Dynamic Fitness plan Generator using wearable data

Objective:

The Dynamic Fitness Plan Generator is designed to create personalized workout plans using real-time data from wearable devices such as Fitbit. It dynamically adjusts the user's workout routine based on their performance data, such as steps taken, calories burned, sleep patterns, and nutrition intake. The system leverages Fitbit's API for retrieving fitness data and Google Generative AI for generating customized workout plans based on user goals, preferences, and available data.

Key Features:

1. Wearable Device Integration: The system fetches real-time fitness data (e.g., steps, calories burned, sleep duration, etc.) from the user's wearable device using the Fitbit API.

2. Dynamic Workout Plan Generation: Based on the data retrieved and the user's fitness goals (e.g., weight loss, muscle gain), the system generates personalized workout routines using Google's Generative AI (Gemini). The plan includes warm-up, main workout, and cool-down sections, dynamically adjusting for available workout time, equipment, and other preferences.

3. User-Centric Customization: The user provides their workout preferences (style, time, equipment) and dietary preferences (if they want a diet plan). The system tailors the plan accordingly.

4. Automated PDF Generation: The generated workout plan is exported as a PDF file for the user's convenience.

Project Workflow:

1. Data Fetching from Fitbit:

   - The system communicates with Fitbit's API to fetch the latest fitness metrics like steps, calories burned, sleep duration, and calories consumed. It uses the user's access token for authentication.
   - Data is fetched in real-time and processed to extract only the relevant metrics for workout plan generation.

2. User Input Collection:

   - The user is asked about their fitness goals, preferred workout types, available time, and access to equipment like weights.
   - The user can also opt for a dietary plan, specifying their preferred cuisine type (e.g., Indian, Italian, Chinese, Mexican).

3. Workout Plan Generation using Google Generative AI:

- The system uses Google's Generative AI (Gemini-1.5-Flash model) to generate a personalized workout plan based on both the user's real-time Fitbit data and their input.
- The AI generates a structured, interactive workout plan tailored for one day, including motivational tips and rest/recovery suggestions.

4. PDF Export:

- The generated workout plan is formatted and saved as a PDF using the FPDF library. This PDF can be downloaded by the user for reference.

Technology Stack:

- **Python**: Core language for API integration, data fetching, and PDF generation.

- **Streamlit**: Provides a user-friendly interface for input collection and interaction.

- **Fitbit API**: Used to fetch real-time fitness data from the user's Fitbit device.

- **Google Generative AI (Gemini-1.5-Flash)**: Generates personalized workout plans.

- **FPDF**: Python library for creating and exporting PDFs.

Challenges

1. API integration: Fitbit API access token is only valid for a specific time and the data is fetched only for one day. So, the access token needs to be continuously updated or refreshed.

2. Real-Time Data Limitation: The system relies on wearable device data. If the device is not synced correctly, the accurate data might not reflect the user's latest activity.

3. Google Generative AI Limitations: Since the workout plans are generated based on pre-defined prompts, it assumes the fitness goals and preferences are categorized into broad types (e.g., weight loss, endurance).

Assumptions

1. Wearable Device Availability: It is assumed that users either have a wearable device or at least the Fitbit mobile app capable of tracking their daily activities (e.g., steps, calories, sleep) even without a physical watch.

2. Daily Data Logging: The system assumes that users will consistently log their fitness-related data daily, such as:

- Food Intake: Users log their daily food and calories consumed in the Fitbit app.

- Sleep: Users log their sleep data either through the wearable device or manually via the app.

- Water Intake: Users log their daily water intake (if applicable).

- Workouts: Users track any workouts or activities not automatically detected by the wearable, such as weight lifting or swimming.

3. Availability of User-Provided Information: It is assumed that users can accurately provide information regarding:

- Access to Equipment: The system assumes users will correctly indicate whether they have access to weights or other gym equipment.

- Available Time: Users provide realistic estimates of their available daily time for working out.

- Diet Preferences: Users will give clear dietary preferences, if requesting a diet plan, and stick to the cuisine preference selected.

4. Data Accuracy from Fitbit: It is assumed that the data fetched from Fitbit's API (e.g., steps, calories burned, sleep, etc.) is accurate and reliable. The system does not account for potential discrepancies in the data provided by the wearable.

5. API Token Validity: The system assumes that the user's Fitbit access token is valid and not expired. If the token expires, users must re-authenticate for continued access to real-time data.