

THE DETECTION OF POTENTIALLY HARMFUL HAND POSTURES IN PIANISTS USING KINECT DEPTH IMAGES

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ABSTRACT

Pianists who practice hours per day may have a risk for developing playing-related musculoskeletal injuries if they do not play with proper hand alignment. In order to detect the harmful, misaligned hand postures (such as wrist flexion and extension, knuckle collapse, and ulnar and radial deviation) and analyze the injury risk, a motion capture system was developed using the Microsoft Kinect depth camera. Data were captured on professional pianists and student pianists from the School of Music, University of Missouri. Hands were segmented out from the raw depth images and landmarks were then detected. Features were then extracted from the 3D point clouds reconstructed from the Kinect depth information and used for hand posture evaluation and classification. An interface was developed to review the logged data; ground truth was provided by an expert pianist using the interface to manually label the hand sample to be in a certain class. The labeled samples were then used to train classifiers. Results are included for different hand postures of 15 participating pianists.