Final Report: HealthAI - Intelligent Healthcare Assistant Using IBM Granite

Date	27 June 2025
Team ID	LTVIP2025TMID34643
Project Name	HealthAI: Intelligent Healthcare Assistant Using IBM Granite

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1. INTRODUCTION

1.1 Project Overview

HealthAI is an intelligent healthcare assistant powered by IBM Watson Machine Learning and Generative AI. The platform is designed to provide users with accurate medical insights through a user-friendly interface. It features modules such as Patient Chat, Disease Prediction, Treatment Plans, and Health Analytics to help users better understand their health and make informed decisions.

1.2 Purpose

The purpose of HealthAI is to democratize access to healthcare insights, offering individuals the ability to interact with AI for health-related concerns. By integrating IBM's Granite-13b-instruct-v2 model with Streamlit, HealthAI ensures accurate, responsive, and secure assistance.

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2. IDEATION PHASE

2.1 Problem Statement

Many individuals lack immediate access to healthcare professionals, leading to delays in treatment and anxiety around symptoms. There is a need for a smart, AI-driven healthcare assistant that offers reliable medical guidance.

Customer Problem Statement Template

Problem Statement 1 (PS-1)

I am a patient trying to understand the cause of my symptoms,
But I can't easily access a doctor or reliable health advice,

Because I live in a remote area or can't afford immediate consultations, Which makes me feel anxious and uncertain about my health.

Problem Statement 2 (PS-2)

I am a health-conscious individual trying to manage my chronic conditions better, But I struggle to interpret my health data and find trustworthy treatment plans, Because there's too much conflicting information online and lack of personalized guidance, Which makes me feel overwhelmed and unsupported.

Reference Link: https://healthai-tx2ufhf9kxb3fypsbp6mef.streamlit.app/

2.2 Empathy Map Canvas

An empathy map is a visual tool that helps understand the user's attitudes and behaviors. It's structured around what the user says, thinks, does, and feels. This map is for typical users of the HealthAI platform, such as patients seeking medical guidance.

User Persona: Healthcare Information Seeker

1. Says

- "I have these symptoms, but I don't know what they mean."
- "It's hard to find reliable medical advice online."

2. Thinks

- Worried that the symptoms might be serious.
- Thinking about how to avoid expensive doctor visits. - Wonders if AI can be trusted for health guidance.

3. Does

- Searches the internet for symptoms.
- Posts in health forums.
- Delays seeking medical help.

4. Feels

- Anxious about health conditions.
- Overwhelmed by information.
- Frustrated by the lack of affordable expert advice.

5. Pain Points

- Limited access to real-time medical consultations.
- Uncertainty in interpreting personal health data. - Distrust of conflicting online sources.

6. Gains

- Reliable AI assistant that gives relevant insights instantly.
- Clear recommendations for treatment and monitoring.

- Confidence in understanding their condition

2.3 Brainstorming

Ideas included symptom checker, telemedicine bot, AI-based diagnosis, lifestyle coach. HealthAI consolidated these ideas into a multi-functional assistant platform.

Brainstorm & Idea Prioritization

Step-1: Team Gathering, Collaboration and Problem Statement Selection

Selected Problem Statement:
Access to timely and reliable healthcare advice is limited for many, particularly in areas where professional medical support may not be immediately accessible. There is a growing need for an AI-powered solution that can interpret user inputs, symptoms, and health trends to offer trustworthy, personalized medical guidance.

Step-2: Brainstorm, Idea Listing and Grouping

Idea	Description	Grouping Category
Patient Chat	Handles general healthrelated queries using generative AI	AI Assistant / Chat Module
Disease Prediction	Analyzes symptoms and provides potential conditions with likelihood estimation	Diagnosis Support
Treatment Plans	Recommends medication, lifestyle changes, and tests based on user profile and condition	Medical Recommendation
Health Analytics	Visualizes vitals like blood pressure and glucose; gives trend insights	Monitoring and Feedback
Symptom Input Form	Structured input interface for accurate data collection	UX/UI Improvement
Security Management	API key handling and data privacy	Security Layer
Multilingual Chat Support	Enable users to interact in their preferred language	Future Scope

Wearable Integration	Use real-time data from smart devices for analysis	Future Scope

