

## Preliminary Investigation of an Innovative Digital Motion Analysis Device for Badminton Athlete Performance Evaluation

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### ABSTRACT

Badminton is a sport that combines several different physical aspects. At a professional level, the sport demands excellent fitness criteria namely the player's aerobic stamina, agility, strength, speed as well as precision. This study fundamentally entails the development of an innovative training system that incorporates technology that could improve the athlete's performance. Although existing motion tracking technology can provide reliable and accurate tracking results, nonetheless, the product cost and complexity keeps them away from being employed in most sports. This investigation involves the comparison between Kinect Technology and inertial measurement unit (IMU). The kinematic movement of the arm from wrist until shoulder was observed in this study for the purpose of investigating the difference between the acceleration of skeleton detected by the Kinect motion tracking and a low-cost IMU. The results obtained were found to be promising, and it is important in enabling pattern recognition of different badminton strokes in the next stage of the study. The movement of the right-hand wrist is tracked by Microsoft Kinect that can track the skeleton of the player whilst the IMU that measures the acceleration is attached at the right-hand wrist. Although the acceleration of the wrist may readily be obtained from the IMU, the acceleration from Kinect may only be obtained through mathematical manipulation. It was found that the accelerations of the upper limb movement from both IMU and Kinect demonstrated good agreement.

**KEYWORDS:** Kinect; motion tracking; IMU; kinematics

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