

The Analysis of Brain Response to Auditory Stimuli through EEG Signals' Non-Linear Analysis

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Abstract : Brain activity can be measured by acquiring and analyzing EEG signals from an individual. In fact, the human brain response to external and internal stimuli is mapped in his EEG signals. During years some methods such as Fourier transform, wavelet transform, empirical mode decomposition, etc. have been used to analyze the EEG signals in order to find the effect of stimuli, especially external stimuli. But each of these methods has some weak points in analysis of EEG signals. For instance, Fourier transform and wavelet transform methods are linear signal analysis methods which are not good to be used for analysis of EEG signals as nonlinear signals. In this research we analyze the brain response to auditory stimuli by extracting information in the form of various measures from EEG signals using a software developed by our research group. The used measures are Jeffrey's measure, Fractal dimension and Hurst exponent. The results of these analyses are useful not only for fundamental understanding of brain response to auditory stimuli but provide us with very good recommendations for clinical purposes.

Keywords : auditory stimuli, brain response, EEG signal, fractal dimension, hurst exponent, Jeffrey's measure

Conference Title : ICBI 2015 : International Conference on Biosignals and Imaging

Conference Location : Prague, Czechia

Conference Dates : March 23-24, 2015