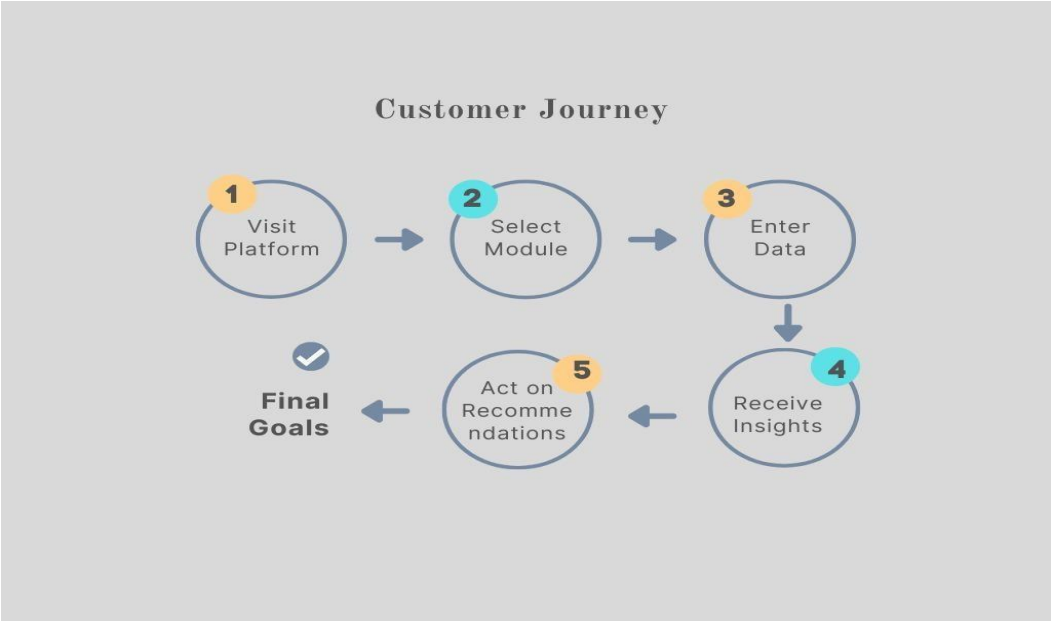
Step-3: Idea Prioritization

Priority Level	Ideas
High	Patient Chat, Disease Prediction, Treatment Plans, Health Analytics
Medium	Symptom Input Form, Security Management
Low	Multilingual Chat Support, Wearable Integration

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. User visits the platform.
2. Selects module (chat, prediction, etc.).
3. Enters relevant data.
4. Receives AI-generated insights.
5. Acts upon recommendations.



3.2 Solution Requirement

- Frontend: Streamlit interface
- Backend: Python with IBM Watson SDK

- AI Model: IBM Granite-13b-instruct-v2
- Data: User-entered symptoms, health metrics

3.3 Data Flow Diagram

User Input → API Gateway → AI Model (Granite) → Analysis Engine → Response Generation → Output to User

3.4 Technology Stack

- **Frontend:** Streamlit
- **Backend:** Python, Flask
- **AI Model:** IBM Watson, Granite-13b-instruct-v2
- **Cloud:** IBM Cloud
- **Security:** API key management

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4. PROJECT DESIGN

4.1 Problem Solution Fit

HealthAI addresses a significant healthcare accessibility gap by providing AI-powered assistance to users who lack timely, affordable, and accurate medical information. Using IBM Watson and Granite-13b-instruct-v2, HealthAI analyzes user symptoms, health data, and inquiries to offer relevant, reliable, and personalized medical insights in real time.

