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AI Based Body Mapping and Exercise Monitoring System

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Abstract: *This paper presents an AI-based body mapping and exercise monitoring system that performs real-time posture analysis using computer vision techniques. The system employs deep learning–based human pose estimation to detect skeletal landmarks from a live camera feed without the use of wearable sensors. Joint angles are computed from selected landmarks to evaluate body movements and identify exercise-specific postures. The proposed framework supports exercises such as squats and push-ups by analyzing critical joint angles and classifying movements into upward and downward stages using predefined thresholds. Accurate repetition counting is achieved while minimizing false detections. Additionally, the system provides real-time visual and textual feedback to guide users toward correct exercise form. The approach is marker-less, cost-effective, and hardware-independent, requiring only a standard camera. Experimental results indicate reliable real-time performance, making the system suitable for home fitness training and preliminary rehabilitation monitoring applications.*

Keywords: Human Pose Estimation, Body Mapping, Exercise Monitoring, Computer Vision, Joint Angle Analysis, Real-Time Posture Analysis

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