

Gym Assistant Website

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1. Introduction

1.1 Purpose

The purpose of this document is to provide a detailed description of the requirements for the **FitCore Gym Assistant Website**. This system is intended to be a comprehensive fitness platform for two primary user groups: individuals who frequent physical gyms ("On-site Users") and individuals who prefer to work out at home ("Offline Users").

The system aims to solve the common challenges of finding suitable gym facilities, creating effective workout and diet plans, and maintaining proper exercise form. For On-site Users, it provides a centralized database of gyms in Cairo and Giza and personalized plans. For Offline Users, it offers personalized home routines coupled with an innovative **AI-powered live workout assistant** to ensure correct form and provide real-time feedback.

This SRS defines the system's scope, functional and non-functional requirements, target users, and data architecture, serving as the foundational agreement between the development team and project stakeholders.

1.2 Scope

The FitCore system will be a web-based application accessible via modern web browsers.

The system WILL:

- Allow users to register as either "On-site" or "Offline."
- Provide user authentication and profile management.
- Generate personalized workout and diet plans based on user-provided data (goals, experience, preferences).
- Maintain a searchable and filterable database of gyms in Cairo and Giza, including operating hours and available equipment.

- Offer an AI-powered workout assistant for Offline Users that uses a webcam to analyze posture and provide real-time corrective feedback.
- Allow users to track their workout progress.
- Send notifications and reminders for scheduled workouts.
- Provide an administrative backend for managing users, gym data, and exercise content.

The system WILL NOT:

- Process payments or manage gym memberships.
- Sell physical fitness equipment or supplements.
- Provide certified medical or nutritional advice (all plans will be suggestions).
- Function as a native mobile application (though it will be mobile-responsive).

1.3 Definitions and Acronyms

- **SRS:** Software Requirements Specification
- **AI:** Artificial Intelligence
- **CV:** Computer Vision
- **UI:** User Interface
- **UX:** User Experience
- **CRUD:** Create, Read, Update, Delete
- **API:** Application Programming Interface
- **On-site User:** A registered member who attends a physical gym.
- **Offline User:** A registered member who works out at home.
- **Admin:** A privileged user responsible for system management.

2. System Overview

The FitCore system is a dynamic, data-driven web application. It consists of three main components:

1. **Client-Side Frontend:** A responsive web interface (built with a modern JavaScript framework) that users interact with. This is where users manage profiles, view plans, and (for Offline Users) interact with the AI assistant.

2. **Server-Side Backend:** An API-driven server that handles business logic, user authentication, data processing, and plan generation.
3. **Database:** A relational database that stores all persistent data, including user profiles, gym information, exercise libraries, and user progress.
4. **AI/CV Service:** A specialized module (potentially a microservice) that processes the video stream from the Offline User's camera, runs the pose-estimation model, and returns real-time feedback.

3. Functional Requirements

FR-1: User Management (Common)

- **FR-1.1: Registration:** The system shall allow a new user to create an account by providing a first name, last name, email, and password.
- **FR-1.2: User Type Selection:** During registration or onboarding, the user must select their primary user type: "On-site" or "Offline."
- **FR-1.3: Login/Logout:** Registered users shall be able to log in using their email and password. The system must provide a secure session and a logout function.
- **FR-1.4: Password Reset:** Users shall be able to reset their password via a secure email link.
- **FR-1.5: Profile & Goal Setting:** All users must complete an onboarding questionnaire to set:
 - **Personal Info:** Age, gender, height, current weight.
 - **Goals:** (e.g., 'Weight Loss', 'Muscle Gain', 'Maintenance').
 - **Experience Level:** ('Beginner', 'Intermediate', 'Advanced').
 - **Dietary Preferences:** (e.g., 'None', 'Vegetarian', 'Vegan', 'Gluten-Free') and known allergies.

FR-2: On-site User Functionality

- **FR-2.1: Gym Database Search:** The user shall be able to search the gym database by name or location (City/Area within Cairo/Giza).
- **FR-2.2: Gym Database Filtering:** The user shall be able to filter search results by:
 - Available equipment (e.g., 'Squat Rack', 'Pool', 'Sauna').
 - Operating hours (e.g., 'Open 24/7', 'Open Now').

- **FR-2.3: View Gym Details:** The user shall be able to click a gym from the search results to view a detailed page containing its full address, a map, complete operating hours, and a list of all available equipment.
- **FR-2.4: Workout Plan Generation:** The system shall generate a personalized weekly workout schedule based on the user's profile (FR-1.5) and goals.
- **FR-2.5: Diet Plan Generation:** The system shall generate a sample daily/weekly diet plan (including meal suggestions and macronutrient targets) based on the user's profile and dietary preferences.
- **FR-2.6: Workout Logging:** The user shall be able to view their daily workout, mark exercises as complete, and log metrics (e.g., weight, sets, reps).

