**Healthy AI – An Intelligent Wellness Companion**

**Project team members:**

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**1.Introduction**

In today’s fast-paced world, maintaining good physical and mental health has become a major challenge for individuals of all ages. Lifestyle-related issues such as stress, poor nutrition, lack of exercise, and irregular sleep patterns are leading to an increase in chronic illnesses and reduced overall well-being. Healthy AI is an innovative artificial intelligence–powered wellness companion designed to address these challenges by offering intelligent, personalized guidance for a healthier lifestyle.

This project combines real-time data analysis, machine learning models, and natural language interaction to provide users with actionable health insights. By integrating wearable devices, diet planning tools, and predictive analytics, Healthy AI helps users track their daily habits, identify potential health risks, and receive tailored recommendations for fitness, nutrition, and mental wellness.

The primary goal of Healthy AI is not only to support individuals in reaching their wellness objectives but also to encourage preventive healthcare practices. With features like conversational coaching, activity monitoring, and risk forecasting, this system empowers users to make informed decisions about their health while creating a proactive approach to long-term well-being.

**2. Project Overview**

• **Purpose**:  
Healthy AI is designed to promote physical and mental well-being by combining artificial intelligence with real-time health data. The system guides users toward healthier lifestyles through personalized recommendations, proactive alerts, and intelligent analysis of daily habits. Whether supporting individuals in fitness goals, balanced diets, stress management, or preventive healthcare, Healthy AI bridges technology and human wellness to create a more health-conscious society.

• **Features**:

**Conversational Health Coach**

* **Key Point**: Natural language wellness interaction
* **Functionality**: Allows users to ask health-related questions, track progress, and receive tailored advice in plain language.

**Diet & Nutrition Planner**

* **Key Point**: Personalized meal suggestions
* **Functionality**: Creates balanced diet plans based on user preferences, allergies, and calorie targets.

**Fitness Tracker Integration**

* **Key Point**: Real-time activity monitoring
* **Functionality**: Connects with wearables to analyze daily steps, heart rate, and workout patterns.

**Mental Wellness Support**

* **Key Point**: Stress & mood guidance
* **Functionality**: Uses sentiment analysis to recommend relaxation activities or breathing exercises.

**Health Risk Prediction**

* **Key Point**: Preventive care analytics
* **Functionality**: Predicts potential health risks (e.g., obesity, hypertension) using historical data and lifestyle inputs.

**Daily Wellness Tips**

* **Key Point**: Actionable micro-goals
* **Functionality**: Sends customized tips like hydration reminders, posture checks, and break alerts.

**Community Feedback Loop**

* **Key Point**: Shared motivation
* **Functionality**: Collects user feedback and supports group challenges to encourage healthy competition.

**Multimodal Data Support**

* **Key Point**: Flexible input
* **Functionality**: Accepts wearable data, medical reports (PDF/CSV), and voice inputs for analysis.

**Streamlit or Gradio UI**

* **Key Point**: User-friendly dashboard
* **Functionality**: Displays health analytics, trends, and interactive goal tracking.

**3. Architecture**

* **Frontend (Streamlit)**:  
  Interactive web UI with dashboards for diet plans, fitness charts, mental wellness trackers, and report downloads.
* **Backend (FastAPI)**:  
  Handles API requests for user data, prediction models, chat interactions, and recommendation generation with optimized asynchronous performance.
* **LLM Integration (Watsonx/Granite or Open Source LLMs)**:  
  Used for natural language understanding, conversational coaching, and health report summarization.
* **Vector Search (Pinecone/FAISS)**:  
  Stores and retrieves medical knowledge bases and wellness articles using semantic search.
* **ML Modules (Risk Forecasting & Anomaly Detection)**:  
  Lightweight models predict health risks and detect abnormal activity or vital trends using time-series analysis.

**4. Setup Instructions**

**Prerequisites**

* Python 3.9 or later
* pip and virtual environment tools
* API keys for LLM service and database
* Wearable device API credentials (optional)

**Installation Process**

* Clone the repository
* Install dependencies from requirements.txt
* Configure .env with API credentials
* Run FastAPI backend server
* Launch Streamlit frontend for dashboard access
* Connect wearables or upload health data

**5. Folder Structure**

app/ – Backend logic for health analysis, chat, and forecasting  
app/api/ – API routes for diet, fitness, mental wellness, and feedback  
ui/ – Streamlit components for dashboards, charts, and forms  
health\_forecaster.py – Predicts future health trends  
risk\_analyzer.py – Identifies potential health risks  
report\_generator.py – Creates AI-generated health summaries

**6. Running the Application**

* Start FastAPI backend to expose endpoints
* Run Streamlit dashboard for interactive access
* Upload health data, ask wellness questions, and view recommendations in real-time

**7. API Documentation**

Key endpoints include:

* **POST /chat/ask** – Submit a wellness question to the AI coach
* **POST /upload-data** – Upload wearable or health records
* **GET /get-tips** – Retrieve daily wellness tips
* **POST /submit-feedback** – Store user feedback for analysis

**8. Authentication**

For secure deployment:

* Token-based authentication (JWT or API keys)
* OAuth2 integration for wearable APIs
* Role-based access (user, trainer, admin)

**9. User Interface**

Minimalist and health-centric design with:

* Sidebar navigation
* Activity & nutrition charts
* Mental wellness scorecards
* Real-time form inputs
* Downloadable personalized reports

**10. Testing**

* **Unit Testing**: For health prediction models and utilities
* **API Testing**: Via Swagger UI, Postman
* **Manual Testing**: For wearable integration and chat accuracy
* **Edge Case Handling**: Missing data, abnormal health metrics

**11. Known Issues**

* Limited accuracy without wearable integration
* Regional diet recommendations may need localization

**12. Future Enhancements**

* Integration with telemedicine services
* AI-powered mental health therapy modules
* Voice-based daily health coaching