

HealthAI: A Smart Healthcare Assistant Application

1. INTRODUCTION

1.1 Project Overview

HealthAI is designed as a smart healthcare assistant application. Users can input their symptoms and receive possible disease predictions along with personalized treatment recommendations. The system integrates an AI-powered chatbot for answering regular health-related questions. It uses natural language processing (NLP) along with to assess user inputs. With a focus on accessibility, HealthAI aims to support individuals in making informed decisions before consulting a healthcare professional.

1.2 Purpose

The primary purpose of HealthAI is to provide a user-friendly, intelligent solution for preliminary healthcare guidance. It aims to bridge the gap between common health issues and professional consultation by delivering relevant suggestions based on user symptoms. This can particularly benefit people in remote areas with limited access to healthcare.

2. IDEATION PHASE

2.1 Problem Statement

In many parts of the world, people lack timely access to medical expertise. Often, individuals delay visiting doctors due to uncertainty, cost, or distance. There is a need for a tool that can offer basic health insight and direct users toward professional help if needed.

2.2 Empathy Map Canvas

- **Says:** "I'm feeling unwell, but I don't know what it could be."
- **Thinks:** "It could be something serious, but I'm unsure."
- **Does:** Searches symptoms online or ignores them.
- **Feels:** Anxious, confused, and helpless.

Creating HealthAI from this perspective ensures a design that is empathetic, accessible, and simple to use, especially for non-technical users.

2.3 Brainstorming

Identified functionalities:

- Chatbot for answering general health queries.
- Disease prediction based on symptoms
- Personalized treatment

Techniques used: How-Now-Wow Matrix to identify practical and innovative ideas.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

- User discovers HealthAI online.
- Registers or logs in.
- Inputs symptoms or queries chatbot.
- Receives disease prediction and guidance.
- Optionally provides feedback.

3.2 Solution Requirements

Functional:

- Login/Register with validation
- Input form for symptoms
- Chatbot functionality
- Disease prediction output
- Personalized treatment suggestions

Non-Functional:

- Usability, responsiveness
- Basic reliability
- Moderate scalability

3.3 Data Flow Diagram

- User submits data via Streamlit frontend.
- Data is passed to backend [Python].
- Backend runs LLM models.
- Result displayed via frontend.

3.4 Technology Stack

- **Frontend:** Streamlit [Python-based]
- **Backend:** Python [Transformers, Pandas]
- **Database:** MySQL [user authentication]
- **Deployment:** Ngrok [development]

4. PROJECT DESIGN

4.1 Problem-Solution Fit


HealthAI directly addresses the problem of self-assessment and lack of healthcare access by offering a virtual assistant capable of providing personalized health advice.

4.2 Proposed Solution

HealthAI consists of three main features:

- A chatbot for answering FAQs.
- Disease prediction using transformer-based models.
- Personalized treatment based on user data.

4.3 Solution Architecture

- **Frontend:** Streamlit App
 - Login/Register  MySQL Database
 - Input Layer: Chatbot or Symptom Form
- **Backend AI Engine:**
 - Symptom Parser [NLP]
 - Disease Prediction Model [e.g., Transformer or IBM Granite]
 - Treatment Module
- **Output:** Suggestions rendered on Streamlit
- **Optional:** Feedback collection for future improvement

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Sprint Schedule:

Sprint-1: User Authentication

- **USN-1:** As a user, I can register using my name, email, and password.
 - Story Points: 2 | Priority: High
- **USN-2:** As a user, I can log in using my email and password.
 - Story Points: 1 | Priority: High

Sprint-2: Chatbot & Symptom Input

- **USN-3:** As a user, I can chat with a health bot to ask general health questions.
 - Story Points: 3 | Priority: High
- **USN-4:** As a user, I can enter my symptoms via chatbot input.
 - Story Points: 3 | Priority: High

Sprint-3: Disease Prediction

- **USN-5:** As a system, I can predict possible diseases based on the user's input.
 - Story Points: 4 | Priority: High

Sprint-4: Personalized Treatment

- **USN-6:** As a user, I can receive personalized treatment advice based on my profile and predictions.
 - Story Points: 3 | Priority: High

Burndown Chart: Used to track remaining story points per sprint.

