Project Documentation Format

1.INTRODUCTION:

- **Project Title**: Health AI-Intelligent Healthcare Assistant Using Granite
- **Team ID:** LTVIP2025TMID33406
- **Team size**:5
- **Team members**:
    1. kiran kumar Bhogam (Team Leader)
    2. Uppara Anusha
    3. T. Deekshitha
    4. R. Aswitha
    5. H. Anjali

2. PROJECT OVERVIEW:

Purpose

A Conceptual or actual project using artificial intelligence to improve healthcare. If you have a specific company, product, or context in mind (e.g., diagnostics, wearable integration, hospital operations), I can tailor this further.

Objective:

To harness the power of artificial intelligence to improve patient outcomes, streamline healthcare operations, and enable personalized, predictive, and preventive healthcare.

Key Goals:

- Early Diagnosis & Detection
- Personalized Treatment Plans
- Remote Monitoring & Virtual Care
- Operational Efficiency
- Clinical Decision Support

Core Technologies Used:

- Machine Learning (ML) and Deep Learning
- Natural Language Processing (NLP) for analyzing clinical notes
- Computer Vision for interpreting medical imaging
- Wearable and IoT Integration
- Chatbots and Virtual Assistants

Expected Outcomes:

- Improved diagnostic accuracy
- Reduced hospital readmissions
- Enhanced patient engagement
- Cost savings through automation and early intervention
- More equitable care through data-driven insights

Features:

Key features

- Natural Language summarization
- AI Assistant for Q & A
- Sentiment Analysis
- Automated status report
- Task and Issue analysis

Functionalities

1.Symptom Identifier:

User enters symptoms → AI suggests possible diseases (non-diagnostic).

2.Home Remedies Generator:

User enters disease → AI gives natural/home-based remedies.

3.Health Chat Assistant:

Users can ask general health questions → AI provides informative, non-diagnostic answers.

4.Disease Prediction:

Based on symptoms input, AI suggests potential conditions (e.g., cold, flu).

5.Personalized Treatment Plan:

Suggests age/gender/history-based tips, non-prescriptive guidance, lifestyle improvements.

3.ARCHITECTURE:

