Capstone Project: 360 Degree Fitness
An AI-Powered Fitness Platform
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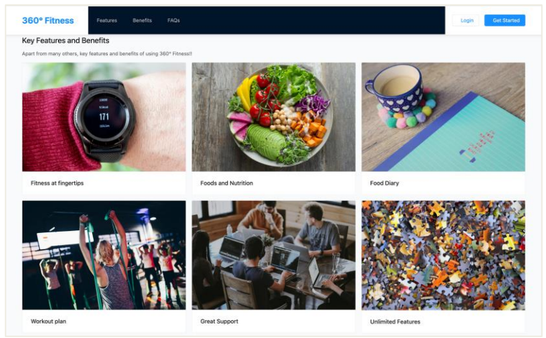
Introduction

Problem Statement

Staying on top of fitness and nutrition is challenging with so many apps and trackers available - yet none offer a truly integrated solution. Users struggle with fragmented data, lack of real-time tracking, and minimal personalized coaching. There's a clear need for an all-in-one platform that combines AI-driven guidance, real-time tracking, and holistic health insights.



Our Solution

360 Degree Fitness is an advanced AI-powered platform that delivers personalized fitness programs encompassing workout plans, weight management, progress tracking, and tailored recommendations. At its core, the system leverages Google's Gemini Model to enable intelligent, multimodal data processing. This fusion of AI-driven insights and personalized tools offers users a dynamic, holistic approach to health and wellness.

Methodology

System Architecture & Technology Stack

[1] Frontend: **React.js** SPA styled with Ant Design

[2] Backend: **Node.js / Express** server handles API routing, JWT authentication, session management

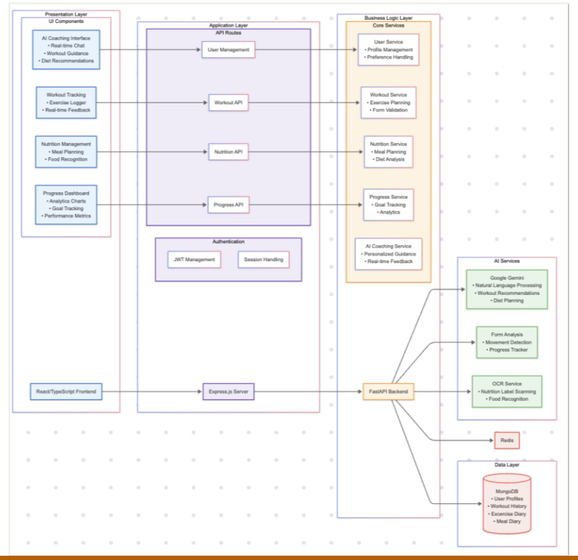
[3] Business Logic: **Python FastAPI** handles **AI-based** personalization and external API integration

[4] Database: **MongoDB** stores user profiles, history, preferences, and real-time fitness data

[5] AI Services & Integrations
- Gemini API for chat-based coaching & smart recommendations
- Gemini Vision API for image recognition (e.g., food, exercises)
- Tesseract OCR for parsing nutrition labels from packaging
- AI Recommendation Engine for program matching

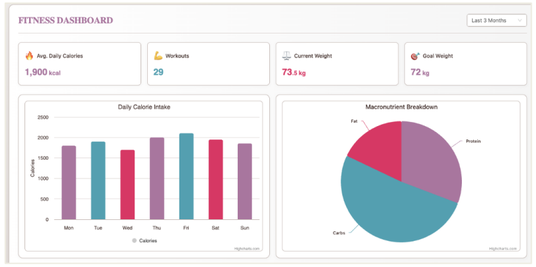
Methodology

See the below system diagram for complete architecture overview.



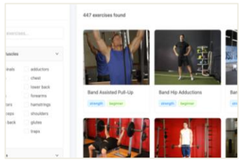
Key Features

[1] Personalized Fitness Dashboard: Provides users with a clear view of their fitness journey, displaying key metrics like daily calorie intake, weight progress, and nutrient breakdown. The dashboard updates in real time to track progress toward fitness goals.



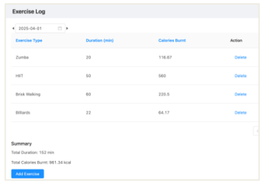
[2] Workout Suggestions: The platform suggests personalized workouts based on user preferences, difficulty levels, and targeted muscle groups. With over 1000 exercises available, users can filter

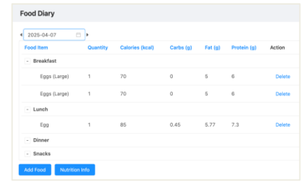
Key Features



by strength, stretching, and other categories to find exercises that suit their goals and fitness level.

[3] Exercise Diary: The platform allows users to log and track their workouts with detailed logs, including exercise type, duration, and calories burned. This helps users monitor their physical activities, adjust their fitness plans, and keep a record of progress over time. The Exercise Diary provides an easy-to-use interface for users to add and delete workout entries.





[4] Food Diary: Users can log their meals through the Food Diary, tracking food items, quantity, calories, carbs, fats, and proteins. This feature helps users stay on top of their nutrition by providing detailed daily records of their intake. The app also offers the ability to add food and view nutritional information, making it easy for users to track their diet alongside their fitness activities.

[5] Dynamic Progress Tracking: Real-time updates on weight progress and calories burned allow users to monitor their journey. The system adapts to users' changing needs and goals, offering real-time suggestions for workouts and meals.

[6] AI Chatbot / Real-Time AI Feedback: The system offers immediate feedback on user input, adjusting fitness and nutrition suggestions based on progress data. This helps users stay on track with their goals and receive timely recommendations.

[7] Food Image Analysis with OCR and Google Vision: Users can upload food images for the AI to analyze. Beyond just food analysis, the AI provides a breakdown of the meal's nutritional composition, helping users understand the balance of fats, carbs, and proteins in their diet.

[8] AI-Powered Health Insights: The platform uses Google Gemini to analyze not just fitness and nutrition data but also integrate other health-related data points (e.g., sleep, mental wellness) to provide holistic health insights. This could help users balance their physical health with mental and emotional well-being, offering personalized tips for overall wellness.

Future Work & Improvements

[1] AWS Deployment: Currently, the app is containerized using Docker for local testing and deployment. The next step is to deploy the app on AWS, which will offer improved scalability, fault tolerance, and performance.

[2] Mobile App Version: Currently, the platform is a web app. A dedicated mobile app is in development to provide users with even greater convenience for tracking fitness, logging meals, and interacting with the AI while on-the-go. This will make it easier for users to interact with the platform anytime, anywhere.

[3] Local Language Model (LLM) Integration: The LLM could be used for personalized fitness coaching, real-time meal suggestions. With LLM, the platform can function more autonomously, offering offline capabilities and reduced dependency on cloud-based services, thus improving user privacy and responsiveness.

[4] Voice Command Integration: A voice assistant can be integrated into the platform, enabling users to log meals, track workouts, and get fitness advice without needing to interact with the screen. This feature would make the app more hands-free and convenient, especially during workouts or meal prep.

Summary/Conclusions

360 Degree Fitness successfully demonstrates the integration of advanced AI technologies with traditional fitness tracking, creating a comprehensive health management platform. By harnessing the power of Google's Gemini AI and a robust MongoDB architecture, the platform provides personalized fitness coaching, real-time health monitoring, and data-driven insights. This integration allows for a highly tailored user experience that adapts to individual fitness needs. The project highlights the growing potential of AI-assisted wellness solutions, paving the way for the future of intelligent health management and personalized fitness journeys.

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