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A Low Cost Motion Analysis System Based on Kinect

Jonathan Michael Cardinale
Cleveland State University, J.CARDINALE@csuohio.edu

Tracy N. Jennemann
Cleveland State University, T.JENNEMANN@csuohio.edu

Vitaliy Sinyuk
Cleveland State University, V.SINYUK@csuohio.edu

Sam Kenji Yokoyama
Cleveland State University, S.YOKOYAMA@csuohio.edu

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A Low Cost Motion Analysis System Based on Kinect

Fenn College of Engineering

Student Researchers: Tracy Jennemann; Sam Yokoyama;
Vitaliy Sinyuk; Jonathan Cardinale

Faculty Advisors: Wenbing Zhao; Nigamanth Sridhar; Ann Reinthal

Abstract

The project focused on the validation of using the Kinect sensor to build a low cost motion analysis system for physical therapy and rehabilitation, and the identification of the types of the motions that cannot be captured well by the Kinect sensor and are in need of inertial sensors. The validation of the Kinect sensor accuracy is done by comparing the joint positions reported by Kinect and those captured by an 8-camera high-end motion analysis system installed in the Motion Analysis Lab at the School of Health Sciences. The results show that the Kinect sensor reports very accurate positions for moving joints and relatively accurate positions for stationary joints. The use of aggressive smoothing technique can improve the accuracy of the stationary joints positions. However, for motions involving subtle rotations, it is beyond the capability of the Kinect sensor and the inertial sensors have to be used. This limitation is important because to characterize the quality of the exercise, it is essential to identify places where transverse plane rotation is needed or should be avoided.