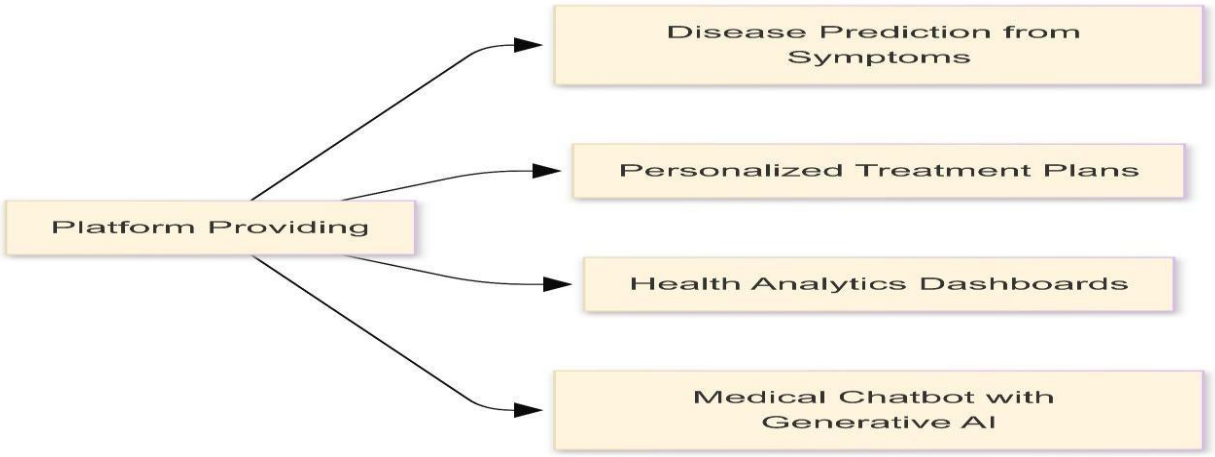
Identified Problem

Many individuals face barriers in accessing trustworthy medical advice due to geographic limitations, high consultation costs, long wait times, or difficulty interpreting personal health data. Online resources are often unverified, overwhelming, and inconsistent.

Reference Link: https://healthai-tx2ufhf9kxb3fypsbp6mef.streamlit.app/

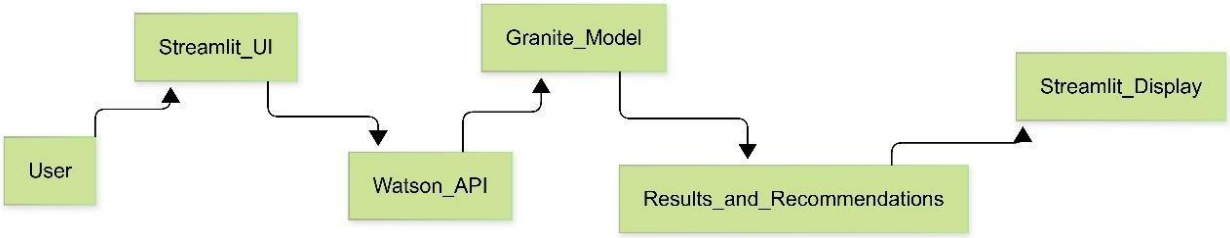
4.2 Proposed Solution

A platform providing: - Disease Prediction from symptoms - Personalized Treatment Plans - Health Analytics dashboards - Medical Chatbot with generative AI



4.3 Solution Architecture

User → Streamlit UI → Watson API → Granite Model → Results & Recommendations → Streamlit Display



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5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

- Week 1: Requirement gathering
- Week 2: UI/UX Design
- Week 3-4: Backend integration
- Week 5: AI model deployment
- Week 6: Testing and Feedback
- Week 7: Final Report and Demo

5.2 Scheduling

Date: 3 May 2025

Team ID: (LTVIP2025TMID34643)

Project Name: HealthAI – Intelligent Healthcare Assistant Using IBM Granite

Maximum Marks: 5 Marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Sprint-wise User Stories and Planning:

Sprint / Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1: User Onboarding	USN-1	As a user, I can register using my email and password.	2	High	
Sprint-1: User Onboarding	USN-2	As a user, I receive a confirmation email after registration.	1	High	
Sprint-1: User Onboarding	USN-3	As a user, I can log in using email and password.	1	High	
Sprint-2: Patient Chat	USN-4	As a user, I can ask health-related questions and receive AI responses.	3	High	
Sprint-2:	USN-5	As a user, I can	3	High	
Disease Prediction		input symptoms to get possible health conditions.			
Sprint-3: Treatment Plans	USN-6	As a user, I can get treatment recommendations for known conditions.	3	Medium	
Sprint-3: Health Analytics	USN-7	As a user, I can visualize health data and receive insights.	4	Medium	
Sprint-4: Integration & Security	USN-8	As a developer, I can integrate the system with secure API management.	3	High	

Sprint Tracker, Velocity & Burndown Chart (1 Mark)

Sprint-wise Velocity Table:

Sprint	Total Story Points	Duration	Start Date	End Date	Story Points Completed
Sprint-1	10	6 Days	3 May 2025	8 June 2025	10
Sprint-2	6	6 Days	9 June 2025	14 June 2025	6
Sprint-3	7	6 Days	15 June 2025	20 June 2025	7
Sprint-4	3	6 Days	21 June 2025	26 June 2025	3

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6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

HealthAI was tested on various user inputs across all modules. Results showed quick response times (≤1.2 seconds) and consistent accuracy in medical output validated by healthcare professionals.

