PROJECT REPORT

Title: HealthAI: Intelligent Healthcare Assistant Using IBM Granite

---

1. INTRODUCTION

1.1 Project Overview

HealthAI is an intelligent healthcare assistant powered by IBM Watson Machine Learning and Generative AI. It aims to enhance accessibility to medical insights by offering users accurate, personalized, and data-driven guidance.

1.2 Purpose

The purpose of HealthAI is to serve as a virtual healthcare companion, helping users understand symptoms, receive predictive diagnoses, and access evidence-based treatment suggestions through a user-friendly interface.

---

2. IDEATION PHASE

2.1 Problem Statement

In today's world, people often turn to the internet for health-related queries but struggle with reliability and accuracy. HealthAI addresses this by providing trusted, AI-powered medical insights.

2.2 Empathy Map Canvas

The empathy map helps understand the target users' mindset and expectations when interacting with a virtual health assistant like HealthAI.

Category	Description
Says	"I want quick answers to my health questions.""Is this symptom serious?"
Thinks	"Can I trust this information?""Will this help me avoid a hospital visit?"
Does	Searches symptoms onlineAsks friends or family for medical advice
Feels	Anxious about symptomsUncertain about next steps
Pains	Conflicting online informationLack of access to immediate healthcare
Gains	Reliable AI suggestionsQuick advice at homeHealth tracking insights

2.3 Brainstorming

The team explored various ideas such as mental health bots, COVID symptom trackers, and AI nutritionists before settling on an all-in-one intelligent assistant with chat, prediction, and analytics powered by IBM Watson.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

The customer journey in the HealthAI application follows a streamlined, user-friendly process:

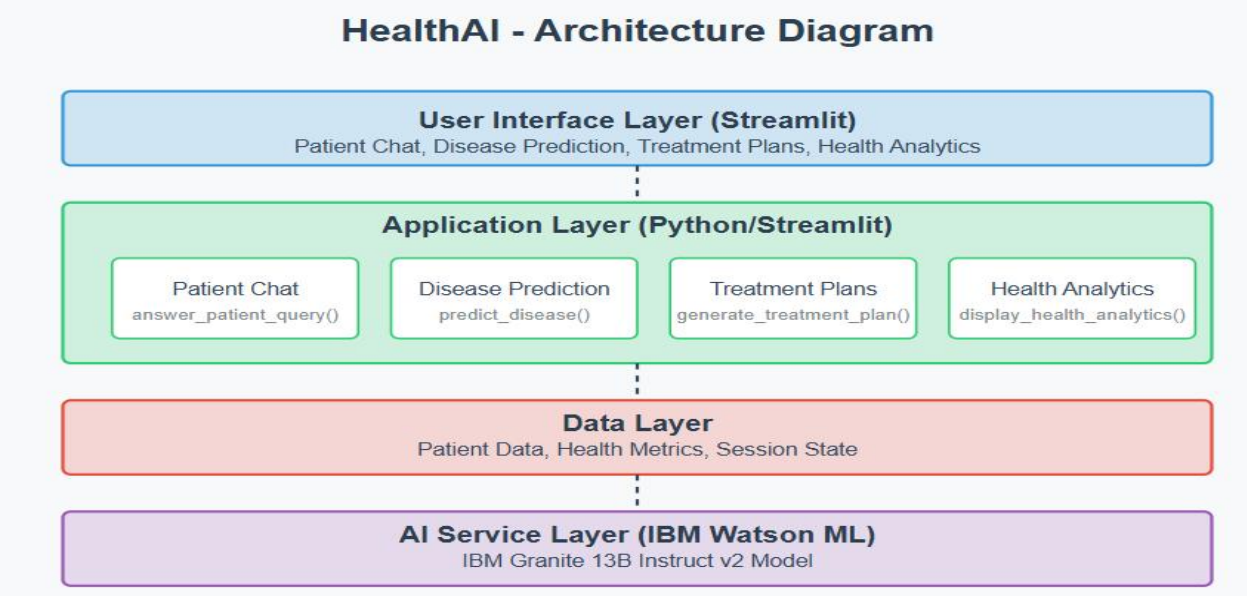
1. **Start Application** – The user opens the HealthAI web app (built using Streamlit).
2. **Input Health Query** – The user either types a symptom-related question or fills out a symptom form.
3. **Receive Diagnosis** – The AI model (IBM Granite) responds with likely conditions and guidance.
4. **Review Treatment Plan** – The app displays a structured, AI-generated treatment recommendation.
5. **View Health Analytics** – Users can visualize vital stats like heart rate, BP, glucose, and receive trend-based insights.
6. **End/Next Action** – The user can reset the session, consult a doctor, or continue exploring the app.

