AI Yoga Pose Detection & Healthcare System

Full One-Page AI + Computer Vision Case Study

Overview

Built a real-time AI-powered yoga pose detection system that analyzes human posture from live video. The system provides instant corrective feedback to improve pose accuracy, enhance practice quality, and reduce the risk of injury using computer vision and similarity algorithms.

Problem → Solution

Incorrect yoga posture can cause strain and long-term injuries. Traditional guidance lacks real-time correction. This system uses pose detection and cosine similarity to compare user posture against ideal pose landmarks and generate instant, personalized feedback.

Technology Stack

Computer Vision	YOLO Pose Detection Model
Posture Matching	Cosine Similarity Algorithm
Backend Services	Node.js & MongoDB
Healthcare Logic	Pain Suggestion & Safety Service
Data Tracking	User Progress & Session History

System Workflow

- Live video input processed by YOLO model
- Human pose landmarks detected in real time
- Cosine similarity compares posture with ideal pose
- Instant corrective feedback displayed to user
- Pain suggestion service recommends safe adjustments
- User progress stored and analyzed in MongoDB

Challenges & Debugging

Faced challenges in achieving accurate landmark detection under varying lighting conditions, optimizing real-time performance, and tuning similarity thresholds. Resolved these through model tuning, frame optimization, and iterative testing.

Outcome & Skills Gained

- Accurate real-time pose detection and classification
- Personalized feedback improving posture correctness
- AI-driven healthcare-focused application design
- Hands-on experience with computer vision pipelines