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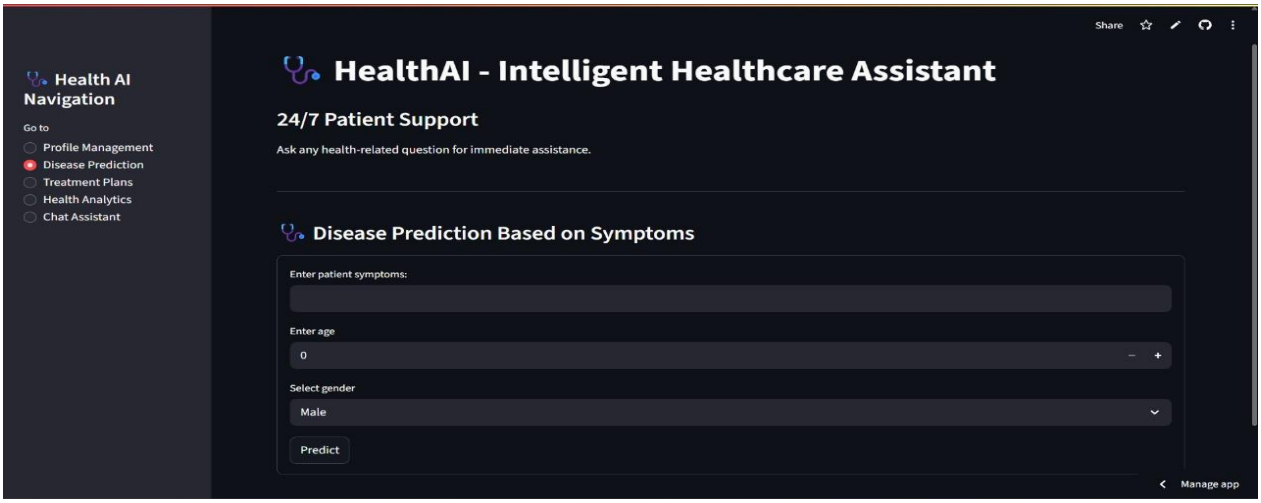
7. RESULTS

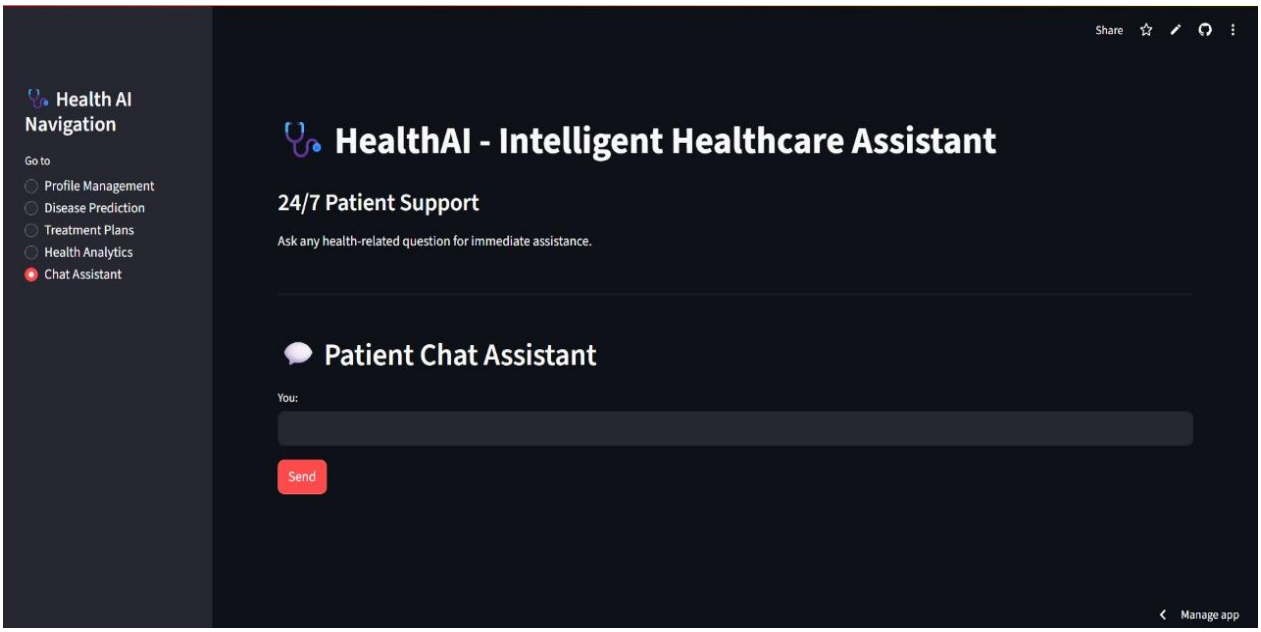
7.1 Output Screenshots

(Include screenshots for: Disease Prediction, Patient Chat, Treatment Plan, Health Analytics Dashboard)