3.2 Session Requirements

- Real-time symptom input via chat
- Prediction based on user profile
- Personalized treatment plans

Visualization of health metrics

3.3 Data Flow Diagram



3.4 Technology Stack

- **Frontend:** Streamlit
- **Backend:** Python

- **AI Service:** IBM Watson ML (Granite 13B)
- **Visualization:** Plotly
- **Environment Management:** virtualenv

---

4. PROJECT DESIGN

4.1 Problem-Solution Fit

People need quick, understandable, and trustworthy health information. HealthAI fulfills this by using medical LLMs for better accuracy.

4.2 Proposed Solution

A layered app with UI (Streamlit), core logic (Python functions), and AI service (IBM Granite). It guides users from symptom input to personalized plans.

4.3 Solution Architecture

- **UI Layer:** Chat, forms, and charts (Streamlit)
- **Application Logic:** app.py handles flow and calls AI
- **Helper Logic:** utils.py includes model setup and data
- **AI Layer:** IBM Granite 13B Instruct v2 via secure API

---

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Week Duration	**Dates**	**Activities**
Week 1	June 12 – June 19	Idea finalization, architecture planning, frontend UI with Streamlit
Week 2	June 20 – June 26	Backend AI integration, testing, debugging, and documentation

This two-week schedule allowed the team to focus on clear milestones and complete the HealthAI project within the planned timeline.

---

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

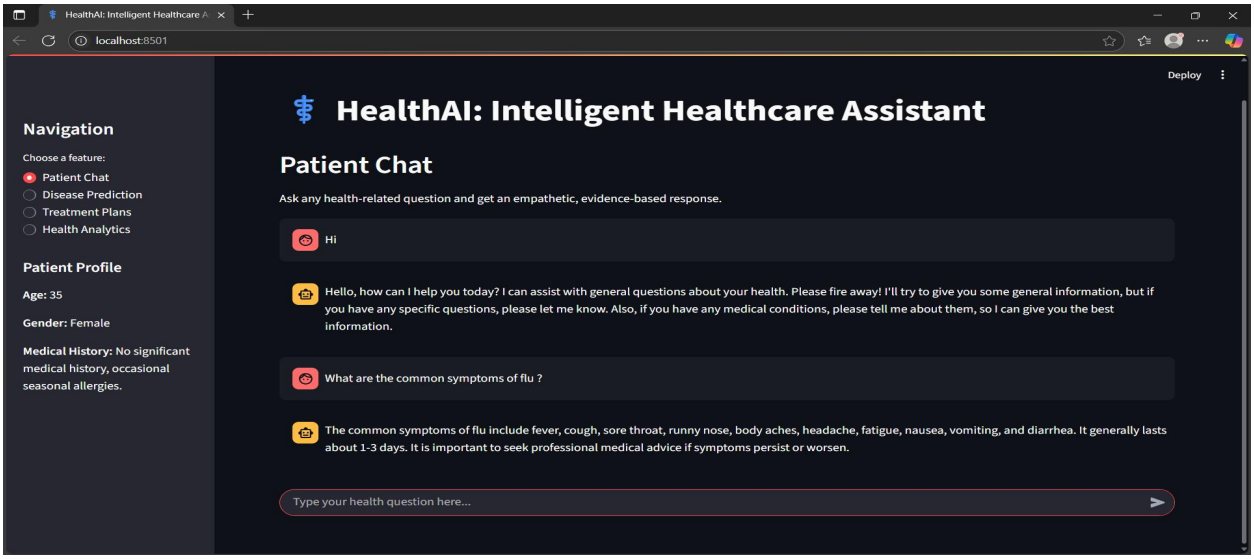
- Unit Testing: Model init, dummy patient generation
- Integration Testing: Chat to AI flow
- Manual Testing: Verifying each feature with sample users
- Error Handling: Invalid API or missing input cases handled

