

# HealthAI: Intelligent Healthcare Assistant

Subtitle: Integrating AI for Smart, Personalized Health Solutions

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# Project Overview

- A Streamlit-based intelligent healthcare web app
- Combines ML + LLM + Analytics
- Solves real-world health support needs
- Four core functionalities:
  - AI Chatbot
  - Disease Predictor
  - Treatment Plan Generator
  - Health Analytics Dashboard

# Purpose of the Project :

The primary purpose of the HealthAI project is to build an intelligent, user-friendly healthcare assistant that:

- Empowers users to better understand their health with AI support
- 🔍 Leverages machine learning to detect early signs of health risks
- 💬 Provides empathetic guidance through an LLM-powered chatbot
- 📊 Enables informed decisions via real-time health data analytics
- 📄 Generates personalized treatment plans tailored to individual profiles

In essence, HealthAI bridges the gap between raw health data and meaningful, actionable insight—accessible to both individuals and healthcare professionals.

# IDEATION PHASE

## 1) Problem Statement:

Patients often lack access to immediate, personalized, and comprehensible healthcare support tools.

Traditional systems don't integrate AI efficiently to provide real-time diagnosis guidance or visual health monitoring.

## 2) Empathy Map Canvas :

Think & Feel: "I need help understanding my symptoms."

See: Confusing online info, no medical background

Hear: "Talk to a doctor later," "Use Google"

Say & Do: Search symptoms, worry, avoid hospital

Pain: Unclear info, delay in care

Gain: Quick, accurate, empathetic support

## 3) Brainstorming:

Conversational chatbot

Risk prediction from vitals

Real-time dashboard

LLM-generated treatment PDF

# REQUIREMENT ANALYSIS

## 1) Customer Journey Map

User enters symptoms or vitals  
Chatbot or predictor responds  
Treatment generated  
User tracks via dashboard

## 2) Solution Requirement

Chatbot for general guidance  
ML model for disease risk prediction  
LLM for treatment planning  
Dashboard for trend visualization

## 3) Data Flow Diagram

[User Input] --> [Frontend (Streamlit)] --> [Model Inference + LLM] -->  
[Response/Prediction] --> [Display + Storage]

# Tools & Tech Used

Frontend: Streamlit

Backend: Python

ML: scikit-learn (Random Forest)

LLM: IBM Granite (watsonx.ai)

PDF: FPDF

Storage: CSV (Scalable to MongoDB)

# PROJECT DESIGN

## 1) Problem Solution :

Fit Patients need quick, personalized, and explainable support without replacing medical professionals.

## 2) Proposed Solution A 4-in-1 assistant providing:

- Health chatbot

- Disease prediction

- PDF-based treatment plan

- Health analytics dashboard

## 3) Solution Architecture:

[Streamlit UI] --> [Input Layer] --> [Disease Predictor] (ML Model) --> [LLM Chatbot + Treatment Generator] (watsonx.ai) --> [Data Storage] --> [Analytics Visualizer]

# PROJECT PLANNING & SCHEDULING

## Project Planning:

Week 1: Requirements gathering + UI

Week 2: Chatbot + Disease Predictor

Week 3: Treatment Generator + PDF

Week 4: Dashboard + Testing + Report



# FUNCTIONAL AND PERFORMANCE TESTING

## Performance Testing:

Response time of chatbot: < 3s

Disease prediction: ~92% accuracy

LLM output: Generated treatment within 10s

Data handling: Smooth for 100+ records

# Architecture Diagram (Visual Slide)

- **UI:** Streamlit
- **Backend:** IBM Granite LLM (watsonx.ai)
- **ML models:** Random Forest
- **Storage:** CSV (can scale to MongoDB)
- **Modules:** Each functionality runs independently

# Folder Structure

## HealthAI\_Chatbot

- venv
- .env
- Healthai.py

## Plangenerator

- requirement.txt
- .env
- PlanGenerator.py
- treatment\_plan\_card\_style.pdf

## DiseasePredictor

- venv
- .env
- disease\_symptoms\_binary.csv
- Train\_disease\_model.py
- Disease\_model.pkl,label\_encoder.pkl
- diseasepredictor.py

## Heath Analytics

- nenv
- .env
- health\_risk\_data.csv
- patient\_health\_data.csv
- train\_model.py
- risk\_model.joblib,label\_map.joblib
- HealthAnalytics.py

**Below are the Results of all four functionalities we implemented**

# HealthAI Chatbot

- Goal: Provide empathetic, AI-driven health guidance
- Tech: IBM Granite 13B Instruct (via watsonx.ai)
- Features:
  - Natural conversation
  - No diagnosis, only guidance
  - Explains symptoms, lifestyle tips

# HealthAI Chatbot Result:

The image displays two screenshots of the HealthAI Chatbot interface, showing the user input and the chatbot's response.

