Generative AI with IBM Cloud

Project Documentation format

1. Introduction

• **Project Title:** HealthAI: Intelligent Healthcare Assistant Using IBM Granite

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2. Project Overview:

Purpose: Lack of instant medical support in remote areas.
No immediate advoice for common symptoms.
Dependance on hospital visits for common symptoms.
Need or a simple AI-based healyh guide. based app build

.3. Architecture

• Frontend: esign and develop the user interface

1. **Main Application Layout:**

Implement tabbed navigation for four main features
Create intuitive input forms with proper validation

2. **Feature-Specific Interfaces:**

Real-Time Corrections: Topic input, paragraph text area, and categorized correction
Explanatory Notes: Multi-language text input with automatic language detection display
Adaptive Quiz: Language selection dropdown with expandable quiz sections
Multilingual Learning: Language and exercise type selection with comprehensive output display

Create dynamic visualizations

1. Language Competency Charts:

Text complexity metrics bar chart showing word count, average word length, sentence count
Radar chart displaying competency across Grammar, Vocabulary, Structure, Coherence, and Style
Base64 encoded image integration for seamless Gradio display

2. Analysis Metrics:

Real-time word count validation with target range feedback
Language detection confidence display
Interactive visualization updates based on text analysis

- **Backend** :Python with FastAPI or FlaskUse pre-trained symptom-checker model (e.g., fine-tuned BERT for NLP)Optionally integrate with open medical APIs like:Infermedica APIHealthwiseOpenAI for AI suggestions
- **Database**:SQLite (for offline data)Firebase / Supabase (for sync & user data)

4.Setup Instructions

- **Prerequisites:** For Frontend(Flutter App)Flutter SDKAndroid Studio or VS Code with Flutter

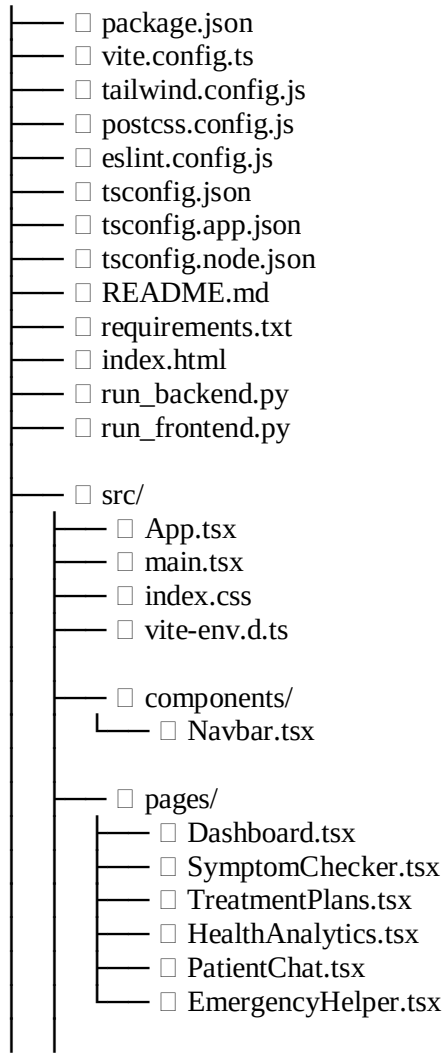
pluginAndroid/iOS device or emulatorGit
For Backend (FastAPI + Python)Python 3.9+pip or condaGit(Optional) virtualenv or conda
environmentInternet access for installing dependencies

- **Installation:** 1. Clone the Repository

git clone https://github.com/your-username/health-ai-app.git
cd health-ai-app
2. Set Up the Frontend (Flutter)
cd frontend flutter pub get Run the Flutter app:basd Edit flutter run
Make sure your emulator or device is connected.
3. Set Up the Backend (FastAPI + Python)
cd ../backend
python -m venv venv
source venv/bin/activate # On Windows: venv\Scripts\activate
pip install -r requirements.txt
Run FastAPI server:uvicorn main:app --reload

5. Folder Structure:

Server and cilent



```
│   └── □ utils/
│       └── □ cn.ts
│
├── □ backend/
│   ├── □ _init_.py
│   ├── □ main.py
│   ├── □ main copy.py
│   └── □ ai_assistant.py
│
├── □ frontend/
│   ├── □ _init_.py
│   └── □ streamlit_app.py
│
└── □ dist/ (build output)
    ├── □ index.html
    └── □ assets/
        ├── □ index-dL08-iYk.css
        └── □ index-DbH5spwF.js
```

