# Health AI

## Project Documentation

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### 1. Introduction

Project Title: Health AI
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### 2. Project Overview

#### Purpose

Health AI is designed to revolutionize the healthcare experience for patients, doctors, and general users by leveraging Artificial Intelligence and Natural Language Processing (NLP). The system provides personalized health guidance, symptom analysis, fitness tracking, and medical information in simple, accessible formats.

For Patients → Symptom checker, preventive care suggestions, and instant guidance.

For Doctors → Quick assistance in patient data analysis, health monitoring, and report generation.

For General Users → Lifestyle tips, diet recommendations, and fitness insights.

👉 Health AI bridges technology and healthcare to create a smarter, more inclusive, and reliable medical support system.

#### Key Features

1. Symptom Checker – AI analyzes user symptoms and suggests possible conditions.

2. Health Chatbot – Conversational assistant for answering health-related questions.

3. Diet & Fitness Guidance – Personalized nutrition and workout tips.

4. Medical Report Analysis – Upload medical reports (PDF/text) for simplified explanation.

5. Medication & Reminder System – Suggests dosage reminders and medication info.

6. Preventive Care Tips – Provides AI-driven health tips for daily routines.

7. Interactive UI (Gradio/Streamlit) – User-friendly interface for patients and doctors.

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3. Architecture

Frontend (Gradio/Streamlit)

Provides an easy-to-use dashboard.

Includes modules for symptom checker, chatbot, diet tips, and file uploads.

Backend (Hugging Face + FastAPI Layer)

Powered by IBM Granite / Hugging Face models for text processing.

FastAPI handles API routing and scalability.

LLM Integration

Uses IBM Granite model for medical Q&A, report summarization, and preventive care tips.

Development Environment

Built and tested in Google Colab for rapid prototyping with GPU support.

Key Dependencies

Transformers → For pre-trained health/LLM models.

Torch → Deep learning inference.

Gradio/Streamlit → Frontend UI.

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4. Setup Instructions

Prerequisites:

Python 3.9+

pip package manager

Google account (Colab)

IBM/Hugging Face API key

Steps:

1. Open Google Colab → create a new Python file.

2. Install required libraries:

pip install transformers torch gradio

3. Configure IBM Watsonx API key inside .env or in Colab.

4. Import libraries, load the Granite model, and connect with Gradio/Streamlit.

5. Run notebook → Health AI app launches with an interactive UI.

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5. Folder Structure

HealthAI/
├── HealthAI.py        # Main Colab/Script file
├── requirements.txt   # Dependencies
├── .env               # API key setup
├── /utils             # Helper functions

Frontend → Gradio interface (chat, quiz, file upload).

Backend → Granite LLM integration + logic for medical Q&A and tips.

Config → API keys and environment setup.

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6. Running the Application

1. Open Colab → create HealthAI.py.

2. Install dependencies (torch, transformers, gradio).

3. Add IBM API key in script.

4. Run notebook cells.

5. Click generated Gradio link → start interacting.

Modules available:

Symptom Checker (input symptoms → get AI suggestions).

Health Chatbot (ask: “What are the symptoms of diabetes?”).

Diet & Fitness Tips.

Medical Report Upload → get simplified explanation.

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7. API Documentation

Since Health AI is built in Gradio, backend APIs are not separately exposed.

Core Functions:

Symptom Checker

Input: Symptoms (e.g., “fever, cough, tiredness”)

Output: Possible conditions & precautions.

Diet/Fitness Guide

Input: User details (age, weight, lifestyle).

Output: Personalized health tips.

Medical Report Analysis

Input: Upload PDF/text file.

Output: Simplified AI-generated report summary.