6. FUNCTIONAL AND PERFORMANCE TESTING

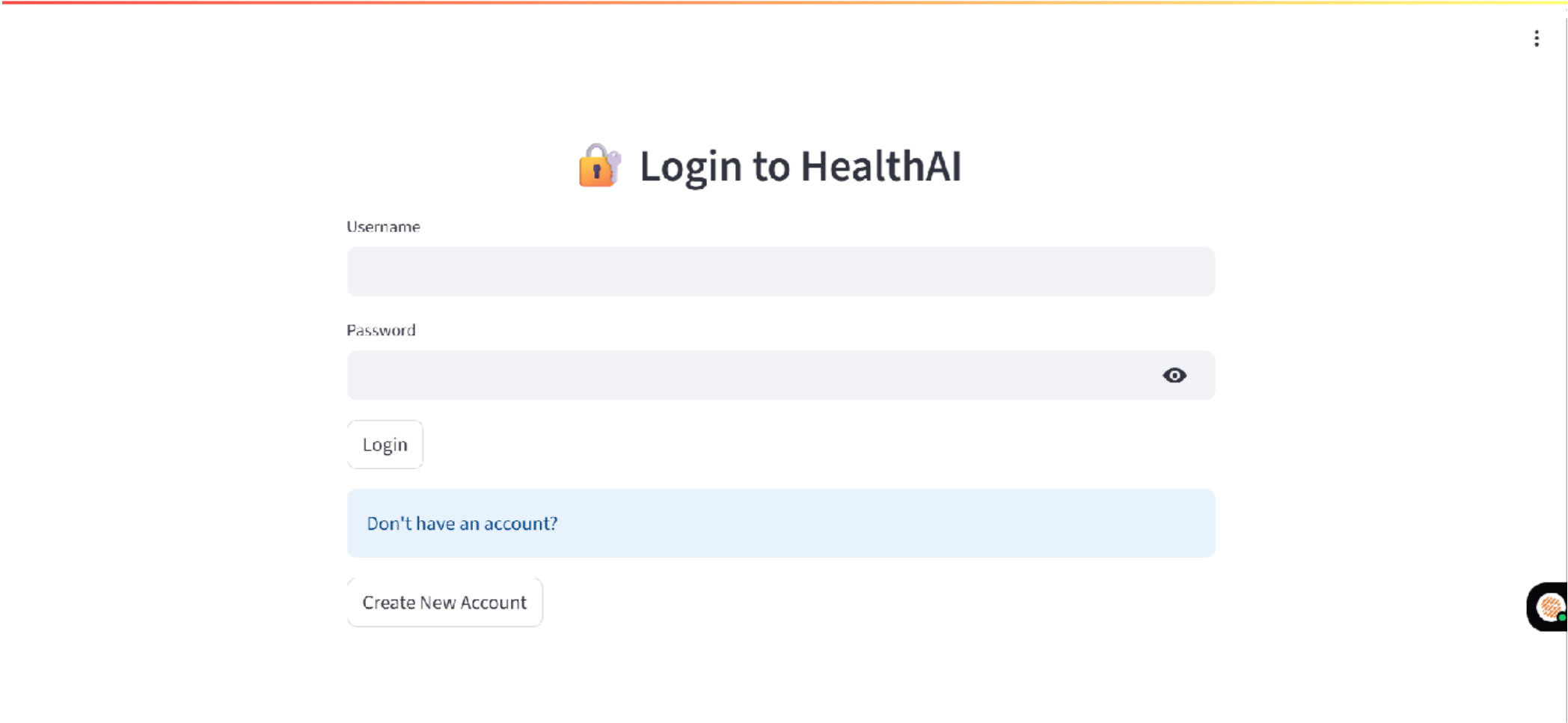
6.1 Performance Testing

- **Test Case:** Chatbot Response Time → **Result:** < 2 seconds → Pass
- **Test Case:** Symptom Form Validation → Pass
- **Test Case:** Prediction Model Accuracy on sample data → Pass