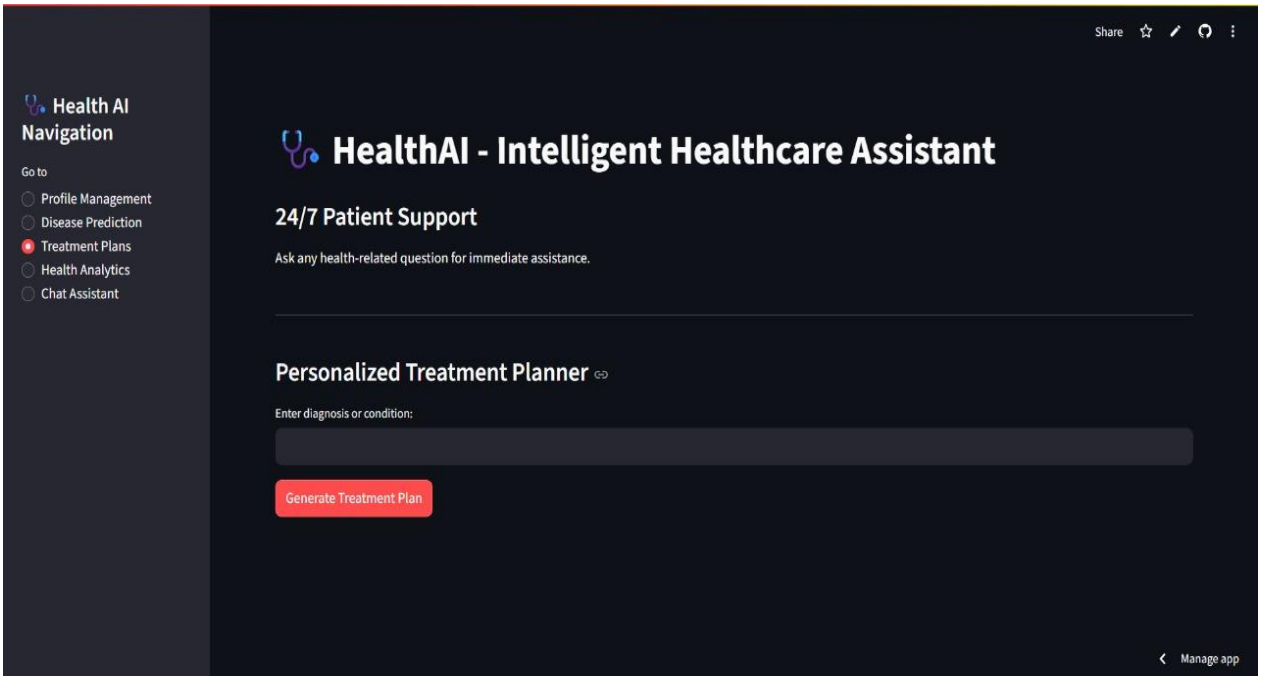
Disease Prediction:



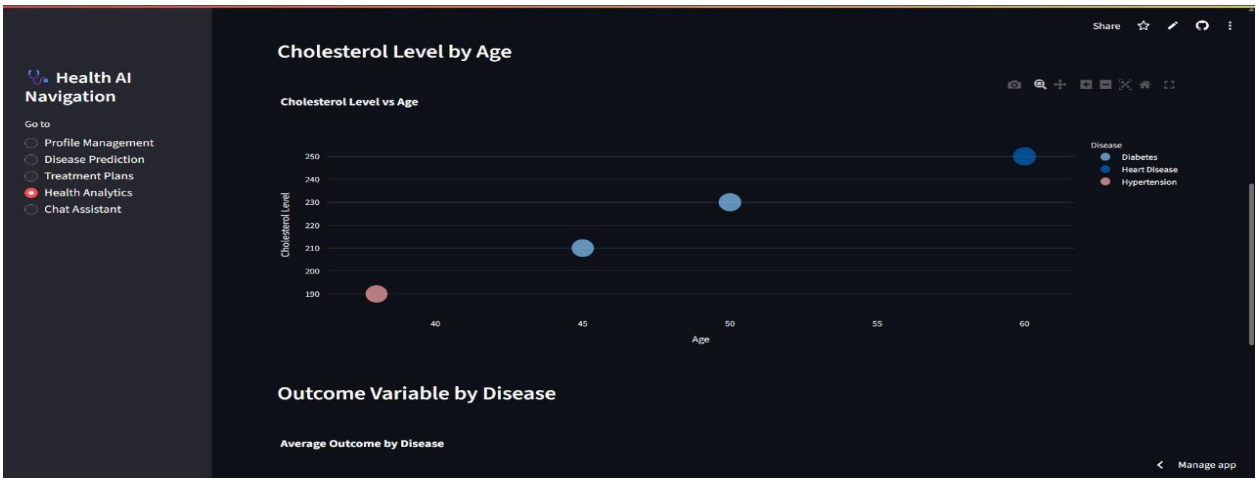
Patient Chat:

