基於骨架偵測之體感動作辨識系統

A Body Motion Recognition System based on Skeleton Detection

李棟良 曾郁凱 詹馥瑄

Dong-Liang Lee **Yu-Kai Tseng** **Fu-Hsuan Chan**

吳孟庭 劉孟杰

Meng-Ting Wu **Meng-Jie Liu**

銘傳大學電腦與通訊工程學系

Department of Information and Telecommunications Engineering,
Ming Chuan University

摘要

近年來科學文獻證實重量訓練比起傳統的有氧運動來的更有效率，漸漸的選擇去健身房運動的人越來越多，然而這些重量訓練只要姿勢不正確就會對關節造成莫大的壓力，這樣不僅沒有鍛鍊到反而讓自己受傷。本研究利用人體關節點偵測系統 OpenPose 和鏡頭的拍攝來偵測人體軀幹和關節點位置。利用相似性匹配的方法來計算使用者的關節點和標準動作的參數，找出錯誤的地方，便可以在訓練時確保動作的正確，就像一位健身教練在旁邊指導一樣。經實際測試我們的方法可成功地針對使用者的錯誤動作加以糾正並給予評分。

關鍵字：OpenPose、動作辨識、關節點辨識、動態時間校正

Abstract

In this research, we use OpenPose and lens to detects the position of the human torso and joint points. Firstly, each action is captured by the lens, the joint coordinates of each frame are calculated through the OpenPose, and these joint coordinate data are then replaced by vectors between joint points. Secondly, similarity between real action and standard action is determined by the angle relationship of the two vectors and then the problem of inconsistency in the single stroke time of each user is corrected by DTW. Finally, the incorrect part of the user's action in the video is remarked and the correct action is displayed at the same time so you can make sure whether the action is correct or not when doing weight training. Experimental results show that our system can be used successfully on correcting and scoring user's actions.

Keywords: OpenPose, motion recognition, computer vision, joint points identification , Dynamic Time Warping (DTW)