

Title : Evaluation of the Microsoft Kinect and KinectLAB software as a clinical assessment tool of functional motor abilities.

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The whole research project takes place in the context of evaluating the functional motor abilities of a person affected by a neuromuscular disease (NMD) with the Motor Function Measure (MFM) quantitative scale. The final aim is to propose more low-cost and easy-to-use technology precise and reproducible tools to be used as outcome measure in clinical trial. In our context, tools are defined as the combinations of technological facilities and their software. Consequences will be to avoid the hazardous characteristic of the human evaluation and increase patients' compliance for the evaluation.

Authors propose to implement the Microsoft Kinect, which presents interesting measurement advantages in the context described: inexpensive, non-invasive, non-intrusive and allowing rapid data collection. The first step was to develop a software named KinectLAB that allow to capture the Kinect digital skeleton and particularly anatomical joints of a patient. Then, experiments were proposed to evaluate if the Kinect with KinectLAB software can be used to obtain a digital skeleton even in the very specific and restrictive conditions of use imposed by users in wheelchairs and clinical services facilities. The results shown that KinectLAB was able to detect one user for three hundred test in manual/electric wheelchair and limited space. Moreover, segmental length measurement dispersions of the digital skeleton are low and stable for a user posture with outstretched arms. Finally, experiments were proposed to adjust the KinectLAB computing algorithm to measure the activity limitation in this research context. The first experiments made on 5 items from the MFM with 3 volunteers' patients (2 with muscular dystrophy and 1 with congenital myopathy) showed that the score generated by our computing algorithm and the practitioners' evaluation score are exactly the same. Works are in progress specifically on Spinal Muscular Atrophy patients to develop a usable tool in clinical trials.