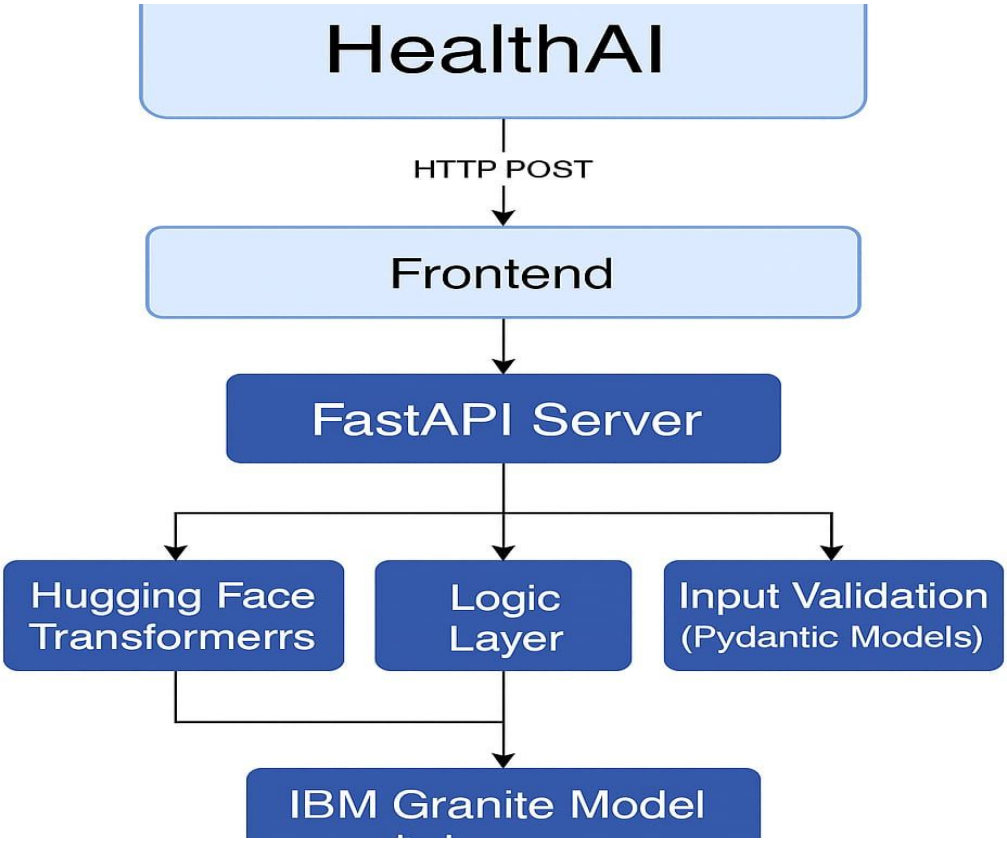
Frontend

Tech Stack:

HTML, CSS, JavaScript (or optionally GRADIO in COLAB), running in browser.

Components:

section	Functionality
Symptom Identifier	User enters symptoms → AI suggests possible diseases
Home Remedies	User enters disease → AI gives natural /home-based remedies.
Patient Chat	Users can ask general health questions → AI provides informative, non-diagnostic answers.
Disease Prediction	Based on symptoms input, AI suggests potential conditions (e.g., cold, flu).
Treatment Plans	Suggests age/gender/history-based tips, non-prescriptive guidance, lifestyle improvements.



Backend

Tech Stack:

- Framework: Fast API
- Model Integration: Hugging Face Transformers (IBM-granite/granite-3b-instruct)
- Google Collab to run the code

Data base

Collections & Schemas

Interactions with IBM Granite:

All model interactions (symptom ID, chat, remedies, treatment plans) follow this pattern:

Frontend form submission → Fast API

IBM_granite(prompt) function

Prepares the prompt

Sends to IBM Granite model (via Hugging Face)

Returns inference result

Advantages of MongoDB

Feature	MongoDB Benefit
User flexibility	Schema-less — add/remove fields as needed
AI logs	Store varied input/output pairs easily
Medical records	Embed arrays or nested documents
Fast API integration	Simple with motor (async MongoDB driver)

4. SETUP INSTRUCTIONS:

Prerequisites:

1. Programming Knowledge

- Python (basic to intermediate)
- HTML & CSS (for frontend)
- Basic JavaScript (if needed)
- Understanding of how AI models work (basic)

2. Tools & Libraries

- Fast API – for backend API
- UVI corn – to run the Fast API server
- Transformers (Hugging Face) – to load the IBM Granite AI model
- MongoDB – to store user data, symptoms, and results
- GRADIO (optional) – for simple UI in GOOGLE COLAB

3. Accounts & Access

- Hugging Face account (to access IBM Granite model)
- MongoDB Atlas account or local MongoDB installation

4. Environment Setup

- Python installed (version 3.9 or above)
- Code editor (e.g., VS Code)
- Internet connection (to use AI models and APIs)

Installation:

Step-by-Step Installation

Step 1: Clone the Project Repository

Step 2: Set Up a Python Virtual Environment

Step 3: Install Required Dependencies

- Fast API
- UVI-corn
- transformers
- torch
- motor

Step 4: Set Up Environment Variables

Step 5: Update Your Code to Use Environment Variables

Step 6: Run the Fast API Server

Step 7 (Optional): Test the API

Step 8: (Optional for Colab)

You're Done!

You now have:

Fast API running locally

IBM Granite model loaded from Hugging Face

5.FOLDER STRUCTURE:

- **Client**

Feature	Frontend Component
Symptom Identifier	SymptomForm.jsx + SymptomChecker.jsx
Home Remedies	RemedyForm.jsx + Remedies.jsx
Patient Chat Assistant	ChatAssistant.jsx + Chat.jsx
Disease Prediction	DiseasePredictor.jsx + Prediction.jsx
Personalized Treatment Plan	TreatmentPlan.jsx + Treatment.jsx

- **Server**

File	Description
symptomController.js	Handles symptom input, predicts disease
remedyController.js	Returns natural remedies based on disease
chatController.js	Handles chatbot questions and responses
predictionController.js	Processes symptoms to predict possible conditions
treatmentController.js	Suggests treatment plans based on user profile

6.RUNNING THE APPLICATION:

Frontend setup for Health AI

Objective:

Run a static HTML/CSS frontend using npm start in the client directory.

