

DEVELOPMENT AND VALIDATION OF AN INTERACTIVE REMOTE PHYSICAL THERAPY SYSTEM

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ABSTRACT

We present an Interactive Physical Therapy System (IPTS) for remote quantitative assessment of clients in the home. The system consists of two different interactive interfaces connected through a network, for a real-time low latency video conference using audio, video, skeletal, and depth data streams from a Microsoft Kinect. To test the potential of IPTS, experiments were conducted with 5 independent living senior subjects in Kansas City, MO. Also, experiments were conducted in the lab to validate the real-time biomechanical measures calculated using the skeletal data from the Microsoft Xbox 360 Kinect and Microsoft Xbox One Kinect, with ground truth data from a Vicon motion capture system and a NeuroCom forceplate system. Good agreements were found in most of the validation tests. The results show potential capabilities of the IPTS system to provide remote physical therapy to clients, especially older adults, who may find it difficult to visit the clinic.