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-powered real-time fitness tracking system** that provides **instant feedback on exercise form and accuracy**. Utilizing **computer vision techniques, pose estimation, and angle-based analysis**, FitMate helps users **correct misalignments** while performing **push-ups, squats, planks, and shoulder presses**. The system is entirely **web-based**, eliminating the need for **wearable sensors or additional hardware**. By leveraging **MediaPipe and OpenCV**, FitMate ensures that users can **train more effectively, count only valid repetitions, minimize injury risks, and make 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

### ****Computer Vision & AI****

### **MediaPipe:** Detects and tracks body landmarks to analyze movement.

### **OpenCV:** Processes live video feeds and assists in movement analysis.

### ****Mathematical Computation****

### **NumPy:** Performs precise angle calculations to ensure correct posture detection.

### ****Software & Deployment****

* **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.