- Create client/index.html
- Create client/style.css
- Create client/package.json
- Install Dependencies
- Start the Frontend Server

Backend setup for Health AI

the backend should be run from the server/ directory — not the client/ directory — because it uses Python (Fast API), not Node.js. However, if you want to use npm start as a command to run the Fast API backend (for consistency), we can set that up.

Backend Setup for Health AI Using IBM Granite + Fast API

1. Install Python Dependencies

Create server/requirements.txt:

- Fast API
- UVI-corn
- transformers
- torch

> Run this in the server/ directory to install

7.API DOCUMENTATION:

HealthAI API Documentation

Overview:

The Health AI backend uses the IBM Granite language model to provide intelligent, non-diagnostic health guidance. The API is built using Fast API and serves as the engine behind the frontend UI.

Base URL (local development):

http://localhost:8000/

All endpoints accept JSON input and return JSON output.

1. POST /symptom_identifier

Description:

Predict the disease based on symptoms provided by the user.

Example Request:

{

"input": "fever, body ache, sore throat"

}

Example Response:

"response": "Based on your symptoms, you might be experiencing the flu

8.AUTHENTICATION:

Goal:

To secure access to the Health AI backend endpoints (especially in production), by ensuring that only authorized users or clients can access them.

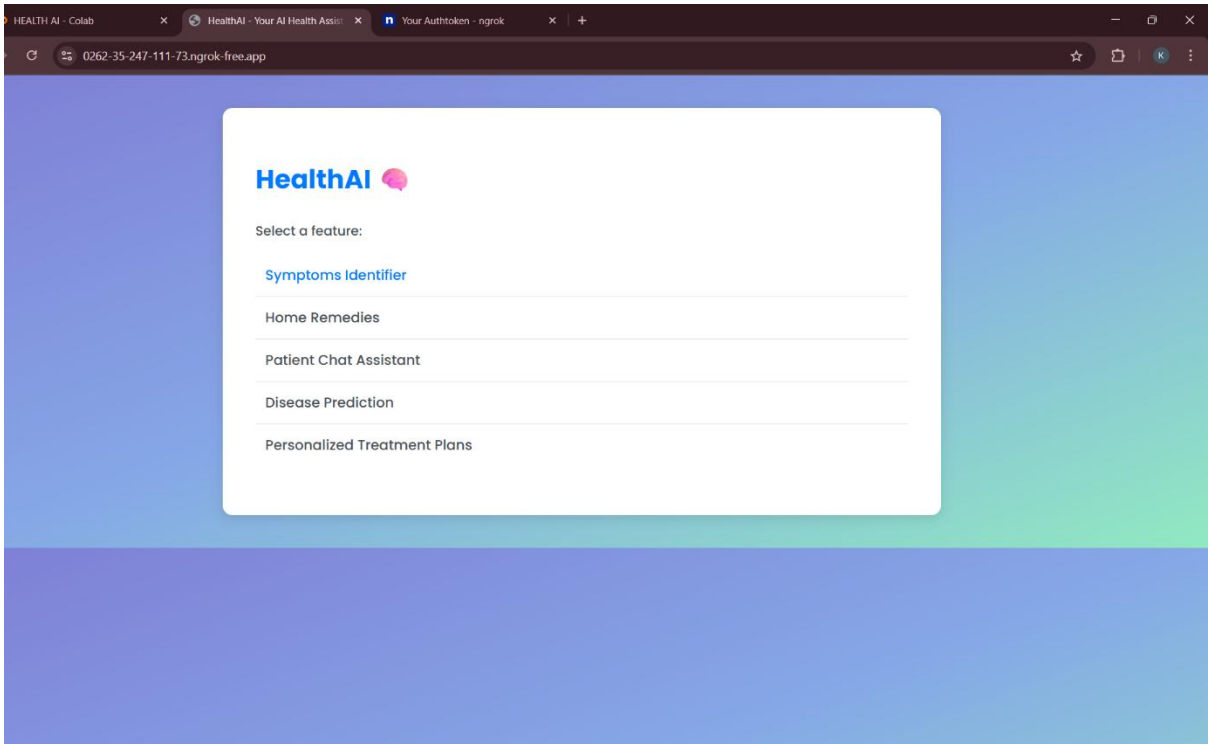
Recommended Authentication Strategy: Token-Based Authentication