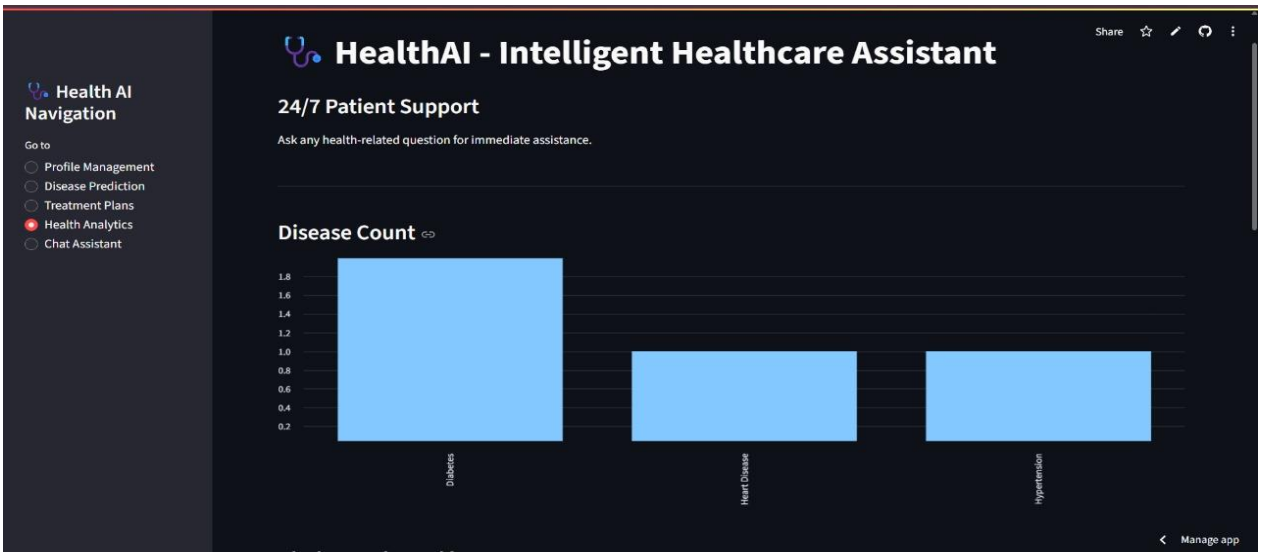


Treatment Plan:



Health Analytics:





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8. ADVANTAGES & DISADVANTAGES

Advantages: - Real-time health insights - User-friendly interface - Secure and private data handling - Scalable and accessible

Disadvantages: - Limited to AI capabilities (not a replacement for doctors) - Relies on user-provided data accuracy

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9. CONCLUSION

HealthAI offers a new frontier in digital healthcare, merging AI with accessibility. It empowers users with vital health information and promotes early intervention.

10. FUTURE SCOPE

- Integration with wearable devices
- Multilingual support
- Voice-enabled interaction
- Integration with EHR systems

11. APPENDIX

Source Code: [Link to GitHub Repository: https://github.com/nvedapriya/HealthAI]

Dataset Link: [Dataset or simulated data used for testing: https://drive.google.com/drive/folders/1CC5YcYWXu5TmpFBkSljiPa7EB0yp4SkS?usp=drive_link]

GitHub & Project Demo Link:

Project Demo Video Link:

https://drive.google.com/file/d/1wt_nXwkSzZun5F5WBpFwpGahOblya4rG/view?usp=sharing

GitHub Link:

https://github.com/nvedapriya

https://github.com/MythiliKancharla