AI-powered home workout assistant: Real-time pose estimation and repetition counting for exercises

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Correct exercise posture is crucial for achieving maximum workout effectiveness and injury prevention. On the other hand, most people do not have access to professional physical trainers who can give them real-time guidance and supervision. This research study suggests an intelligent exercise assistant app that implements a camera-based method to recognize human poses while exercising. This system utilizes Google's MoveNet pose estimation model to locate 17 key points of the user in real time. A sequence-based LSTM classification model is then used to interpret these key points and to decide which exercise has been performed and if it is executed correctly or not. Depending on the classification, the program will give the user, possible actions to fix the mistake in the posture and form. The dataset for training purposes contains key point sequences taken from workout videos that are labeled with correct and incorrect postures. Experimental findings show that this developed AI based system can correctly identify various types of exercises and also recognize the incorrect poses without any extra sensors. This low-cost AI-powered virtual coaching tool can be accessed on smartphones and is therefore more accessible and scalable. This research indicates the opportunity of utilizing real-time pose estimation and deep learning in combination, to enable fitness training that is safe and more efficient for those without professional supervision.

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