

Stereotypical Motor Movement Recognition Using Microsoft Kinect with Artificial Neural Network

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Abstract : Autism spectrum disorder is a complex developmental disability. It is defined by a certain set of behaviors. Persons with Autism Spectrum Disorders (ASD) frequently engage in stereotyped and repetitive motor movements. The objective of this article is to propose a method to automatically detect this unusual behavior. Our study provides a clinical tool which facilitates for doctors the diagnosis of ASD. We focus on automatic identification of five repetitive gestures among autistic children in real time: body rocking, hand flapping, fingers flapping, hand on the face and hands behind back. In this paper, we present a gesture recognition system for children with autism, which consists of three modules: model-based movement tracking, feature extraction, and gesture recognition using artificial neural network (ANN). The first one uses the Microsoft Kinect sensor, the second one chooses points of interest from the 3D skeleton to characterize the gestures, and the last one proposes a neural connectionist model to perform the supervised classification of data. The experimental results show that our system can achieve above 93.3% recognition rate.

Keywords : ASD, artificial neural network, kinect, stereotypical motor movements

Conference Title : ICMVIPPA 2016 : International Conference on Machine Vision, Image Processing and Pattern Analysis

Conference Location : Stockholm, Sweden

Conference Dates : July 11-12, 2016