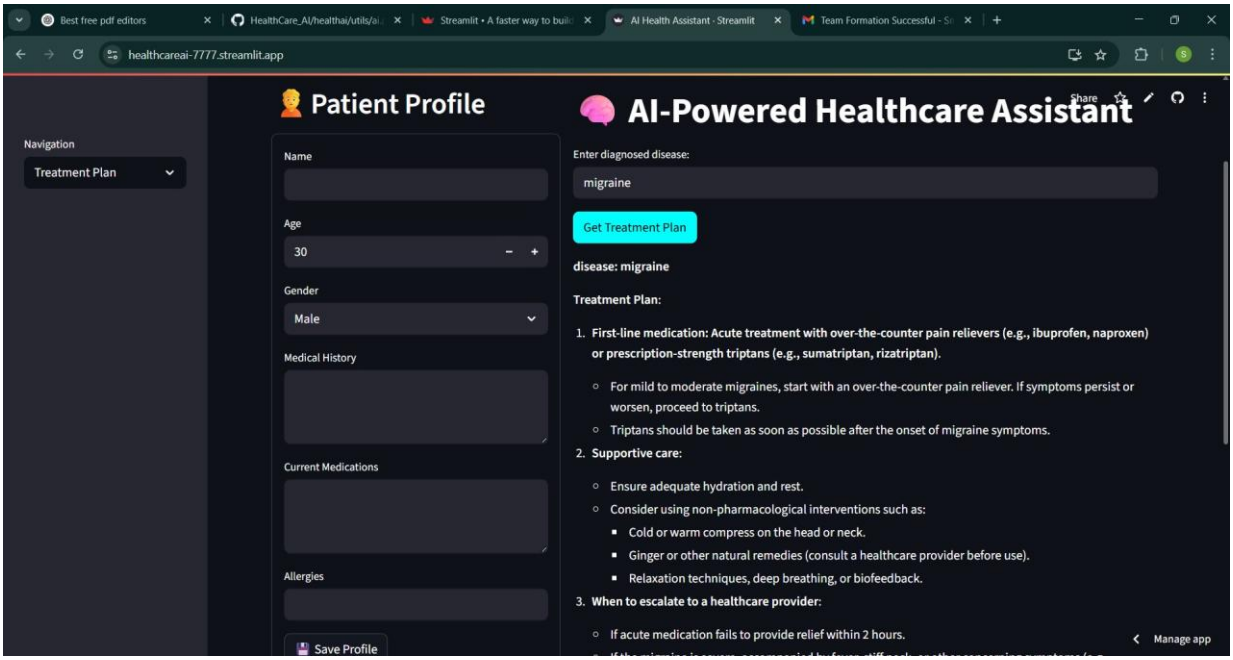
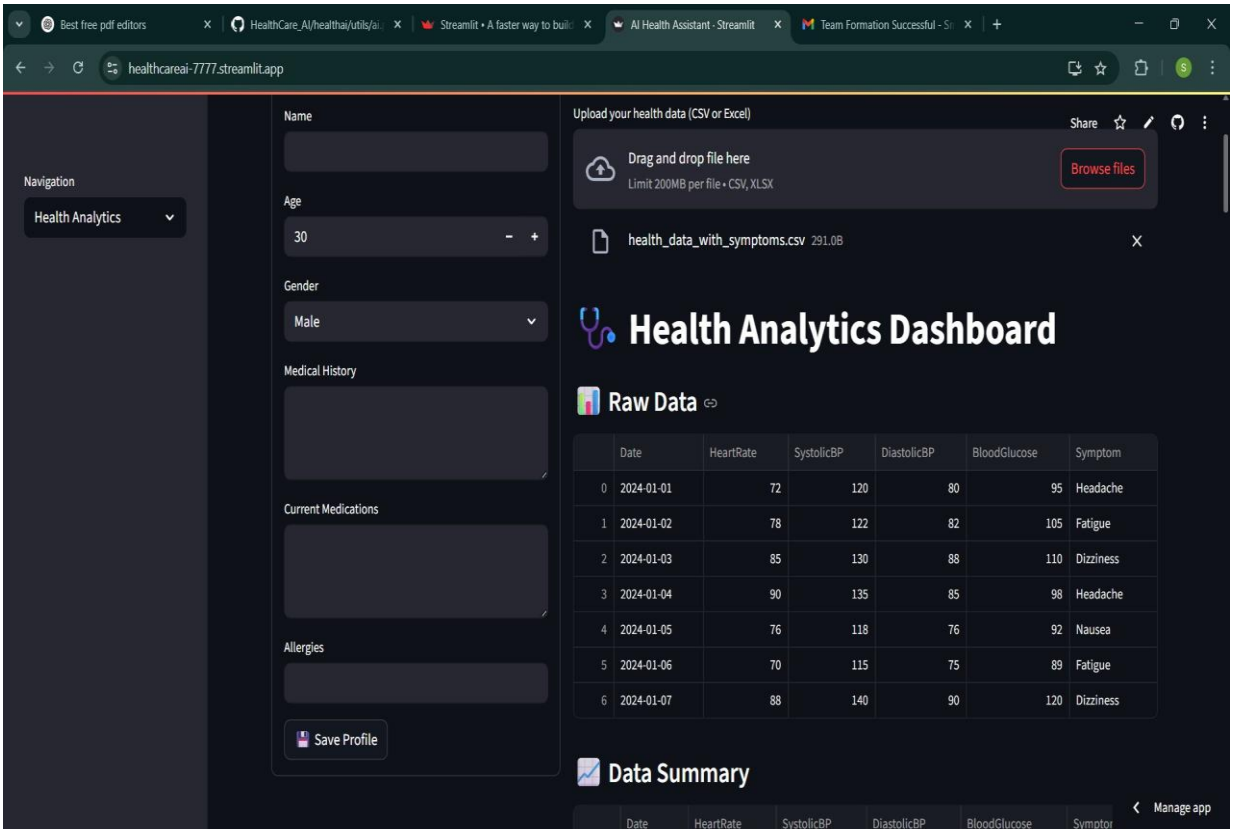
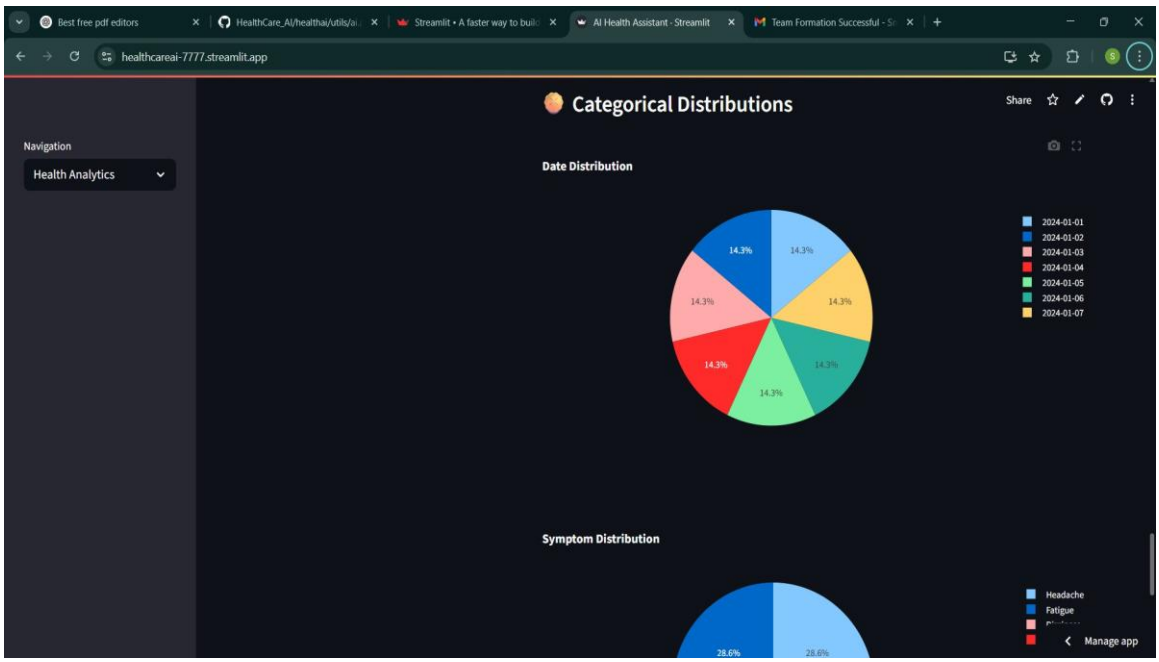




	Date	HeartRate	SystolicBP	DiastolicBP	BloodGlucose	Symptom
0	2024-01-01	72	120	80	95	Headache
1	2024-01-02	78	122	82	105	Fatigue
2	2024-01-03	85	130	88	110	Dizziness
3	2024-01-04	90	135	85	98	Headache
4	2024-01-05	76	118	76	92	Nausea
5	2024-01-06	70	115	75	89	Fatigue
6	2024-01-07	88	140	90	120	Dizziness



12. Known Issues

- Generic model outputs due to lack of medical domain fine-tuning
- Internet dependency when using IBM watsonx.
- No data persistence (currently stateless app)

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13. Future Enhancements

- ☑ Add user authentication and patient record storage
- ☑ Multilingual prompt support
- ☑ Mobile version of the app
- ☑ Integrate with real-time health APIs or EHRs
