# Technology Stack – HealthAI

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Project Name: HealthAI

Maximum Marks: 4

## Technical Architecture Overview

HealthAI is an AI-driven healthcare assistant application built with a Streamlit frontend. It leverages Generative AI models—currently using Google Gemini API for simulation, with planned integration of IBM Granite-13B-instruct-v2—to provide intelligent medical query handling, disease prediction, and personalized treatment recommendations. The application also includes robust health analytics capabilities with dynamic data visualization.

## Table 1: Components & Technologies

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| --- | --- | --- |
| S.No | Component | Technology Used |
| 1 | User Interface | Streamlit (for interactive web app development) |
| 2 | App Logic - Chatbot | Python + Google Gemini API (simulating IBM Granite) |
| 3 | App Logic - Prediction | Python + Google Gemini API (simulating IBM Granite) |
| 4 | App Logic - Treatment | Python + Google Gemini API (simulating IBM Granite) |
| 5 | Logging & Data Handling | Pandas (for data manipulation), CSV, JSON (for logs) |
| 6 | Session Management | Streamlit Session State (for in-app user data) |
| 7 | External AI API | Google Gemini API (for current AI functionalities) |
| 8 | Target AI Integration | IBM Watson Machine Learning API (Planned for IBM Granite-13B-instruct-v2) |
| 9 | ML Models | Google Gemini-2.0-Flash (Current), IBM Granite-13B-instruct-v2 (Target) |
| 10 | Data Visualization | Plotly (for interactive charts) |
| 11 | Infrastructure | Localhost (development), Deployable to Streamlit Cloud / IBM Cloud |
| 12 | Asynchronous Operations | aiohttp (for async API calls) |

## Table 2: Application Characteristics

|  |  |  |
| --- | --- | --- |
| S.No | Characteristic | Description |
| 1 | Open-Source Frameworks | Streamlit, Plotly, Pandas, aiohttp, python-dotenv |
| 2 | Security Implementations | API token-based access (for AI models), secure environment variable handling |
| 3 | Scalable Architecture | Modular design with decoupled UI and AI service layers, enabling future scaling |
| 4 | Availability | Functions locally; designed for easy cloud deployment (e.g., Streamlit Cloud) |
| 5 | Performance | Fast API response times (asynchronous calls), efficient data handling |
| 6 | Data Storage | Session-based (in-memory); local filesystem for logs; future database integration planned |
| 7 | User Experience | Intuitive, responsive, and human-centered interface for seamless interaction |

## Summary

HealthAI effectively blends robust open-source tools with powerful AI models—currently simulated using Google Gemini, with plans to integrate IBM Granite—to deliver a functional, secure, and user-friendly digital health platform. The architecture supports rapid development and iteration, enabling a comprehensive demonstration of core features. Designed with scalability in mind, it provides a clear path for future enhancements including full IBM Watson Machine Learning integration, advanced data persistence, and seamless cloud deployment.