Because Health AI is a stateless API (Fast API backend with HTML/JS frontend or possibly a GRADIO app), the best approach is token-based authentication using OAuth2 with JWT (JSON Web Tokens).

Implementation Outline in FastAPI

- Install Security Libraries
- User & Token Models
- Auth Logic (Simplified)
- Secure Endpoints Example

9.USER INTERFACE:



Health AI Features to Showcase Visually:

1. Symptoms Identifier

➤ User inputs symptoms → AI predicts disease.

2. Home Remedies

➤ User enters disease → AI returns natural remedies.

3. Patient Chat Assistant

➤ Chat-like Q&A with AI (non-diagnostic).

4. Disease Prediction

➤ Multi-symptom input → multiple condition suggestions.

5. Personalized Treatment Plans

➤ Inputs include age/gender/history → AI responds with tailored plan.

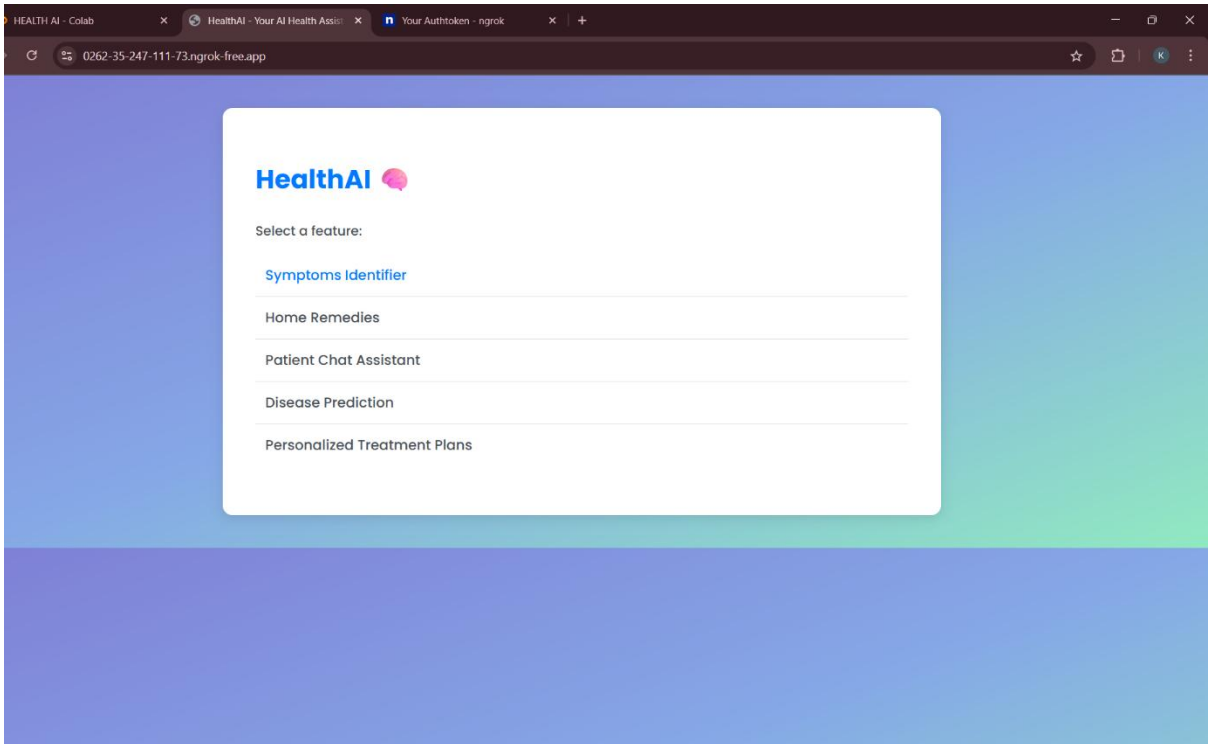
10.TESTING:

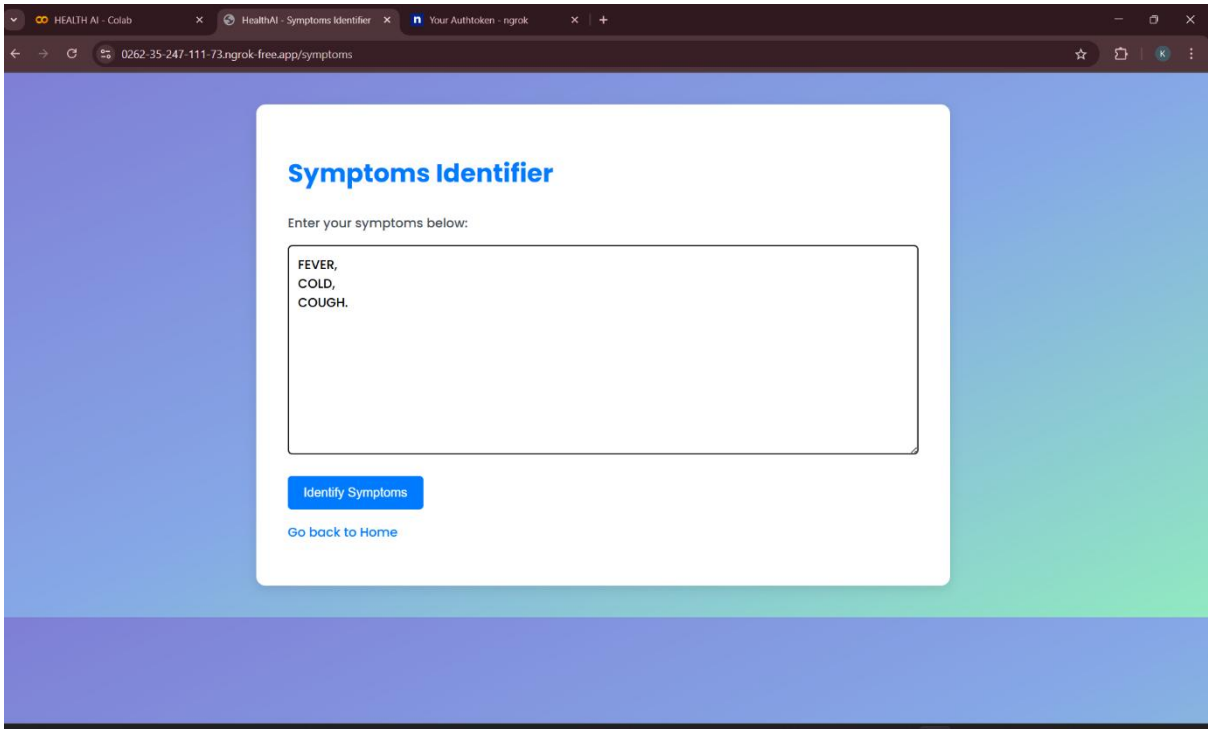
Performance Testing

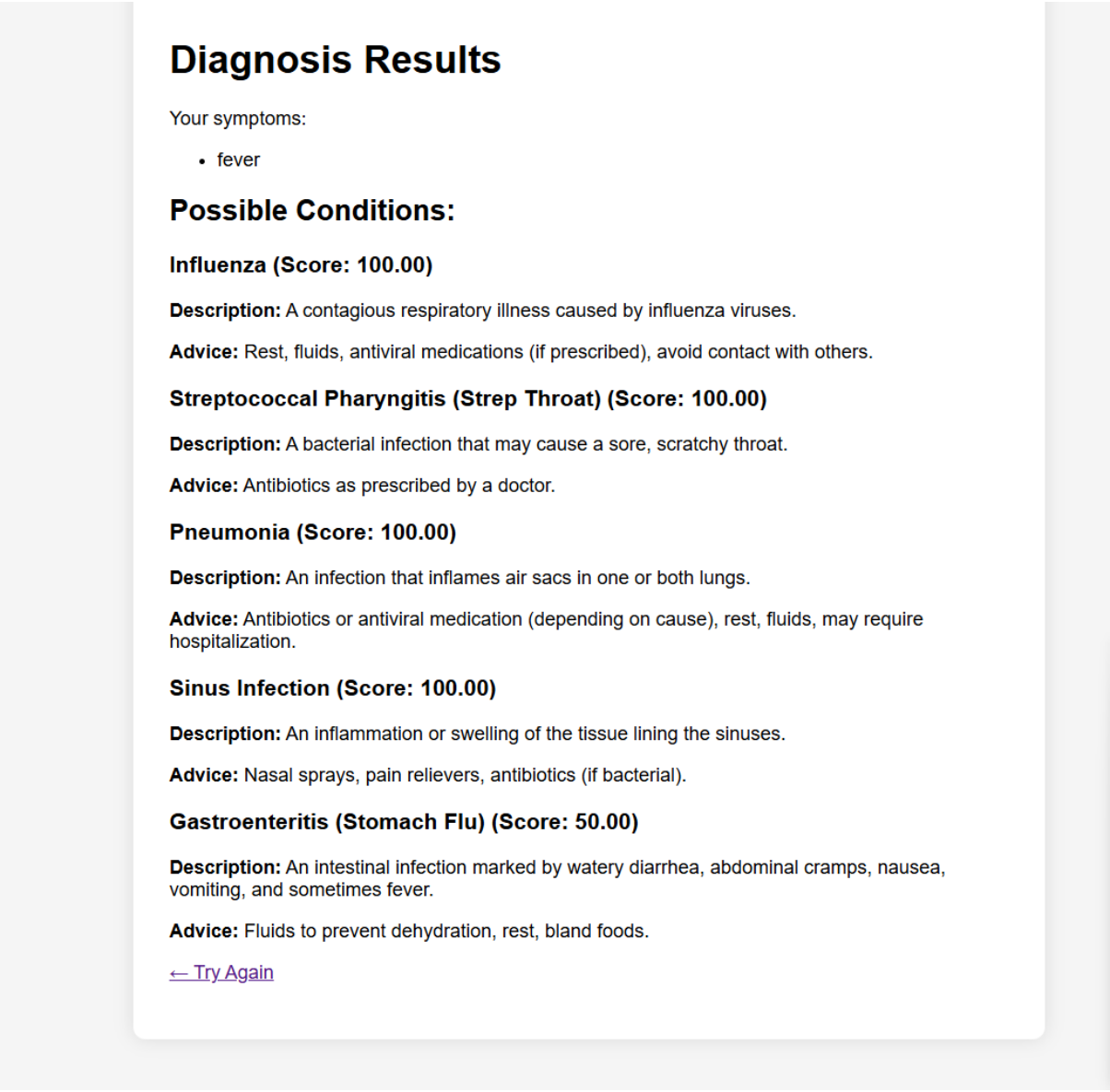
- Test input validation
- Number input validation
- Content Generation

- API connection check
- Response Time test
- API speed test
- File upload load test

11.SCREENSHOTS OR DEMO:







DEMO LINK:

https://drive.google.com/file/d/1WdXw0Jaq9pF0UodR09XOfWdVBxaKlplL/view?usp=drive_link

12. KNOWN ISSUES:

- Model Latency / Slow Response Times
- Non-Deterministic Model Output
- No True Medical Diagnosis Capability
- Granite Model Token Limit
- Input Sanitization Required

13.FUTURE ENHANCEMENTS:

- Multimodal Diagnostic Assistance
- Real-time Triage Assistant
- Automated Coding & Billing
- Personalized Healthcare & Treatment Planning
- Clinical Documentation Automation
- Medical Research & Drug Discovery
- Multilingual & Global Health Applications
- Predictive & Preventive Healthcare