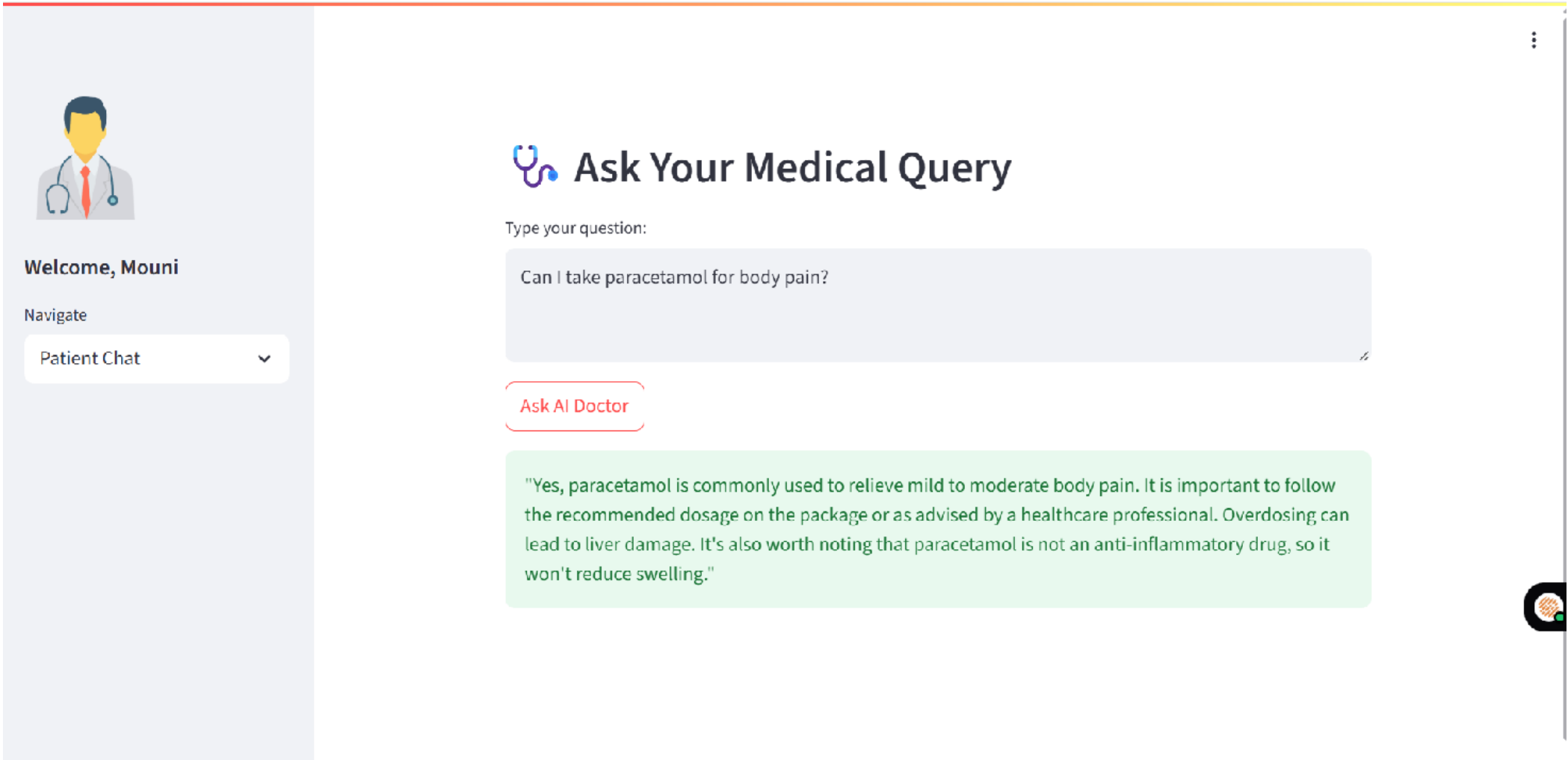
7. RESULTS

7.1 Output Screenshots


- Screenshot 1: Login Page
- Screenshot 2: Chatbot Response
- Screenshot 3: Disease Prediction
- Screenshot 4: Treatment Advice Output



Scenerio 1



Scenerio 2



Welcome, Mouni

Navigate

Disease Prediction

Disease Prediction

Enter symptoms


I have a fever and sore throat, what could it be?

Health history (optional)

Predict

Based on the provided symptoms of fever and sore throat, a common diagnosis could be pharyngitis, an inflammation of the pharynx. This condition is often caused by a viral or bacterial infection, such as streptococcus (strep throat), which can lead to fever. However, it's crucial to note that these symptoms can also be associated with other conditions like influenza or COVID-19. A definitive diagnosis requires a thorough medical evaluation.

Scenerio 3



Welcome, Mouni

Navigate

Treatment Plan

Patient Chat

Disease Prediction

Treatment Plan

Logout

Personalized Treatment

Medical condition

I have a fever and sore throat, what could it be. And what personalized Treatment should i need to take?

Additional health info

Generate Plan

1. **Symptom Analysis:**

- Fever: A body temperature above 100.4°F (38°C) indicates an infection or inflammation.
- Sore throat: Pain or discomfort when swallowing, often due to a viral or bacterial infection.

2. **Potential Causes:**

- Viral infection (e.g., common cold, flu, or strep throat): These are usually self-limiting and resolve within a week without specific treatment. Antiviral medications may be prescribed for influenza in some cases.
- Bacterial infection (e.g., streptococcal pharyngitis): Requires antibiotics for treatment. A rapid strep test or throat culture can confirm the diagnosis.
- Other causes: Allergies, tonsillitis, or less commonly, dental issues.

3. **Home Care Measures:**

8. ADVANTAGES & DISADVANTAGES

Advantages

- User-friendly and fast
- Offers preliminary diagnosis
- Personalized advice

Disadvantages

- Not a replacement for doctors

9. CONCLUSION

HealthAI simplifies the process of health self-assessment using machine learning and AI tools. While it doesn't replace professional medical advice, it serves as a valuable tool for initial evaluation and decision-making support.

10. FUTURE SCOPE

- Add voice assistant
- Multilingual chatbot
- Integration with real-time healthcare APIs

11. APPENDIX

- **Source Code:** GitHub Link [<https://github.com/soni789-s/HealthAI-Intelligent-Healthcare-Assistant-Using-IBM-Gran>]
- **Demo:** Ngrok or Render Deployment Link [<https://6e4a-106-215-168-119.ngrok-free.app>]