FITMATE

PROBLEM STATEMENT

Many individuals struggle with maintaining proper exercise form, leading to ineffective workouts, increased injury risks, and slower progress. Traditional fitness solutions, such as pre-recorded workout videos and wearable fitness trackers, fail to provide real-time posture correction and dynamic movement analysis. Without proper feedback, users may unknowingly develop incorrect form habits that can cause muscle strain, joint stress, and long-term injuries. Additionally, personal trainers, while effective, are not always affordable or accessible to everyone. This highlights the need for a real-time, AI-powered solution that can assist users in maintaining correct exercise form without requiring additional hardware or human supervision.

PROJECT OVERVIEW

FitMate is an AI-driven real-time fitness tracking system designed to provide instant feedback on exercise form and movement accuracy. Using computer vision techniques, pose estimation, and angle-based analysis, FitMate helps users correct postural misalignments while performing push-ups, squats, planks, and shoulder presses. The system is completely web-based, eliminating the need for wearable sensors or additional devices. By leveraging MediaPipe and OpenCV, FitMate ensures that users can train more effectively, count only valid reps, and reduce the risk of injuries, making workouts safer, smarter, and more structured.

SOLUTION OFFERED

FitMate is a real-time form validation and rep-counting system that provides users with instant exercise feedback using AI-based posture tracking. The system includes:

- Live Video Tracking: Uses a webcam to monitor the user's body movements in real time.
- Pose Estimation & Angle Calculation: Analyzes joint positions and angles to ensure correct movement execution.
- Instant Form Correction Feedback: Alerts users when their posture is incorrect and provides visual cues for adjustments.
- Automated Rep Counting: Ensures that only properly executed repetitions are counted to improve workout accuracy.
- Web-Based Accessibility: FitMate operates entirely in a browser, eliminating the need for expensive fitness wearables or dedicated hardware.

WHO ARE THE END USERS?

- Home workout enthusiasts who want structured, real-time feedback.
- Gym-goers looking to perfect their form and track progress.
- Personal trainers who need a tool to remotely monitor multiple clients.
- Rehabilitation patients who require posture correction for safe recovery.
- Athletes and fitness professionals aiming for injury prevention and better performance.

TECHNOLOGY USED TO SOLVE THE PROBLEM

- MediaPipe: Detects and tracks body landmarks to analyze movement.
- OpenCV: Processes live video feeds and assists in movement analysis.
- NumPy: Performs precise angle calculations to ensure correct posture detection.
- Python: Used for real-time data processing, movement analysis, and feedback generation.
- Web-Based Interface: Eliminates the need for installations, allowing users to access FitMate via a simple web browser.