A Prototype for a Smart School Uniform to Manage Stress in Autistic School Children

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Recent research has shown that anxiety and poor stress management are common concerns in children with Autism Spectrum Disorders (ASD). This apparently occurs in the school context where the interaction between the autistic child and other students is intrusive. Any anxiety attack interrupts the educational process causes panic to other students and increases the worries of the autistic children. The goal of the current study is to use wireless sensor technologies to develop a smart school uniform to monitor the physiological and behavioral markers of autistic students in real time in order to measure the mental stress level. Through embedded leveraging specialized sensors measuring key patient parameters and sharing them with healthcare providers, the design and delivery of just-in-time interventions (JITI) is enabled and adults can prevent anxiety attacks from happening. This paper presents the prototype design of a real-time embedded device that accurately measures heart rate, electrocardiography (ECG) and behavioral markers; namely hand flapping and rocking, which is then used by the intelligent decision-making module to determine the stress level of the autistic child. The prototype was designed using Arduino ESP8266 platform and tested with 10 actors to induce stress and act out autistic attacks. Initial results have shown that the device can detect and display the various stress signs efficiently. Such a device gives early warning of an imminent anxiety attack, help manage the attacks and continue providing school children with a safe learning environment.