6. Running the Application

Frontend (React)

Location: `client/`

Command:

```
cd client
npm install       # Only required on first setup
npm start
```

Backend (Node.js + Express)

Location: server/

Command

```
cd server
npm install     # Only required on first setup
npm start
```

7. API Documentation

Base URL: `http://localhost:5000/api`

---

1. POST **`/api/symptoms`**

Description: Analyzes user-reported symptoms and returns basic health guidance.

Method: `POST`

```
{
  "symptoms": "headache, fatigue, and slight fever"}
```

Success Response:

```
{
  "condition": "Possible common cold or mild flu",
  "urgency": "Low",
  "recommendation": "Rest, stay hydrated, and monitor for worsening symptoms."}
```


Error Response:


```
{
  "error": "Symptoms input is required."}
```


---

2. GET `/api/tips`

Description: Returns general health tips or self-care suggestions

Method: `GET`

Response:


```
{

  "tips": [
    "Drink at least 8 glasses of water daily.",
    "Wash hands regularly to prevent infections.",
    "Get at least 7-8 hours of sleep every night."
  ]}
```


---

3. GET `/api/emergency`

Description: Returns step-by-step instructions for common emergency cases (e.g. CPR, burns).

Method: `GET`

Response:


```
{
  "emergencyGuide": {
    "burns": "Cool the burn under running water for at least 10 minutes...",
    "cpr": "Check responsiveness, call emergency services, begin chest compressions..."
```


7. Authentication:

- Role-based access can be implemented by decoding the token to determine the user's role (e.g., `admin`, `user`).
- Certain endpoints (like feedback analytics, admin panel) are restricted based on roles.

Example Tools Used

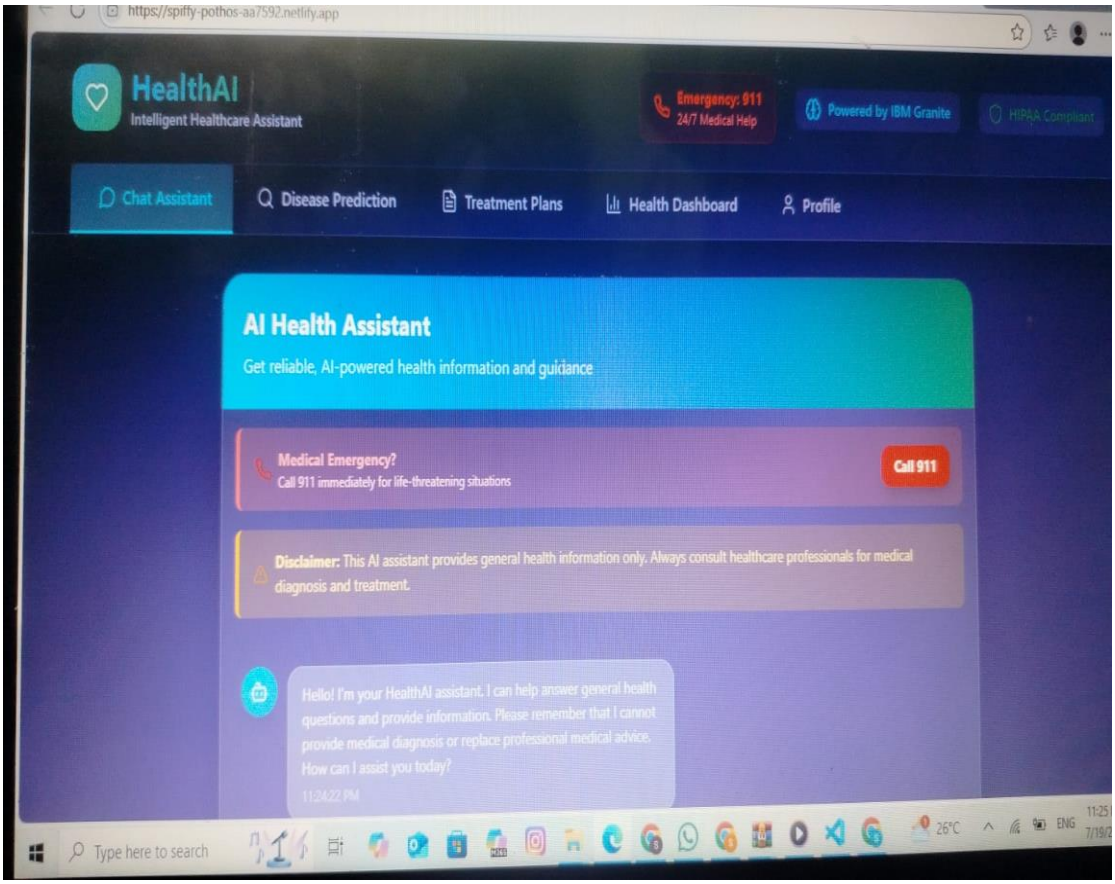
webtoken (Node.js package) for signing and verifying JWTs.

