Design and Development of an Alert Prototype to Assist People with Simple Motor Seizures Events Using Triaxial Micro-sensors

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Epilepsy is a chronic neurological disorder with different types of seizures, some of them characterized by involuntary recurrent convulsions, which have a great impact on the everyday life of the patients (Vergara et al., 2017). Authors Lockman (2011), Beniczky (2018) and Angelov (2019) presented a variety of monitors to detect seizures, however, their approaches are expensive, with issues in the identification of seizures and discomfort in patients, in terms of design and portability. The researchers proposed to build and test if a prototype created with triaxial microsensors is effective to detect, alert and monitor simple motor seizures events. An arm model was built with an oscillating multi tool that simulates the frequency (Hz) movements of muscle contractions during simple motor seizures events. The prototype was programmed with the Arduino Setup V3.0 to recognize seizures movements in frequencies that ranged from 20Hz to 50Hz from normal movements, and to respond with a repetitive emergency voice alert message as a monitoring action. The values and graphs generated by the device during the epileptic seizure simulations were detected and analyzed by the serial plotter in the application. Based on the data collected and the analysis, the hypothesis was retained. The device effectively detected and respond with the different types of frequencies that simulates the epileptic seizures. The researchers expect to continue this project to transform the prototype into a wireless printed circuit board to be used in daily routines and send emergency and location alarms to mobile devices of patient's relatives.