FR-3: Offline (Home) User Functionality

- **FR-3.1: Home Onboarding:** In addition to FR-1.5, the Offline User's onboarding shall collect data on **available home equipment** (e.g., 'None (Bodyweight)', 'Dumbbells', 'Yoga Mat', 'Resistance Bands').
- **FR-3.2: Home Workout Plan Generation:** The system shall generate a personalized weekly workout schedule based on the user's profile, goals, and available home equipment.
- **FR-3.3: Diet Plan Generation:** (Same as FR-2.5).
- **FR-3.4: Workout Notifications:** The system shall send email or browser-based notifications to remind the user of their scheduled workout times.
- **FR-3.5: AI Workout Assistant (Live Session):**
 - **FR-3.5.1: Camera Access:** The system shall request permission to access the user's webcam upon starting a live workout.
 - **FR-3.5.2: Exercise Selection:** The user shall select an exercise from their plan to begin the AI-guided session.
 - **FR-3.5.3: Real-time Instructions:** The system shall provide initial audio/text instructions on how to perform the exercise.
 - **FR-3.5.4: Posture Detection:** The system shall use a computer vision model to detect the user's key body landmarks (e.g., shoulders, elbows, hips, knees) in real-time.
 - **FR-3.5.5: Real-time Corrective Feedback:** The system shall analyze the user's posture and movement against a model of the correct form.
 - **FR-3.5.6: Feedback Delivery:** If a mistake is detected (e.g., 'back is rounded,' 'squat not deep enough'), the system shall provide immediate, constructive audio and visual feedback (e.g., "Straighten your back!").

FR-4: Administrator Functionality

- **FR-4.1: Admin Dashboard:** The admin shall have access to a secure dashboard displaying key system statistics (e.g., total users, new signups, number of gyms).
- **FR-4.2: User Management (CRUD):** The admin shall be able to view, search for, edit, and delete user accounts.
- **FR-4.3: Gym Management (CRUD):** The admin shall be able to add, edit, and delete gyms in the database, including their location, operating hours, and equipment lists.
- **FR-4.4: Exercise Management (CRUD):** The admin shall be able to manage the exercise database, including adding new exercises, instructions, target muscles, and video links.

4. Non-Functional Requirements

- **NFR-1: Performance**
 - **Page Load:** All website pages must load in under 3 seconds on a standard broadband connection.
 - **AI Latency:** The AI assistant's corrective feedback must be delivered to the user within 500ms of the detected posture error to be "real-time."
 - **Concurrency:** The system must support at least 500 concurrent active users, with at least 50 concurrent users actively using the AI workout assistant.
- **NFR-2: Security**
 - **Authentication:** All user passwords must be hashed using a strong, salted algorithm (e.g., bcrypt).
 - **Data Transmission:** All data transmitted between the client and server must be encrypted using SSL (HTTPS).
 - **Privacy:** The AI assistant's camera stream must be processed in real-time. No video data shall be stored on the server without explicit, opt-in consent from the user for quality improvement purposes.
 - **Vulnerabilities:** The system must be protected against common web vulnerabilities, including SQL Injection, Cross-Site Scripting (XSS), and Cross-Site Request Forgery (CSRF).
- **NFR-3: Usability**

- **Responsive Design:** The website UI must be fully responsive and functional on all major device types (desktop, tablet, and mobile).
- **Accessibility:** The system shall adhere to WCAG 2.1 Level AA guidelines to ensure accessibility for users with disabilities.
- **Consistency:** The UI shall be consistent across all pages, with clear navigation and intuitive workflows.
- **NFR-4: Scalability**
 - The system architecture must be horizontally scalable, allowing the backend and AI services to handle increasing user loads.
 - The gym database must be designed to easily expand to new cities beyond Cairo and Giza.
- **NFR-5: Reliability**
 - The system shall have an uptime of 99.9% (excluding scheduled maintenance).
 - All system errors must be handled gracefully and logged on the server for debugging.

5. System Actors and Use Cases

5.1 System Actors

1. **On-site User (Member):** A registered user who attends a physical gym. Their primary goal is to find gyms and get structured workout/diet plans to follow at their facility.
2. **Offline User (Member):** A registered user who works out at home. Their primary goal is to get personalized home workouts and use the AI assistant for guidance and form correction.
3. **System Administrator (Admin):** An employee or developer with privileged access. Their goal is to manage the platform's content, users, and ensure its smooth operation.
4. **Unregistered Visitor:** A user who has not created an account. They can only view marketing pages and the registration/login page.