# 創新應用擴增實境與動作辨識技術於重量訓練運動

# Innovative Application of the Augmented Reality and Motion Recognition Technology in Weight Training Exercises

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Weight training (WT) is a popular exercise worldwide, and have lots of benefits for human body. However, the correct techniques and professional guidance are the most important part for the success of WT. Therefore, the purpose of this project was to develop a weight training (WT) guidance system with the functions of supporting the augmented reality (AR) and motion recognition (MR) technology on the intelligent mobile devices.

In our field testing, a well-trained weight lifter was volunteered as our model for the preparing of AR in the training room. The AR2VR software package was utilized to record the demonstration of 3 different lift styles as showed on the below Fig. 1.


Fig. 1 Experimental setting for AR capture.

In the meantime, we also collect MR information by the Microsoft Kinect™ v2 (30 fps), which showed in the below as Fig. 2,

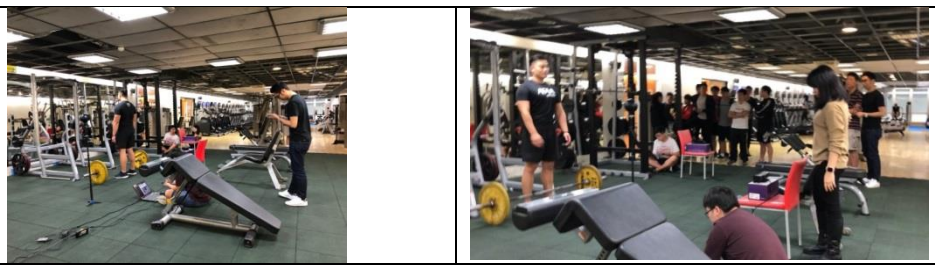
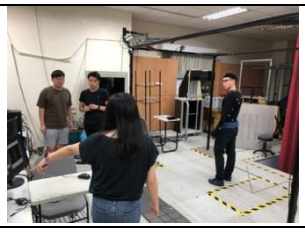


Fig. 2 Experimental setting for AR capture.

In the following laboratory testing, the Natural Point, Optical Motion Tracking System was used to verified the correctness of the joint angular data which collected by the Microsoft Kinect™ v2 (Fig 3) during the weight lift movement (Fig 4).



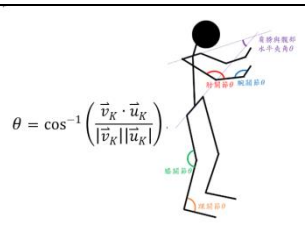



Fig 3. The used of Microsoft Kinect™ v2 and Optical Motion Tracking System

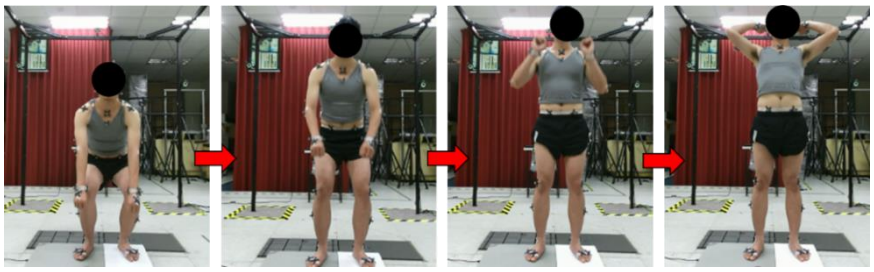


Fig 4. Joint angular data were collected during the weight lifting.

From the angular data which collected from the laboratory, we analysed and calculated the changing of the angular degree and the discrepancy bilateral joint, which also showed on the Fig 5.

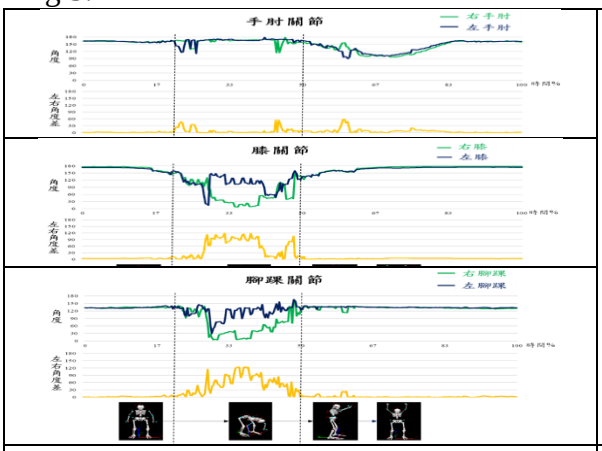



Fig 5. The change of joint angular

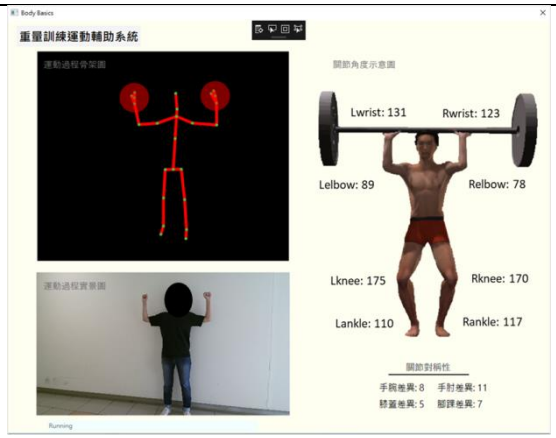



Fig 6. Visual information for user friendly

In order for easy and friendly operation, C+ was used to creative a visual information as Fig 6, which provide the body segment movement and the joint angular changing during the weight lifting.

**References**

Lloyd, R.S. et al. (2014). Position statement on youth resistance training: the 2014 International Consensus. Br J Sports Med, 48(7), 498-505.

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