



# Enhancing deadlift training through an artificial intelligence-driven personal coaching system using skeletal analysis [

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text (article)

Analítica

This paper presents an innovative AI-driven personal coaching system designed to enhance deadlift training through advanced skeletal analysis and deep learning techniques. The proposed system employs the PoseNet model to capture and analyze real-time video feeds, extracting keypoint coordinates and skeletal angles to monitor user posture and movements accurately. Utilizing Local Histograms of Oriented Gradients (LHOG) and Local Histograms of Optical Flow (LHOF) methods, the system performs comprehensive feature extraction, assessing both static and dynamic aspects of the exercise. The deep learning model, trained on an extensive dataset of correctly and incorrectly performed deadlifts, classifies the correctness of the exercise with high accuracy, providing real-time feedback and personalized recommendations to users. This immediate corrective feedback facilitates prompt adjustments, reduces injury risk, and promotes proper technique, enhancing the overall efficacy of strength training. The system's ability to offer user-specific feedback, tailored to individual body structures and movement patterns, ensures relevance and effectiveness in diverse training environments. Practical applications of this system span gyms, rehabilitation centers, and home settings, making it a valuable tool for personal trainers and physiotherapists. While the study demonstrates significant potential, it also identifies areas for future research, including algorithm refinement, dataset expansion, and integration of additional metrics and technologies. Overall, the proposed system represents a substantial advancement in exercise monitoring and improvement, contributing to the broader field of AI-driven fitness and health technologies, and paving the way for safer and more effective strength training routines.

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