Classification of EEG Signal for Body Earthing Application

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ABSTRACT

Stress is the way of our body reacts to the threat and any kind of demand. Stress happened when your nervous system are released the stress hormones including   adrenaline and cortisol that lead to emergency responds of the body. Body earthing technique is used to resolve this problem. Body earthing is a method that used for   neutralize positive and negative charge in human body by connected to the earth. EEG signals can be used to verify the positive effect of body earthing. This project focuses on the classification of EEG signals for body earthing application. First, EEG signals from human brainwaves were recorded by using Emotive EPOC Headset, before and after body earthing for the 30 subjects. Alpha band and Beta band were filtered by using Band-pass filter 'Butterworth'. After filtering, the threshold of signal amplitude was set in the range of   -100 μV to 100 μV in order to remove the noise or artifact. For feature extraction, Short-time Fourier Transform (STFT) and Continuous Wavelet Transform (CWT) were used. Lastly, the Artificial Neural Networks (ANN) model is employed to classify EEG signal taken from samples, before and after the body earthing. Number of neuron chosen for this project is 55 with the mean square error 0.0023738. Result showed that Alpha band signals before body earthing are low compare to after body earthing. While, for the Beta band signals, the result before body earthing is high compare to after body earthing. Alpha band signals increased shows that subjects are in relax state, while the Beta band signals decreased shows sample in stress state. These results imply for both feature of STFT and CWT. Based on confusion matrix, the result for the ANN classification yields that 86.7% of classification are correct.

Keywords: Classification, EEG signal, Body Earthing, STFT, CWT