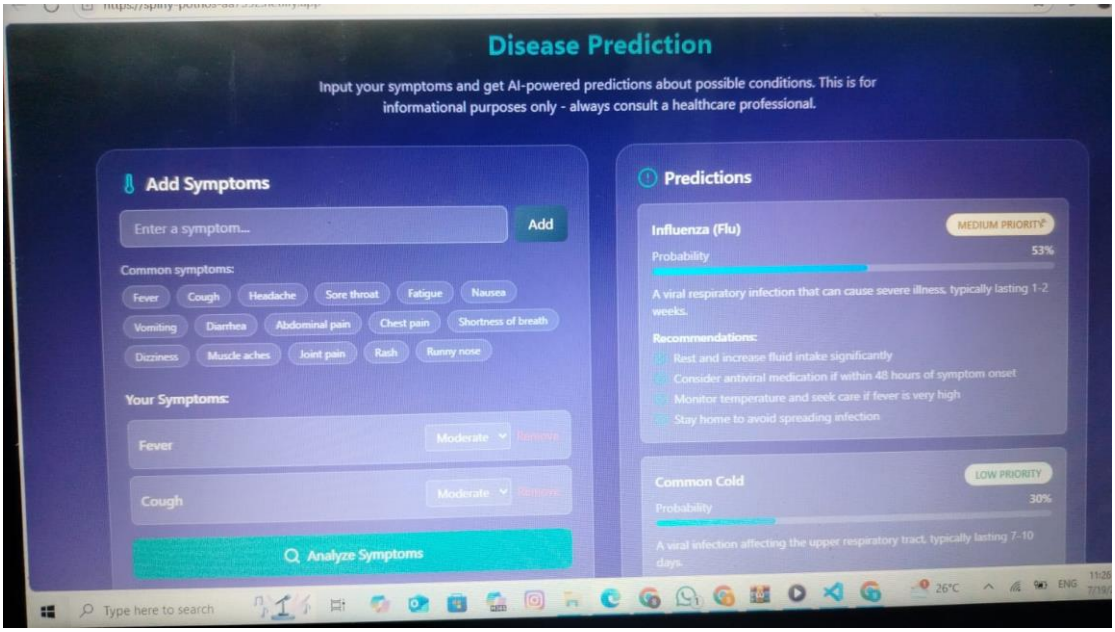
bcryptjs or **argon2** for hashing passwords before storing in the database.