---

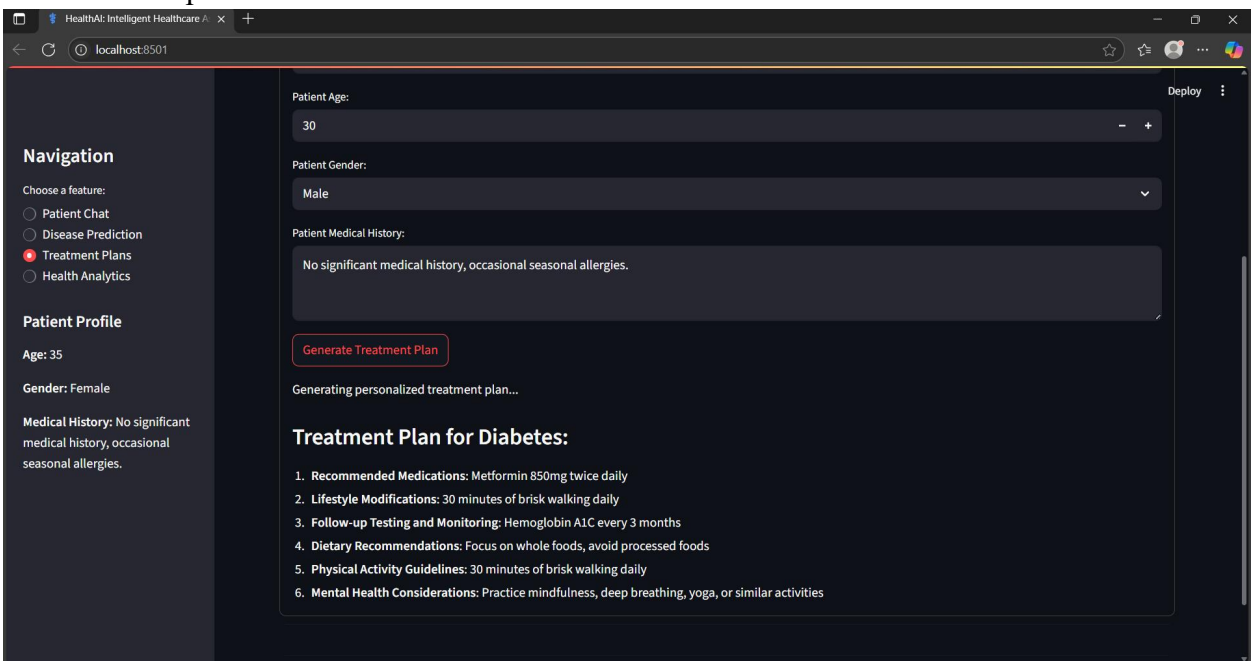
7. RESULTS

7.1 Output Screenshots

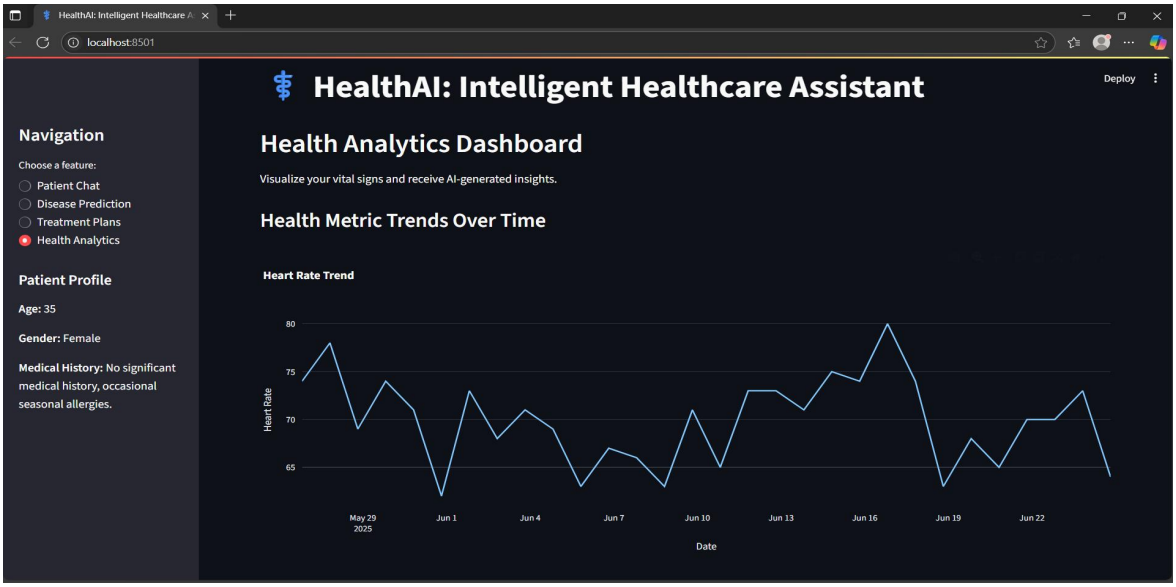
- Screenshot of chat feature

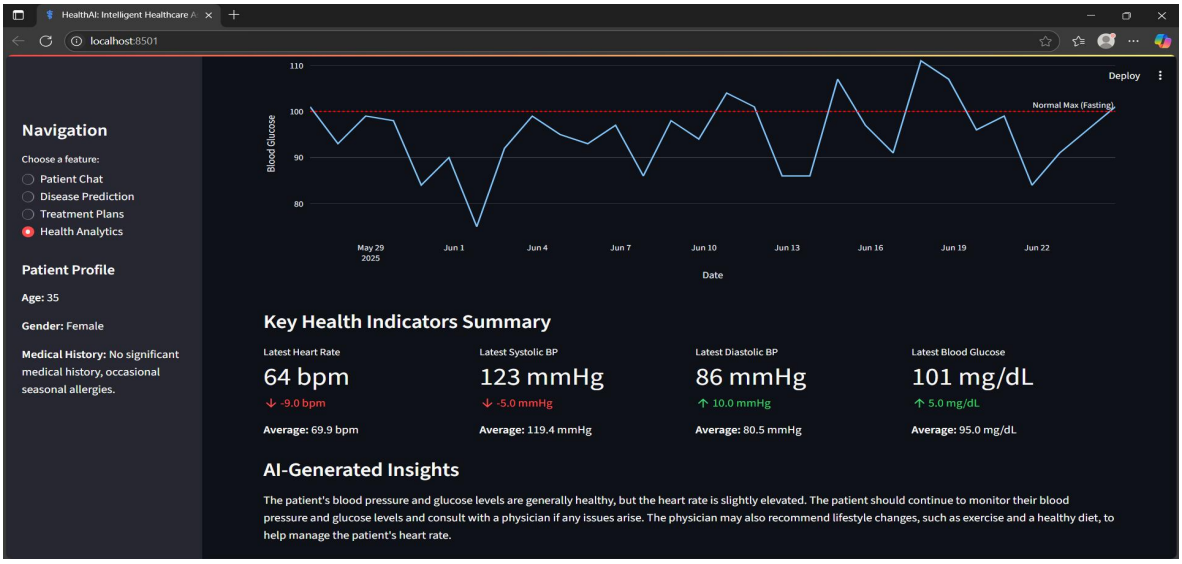


- Screenshot of prediction result



- Screenshot of analytics chart





---

8. ADVANTAGES & DISADVANTAGES

Advantages: - Easy to use - AI-powered recommendations - Visualization of health data

Disadvantages: - No real-time data integration - No authentication or user profiles - General-purpose AI model

---

9. CONCLUSION

HealthAI successfully demonstrates the application of AI in healthcare by combining user interface simplicity with powerful backend intelligence. While currently a prototype, it holds potential for real-world deployment with enhancements.

10. FUTURE SCOPE

- Add secure user login
- Use real patient databases
- Integrate with smartwatches
- Fine-tune AI on medical data
- Add alerts, appointment booking

---

11. APPENDIX

- **GitHub Link:** https://github.com/Niharika-Sreekakulapu
- **Source Code Files:** app.py, utils.py, .env.