# Data Flow Diagrams & User Stories – HealthAI

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Project Name: HealthAI

Maximum Marks: 4

## Data Flow Diagram – Level 1 (Text Description):

This outlines the high-level flow of information within the HealthAI system.

### User Input

* Health Queries: Text-based questions or descriptions of symptoms entered into the "Patient Chat" or "Disease Prediction" text inputs on the Streamlit UI.
* Medical Conditions: Text input for specific conditions provided to the "Treatment Plans" module.
* Patient Profile Data: Demographic and medical history details (Name, Age, Gender, Medical History, etc.) entered via the persistent sidebar.
* Simulated Health Metrics: Implicit input from the application's internal generation of synthetic health data for the dashboard.

### Processing

* Application Logic (Python Backend): The Streamlit application's Python backend receives user inputs.
* Prompt Engineering: User inputs, combined with relevant patient profile data and chat history, are formatted into specific prompts for the AI model.
* AI Model Interaction: These prompts are sent to the Google Gemini API (currently simulating IBM Granite-13B-instruct-v2).
* Response Parsing: The AI's JSON or text responses are received and parsed by the Python backend.
* Data Aggregation for Analytics: Simulated health data is aggregated and processed by Pandas for visualization.

### Visualization

* Health Trend Charts: Processed health metrics are used by Plotly to generate interactive line charts (Heart Rate, Blood Pressure, Blood Glucose) and a pie chart (Symptom Frequency).
* Metrics Summary & Insights: Key average metrics and AI-generated health insights are displayed on the "Health Analytics" dashboard in real-time.

### Storage

* Session State: All active session data, including patient profile, chat history, and generated health data, is managed and preserved using Streamlit's st.session\_state. This is in-memory for the duration of the current application run.
* Logs: (Future) Detailed interaction and performance logs can be saved locally as CSV/JSON files.

### Output

* AI Responses: AI-generated text for chat, structured predictions for diseases, and detailed treatment plans are displayed directly within the respective tabs of the Streamlit UI.
* Interactive Visualizations: Charts and metrics are rendered dynamically on the "Health Analytics" dashboard.

## User Stories

These user stories represent key functionalities from different user perspectives, prioritized for development.

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| --- | --- | --- | --- | --- | --- | --- |
| User | Epic | USN | Story | Acceptance Criteria | Priority | Release |
| Web User | Patient Chat | USN-1 | As a user, I can ask health-related questions and get AI replies. | AI response is relevant, empathetic, factual, and includes advice for seeking professional help. | High | Sprint-1 |
| Web User | Patient Profile Management | USN-2 | As a user, I can input and update my demographic & medical profile. | Profile fields are successfully updated and persist across session tabs. | High | Sprint-1 |
| Web User | Disease Prediction | USN-3 | As a user, I can enter symptoms to get potential diagnoses. | 1–3 clear conditions are returned with likelihood, explanation, and next steps. | High | Sprint-2 |
| Web User | Treatment Plan | USN-4 | As a user, I can generate personalized treatment plans. | A comprehensive plan with sections (meds, lifestyle, follow-up) is provided for a given condition. | High | Sprint-2 |
| Web User | Health Analytics | USN-5 | As a user, I can see my health trends visualized on a dashboard. | Interactive charts for HR, BP, Glucose, and Symptom Frequency are displayed. | High | Sprint-3 |
| Web User | Health Analytics | USN-6 | As a user, I can get AI-generated insights from my health data. | Textual insights are generated based on dashboard metrics and trends. | Medium | Sprint-3 |
| Web User | Session Management | USN-7 | As a user, my chat history and profile state persist in-session. | Data remains available when switching tabs within the same application run. | Low | Sprint-3 |
| Admin | QA Monitoring | USN-8 | As an admin, I can verify AI response times and stability. | AI responses are consistently generated within performance thresholds. | High | Sprint-4 |
| Developer | Deployment Prep | USN-9 | As a developer, I can easily prepare the app for cloud deployment. | requirements.txt and .env handling are correctly configured. | Medium | Sprint-4 |

## Summary:

This document outlines the primary data flow and corresponding user stories for the HealthAI project. It confirms functional components and user expectations for an intelligent healthcare assistant, from initial conversational AI interactions and personalized guidance to comprehensive health data visualization and AI-driven insights. The user stories are aligned with the agile development plan, ensuring iterative delivery of high-value features.