**Left Screenshot (Input Screen):**

- Browser:** localhost:8503
- Patient Details:**
  - Name: muppala vinisree
  - Age: 21
  - Gender: Male
  - Medical History: no
  - Current Medications: no
- HealthAI Chatbot Header:** Chat with the intelligent healthcare assistant below.
- Suggested Questions:** What are symptoms of diabetes?, How to reduce fever?, How to control migraine?
- Input Field:** cough and fever

**Right Screenshot (Chatbot Response):**

- Browser:** localhost:8503
- Patient Details:** (Same as left screenshot)
- HealthAI Chatbot Header:** Chat with the intelligent healthcare assistant below.
- User Input:** cough and fever
- Chatbot Response:**

I understand that you're experiencing a cough and fever. These symptoms can be caused by a variety of common illnesses, such as the flu, a common cold, or even allergies. However, they can also be signs of more serious conditions like pneumonia or COVID-19.

Given your medical history, current medications, and allergies, I can't provide specific advice without more information. It's important to monitor your symptoms. If your fever is high (above 101°F or 38.3°C), if your symptoms worsen, or if you experience difficulty breathing, chest pain, or persistent dizziness, you should seek immediate medical attention.

Chest pain or shortness of breath could be signs of a more serious issue, such as pneumonia or a respiratory infection. If you don't have a primary care
- Response Controls:** Yes, No
- Suggested Questions:** What are symptoms of diabetes?, How to reduce fever?, How to control migraine?
- Input Field:** Ask a health-related question:

# Disease Predictor

- **Goal:** Predict disease risk from vital stats + symptoms
- **Inputs:**
  - Heart rate, BP, glucose, sleep, symptoms
- **Model:** Random Forest Classifier
- **Output:** Risk prediction + label
- **Accuracy:** ~92%

# Disease Predictor Result:

localhost:8504

no

**Vitals & Recent Info**

Average Heart Rate (bpm)

80

Avg. BP Systolic

120

Avg. BP Diastolic

80

Average Glucose (mg/dL)

100

Recently Reported Symptoms

no

## LLM-powered Disease Predictor

Enter your symptoms in natural language, or select below:

What's bothering you today?

☐ Fever ☐ Cough ☒ Headache

☐ Fatigue ☒ Shortness\_of\_breath ☐ Chest\_pain

☐ Nausea ☐ Sore\_throat

**Predict**

⚠ This tool is not a substitute for professional medical advice.

**Predict**

vinisree, based on your symptoms, the predicted disease (ML) is: **Migraine**

- Age:
- Gender: Female
- Symptoms: headache, shortness\_of\_breath

### LLM-Based Prediction

1. Potential Condition: Migraine Likelihood: High Explanation: The patient is experiencing a headache, which is a common symptom of a migraine. The absence of other symptoms and normal health metrics make a migraine a likely possibility. Recommended next steps: The patient should consider keeping a headache diary to track triggers, duration, and intensity. Over-the-counter pain relievers may provide relief. If headaches are severe, frequent, or worsening, consult a healthcare professional.
2. Potential Condition: Anxiety Likelihood: Medium Explanation: Shortness of breath can be a symptom of anxiety, and the patient's age and gender are also factors that may increase the likelihood of anxiety disorders. However, without further information, it is difficult to make a definitive diagnosis.



# Treatment Plan Generator

- Goal: Generate personalized treatment plans
- Inputs:
  - Age, Gender, Condition, Medical History, Medications, Allergies
- Model: IBM Granite LLM
- Output:
  - PDF with 5-section treatment strategy using FPDF

# Treatment Plan Generator Results:

Patient Profile

Name

Rithu

Age

21


Gender

Male

Medical History


None


Current Medications


 **HealthAI - Intelligent Healthcare Assistant**


Enter the Medical Condition

heart attack

 **Generate Treatment Plan**

 Generating personalized plan...

 Stop

 **Personalized Treatment Plan**

Condition: heart attack

Age: 21

Gender: Female

Medical History: None

Current Medications: None

Allergies: None

Summary: A heart attack, also known as a myocardial infarction, occurs when blood flow to a part of the heart is blocked, usually by a clot . Common symptoms include chest pain, shortness of breath, nausea, and pain in the arm or back.

Treatment Plan:

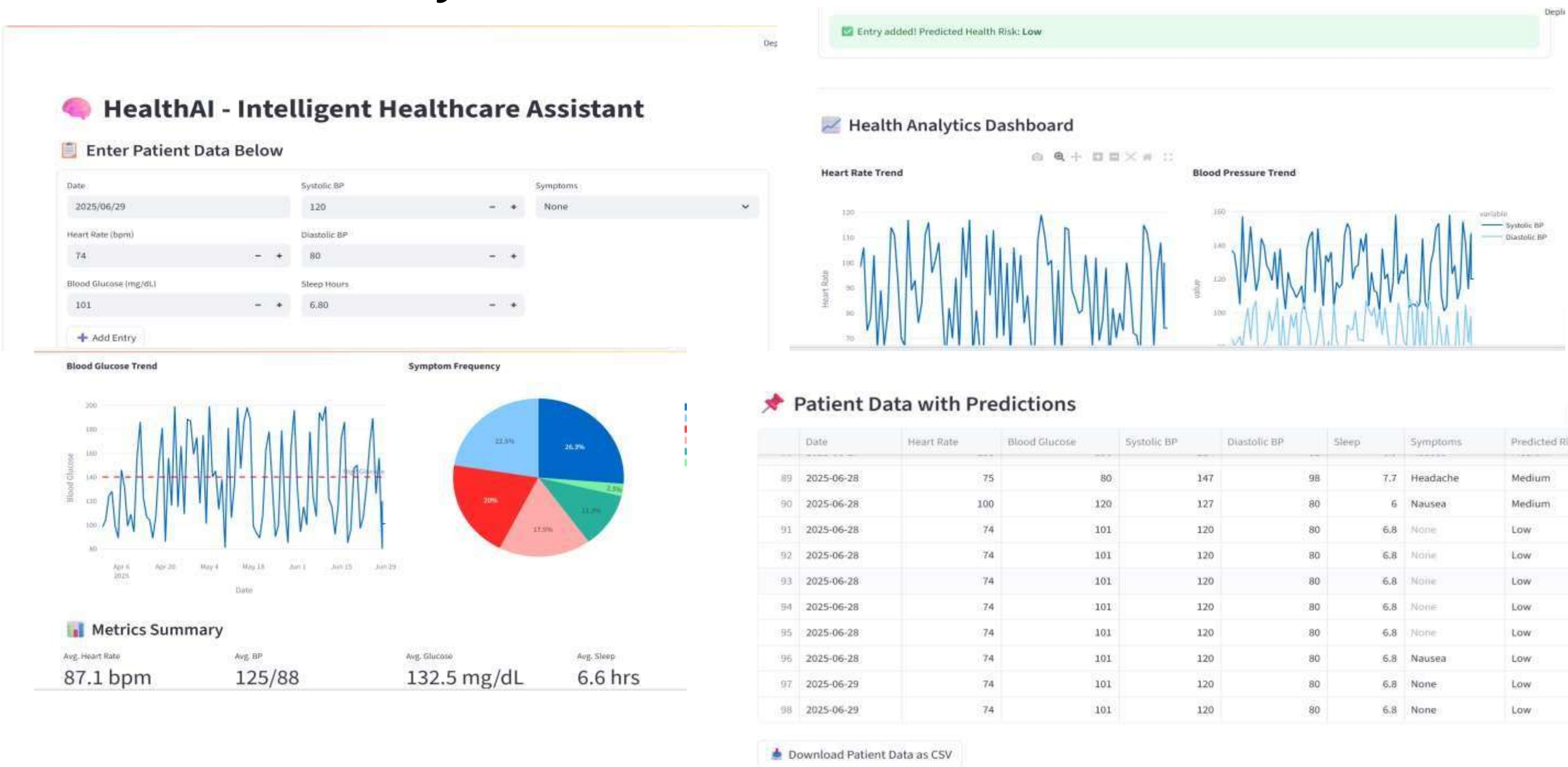
1. Medications

- Aspirin: Start with 81mg daily to prevent further clot formation.
- Clopidogrel: Begin 75mg daily for at least 1 month to reduce clot risk.

# Health Analytics Dashboard

- Goal: Visualize health trends & patterns
- Charts:
  - Heart rate, Blood pressure, Glucose, Sleep
  - Symptom frequency pie chart
- Features:
  - Avg. metrics
  - CSV export
  - Dynamic date-wise analysis

# Health Analytics Dashboard Results:



# ADVANTAGES & DISADVANTAGES

## Advantages

- Simple UI with powerful AI backend
- Multimodal health insights
- Portable and modular
- Personalized PDF generation

## Disadvantages

- No real-time wearable integration (yet)
- Dependent on API key for LLM
- No user login/session management
- As worked with free plan of ibm cloud cannot generate more prompts.

# CONCLUSION

HealthAI offers a comprehensive AI-powered platform that provides empathetic interaction, smart diagnosis prediction, treatment generation, and health trend analytics—all accessible via a unified and user-friendly web application.

# FUTURE SCOPE

Add user authentication

Real-time wearable integration (e.g., smartwatches)

Scale backend using MongoDB/Firebase

Enable multi-language chatbot support

Real-time doctor notifications for high-risk predictions

# APPENDIX

Source Code: Available in project repository go to github.

Dataset Link: Custom synthetic + sample vitals dataset

GitHub Link: [Muppalavinisree/Intelligent-health-care-assistance-using-ibm-granite](https://github.com/Muppalavinisree/Intelligent-health-care-assistance-using-ibm-granite)

Project Demo: [Click here to see video demo on project](#)



# THANK YOU

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