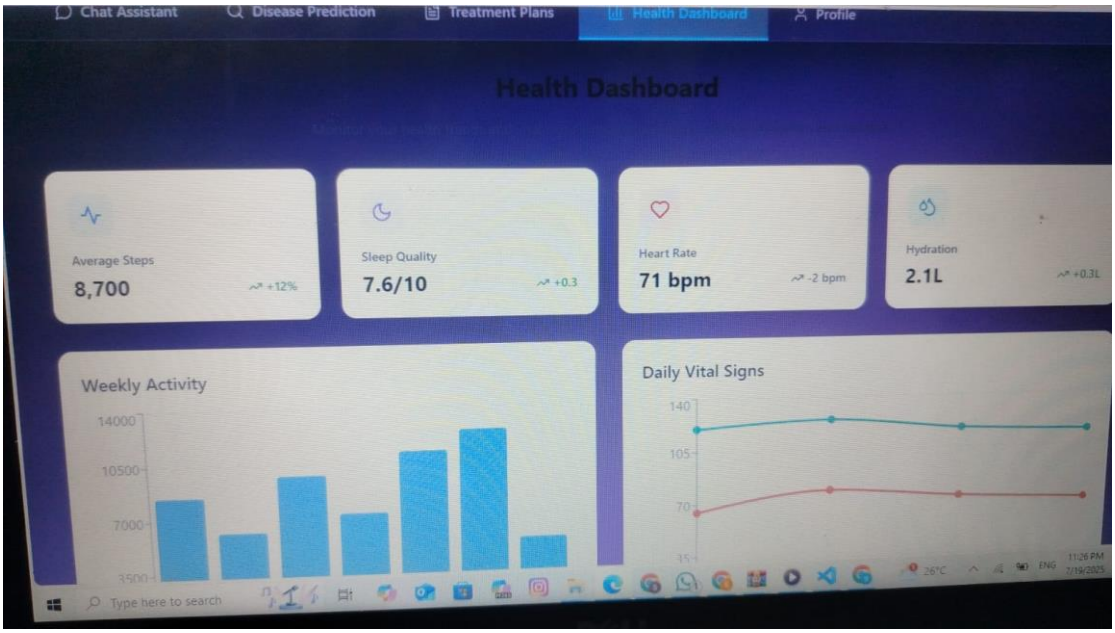
Example Token Payload

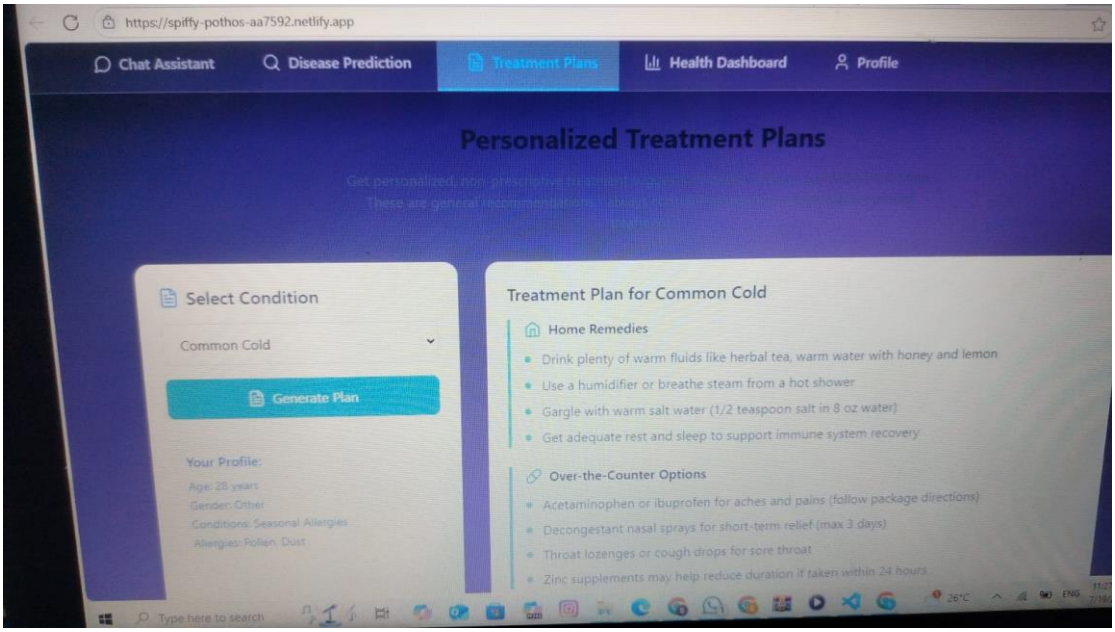
```
{
  "userId": "abc123",
  "role": "admin",
  "exp": 1718123456}
```

