Self-Stimulatory Behavior Detection Using Wearable Sensors for Children With Autistic Spectrum Disorder

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An affordable, user-friendly and reliable infrastructure that supports evidence based tools for health assessment of children with Autistic Spectrum Disorder (ASD) has been developed. This system can detect the behaviors of children at various stages of autism and enables the therapist and parents to monitor, assist diagnosis and therapies of autistic children. The system incorporates 2 different sensor platforms which are wearable and static. The wearable system consists of a 3-axis accelerometer, small micro processor and a Bluetooth module to transmit data to the base station. This wearable device integrates these 3 modules to a customized Printed Circuit Board (PCB) which can be worn as a cuff or could be sewed into the sleeves of a child's shirt. The static sensor is composed of an audio sensor and a webcam which detects the sound/speech and captures video data of the subject within the room. Using this sensor system, we are able to achieve the necessary information for assessment and therapy in autism research. Based on the data collected and our preliminary analysis, we were able to detect and recognize several self-stimulatory behaviors of a child with autism. The device allows for a continuous monitoring of the activities and self-stimulatory behaviors. It benefits both therapists and parents by helping them to better understand the behaviors of an autistic child and it will also enable early diagnosis of ASD.