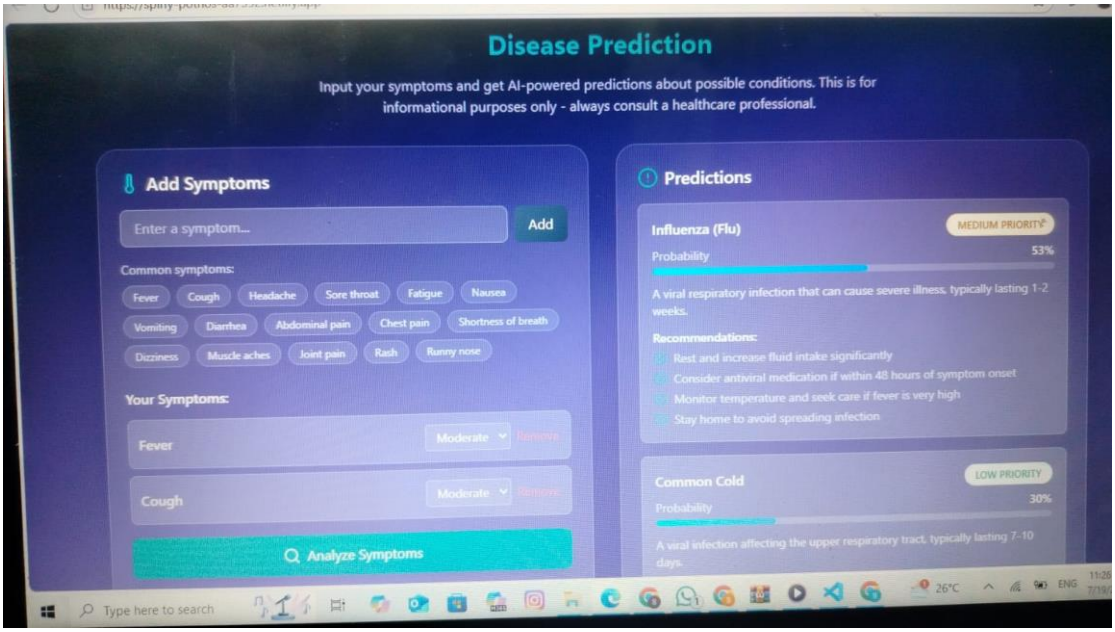
Screen shots




Disease Prediction
Input your symptoms and get AI-powered predictions about possible conditions. This is for informational purposes only - always consult a healthcare professional.
Add Symptoms
Enter a symptom...
Add
Common symptoms:
Fever
Cough
Headache
Sore throat
Fatigue
Nausea
Vomiting
Diarrhea
Abdominal pain
Chest pain
Shortness of breath
Dizziness
Muscle aches
Joint pain
Rash
Runny nose
Your Symptoms:
Fever
Moderate
Remove
Cough
Moderate
Remove
Analyze Symptoms
Predictions
Influenza (Flu)
MEDIUM PRIORITY
Probability
53%
A viral respiratory infection that can cause severe illness, typically lasting 1-2 weeks.
Recommendations:
Rest and increase fluid intake significantly
Consider antiviral medication if within 48 hours of symptom onset
Monitor temperature and seek care if fever is very high
Stay home to avoid spreading infection
Common Cold
LOW PRIORITY
Probability
30%
A viral infection affecting the upper respiratory tract, typically lasting 7-10 days.
Type here to search
26°C
ENG


Chat Assistant
Disease Prediction
Treatment Plans
Health Dashboard
Profile
Health Dashboard
Average Steps
8,700
+12%
Sleep Quality
7.6/10
+0.3
Heart Rate
71 bpm
-2 bpm
Hydration
2.1L
+0.3L
Weekly Activity
14000
10500
7000
3500
Daily Vital Signs
140
105
70
35
Type here to search
26°C
ENG
11:26 PM
7/19/2025


https://spiffy-pothos-aa7592.netlify.app
Chat Assistant
Disease Prediction
Treatment Plans
Health Dashboard
Profile
Personalized Treatment Plans
Select Condition
Common Cold
Generate Plan
Your Profile:
Age: 28 years
Gender: Other
Conditions: Seasonal Allergies
Allergies: Pollen, Dust
Treatment Plan for Common Cold
Home Remedies
Drink plenty of warm fluids like herbal tea, warm water with honey and lemon
Use a humidifier or breathe steam from a hot shower
Gargle with warm salt water (1/2 teaspoon salt in 8 oz water)
Get adequate rest and sleep to support immune system recovery
Over-the-Counter Options
Acetaminophen or ibuprofen for aches and pains (follow package directions)
Decongestant nasal sprays for short-term relief (max 3 days)
Throat lozenges or cough drops for sore throat
Zinc supplements may help reduce duration if taken within 24 hours
Type here to search
26°C
ENG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