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Electroencephalography (EEG) analysis of alcoholic and control subjects using multiscale permutation entropy

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Brain electrical activity as reflected in Electroencephalography (EEG) have been analyzed and diagnosed using various techniques. Among them, complexity measure, nonlinearity, disorder and unpredictability play vital role due to nonlinear interconnection between functional and anatomical subsystem emerged in brain in healthy state andduring various diseases. There are many social and economical issues of alcoholic abuse as memory weakness, decision making, impairments and concentrations etc. Alcoholism not only defect the brains but also associated with emotional, behavior and cognitive impairments damaging the white and gray brain matters. A recently developed signal analysis method i.e. Multiscale Permutation Entropy (MPE) is proposed to estimate the complexity of long-range temporal correlation time series EEG of Alcoholic and Control subjects acquired from University of California Machine Learning repository and results are compared with MSE. Using MPE, coarsed grained series is first generated and the PE is computed for each coarsed grained time series against the electrodes O1, O2, C3, C4, F2, F3, F4, F7, F8, Fp1, Fp2, P3, P4, T7 and T8. The results computed against each electrode using MPE gives higher significant values as compared to MSE as well as mean rank differences accordingly. Likewise, ROC and Area under the ROC also gives higher separation against each electrode using MPE in comparison to MSE.

Biography

Lal Hussain has completed his MCS degree in Computer Science from University of Azad Jammu and Kashmir, Pakistan in 2005 and MS in Communication and Networks from Iqra University, Islamabad, Pakistan in 2012 with Gold medal. Mr. Hussain enrolled in Ph. D at Department of CS & IT, University of Azad Jammu and Kashmir, Muzaffarabad, Pakistan in 2012. He is working as Assistant Director Quality Enhancement Cell, University of Azad Jammu and Kashmir since 2006. His responsibilities includes to arrange trainings for faculty members, assist program teams and assessment team in preparing self-assessment reports, preparing institutional performance evaluation data, program assessment, research activities etc. His research interest includes Biomedical Signal Processing and Engineering on Biomedical and Physiological signals with concentration on analysis of Time- Frequency based techniques including wavelet coherence, Bicoherence, synchronization, directionality, coupling, cross frequency coupling, Bayesian inference, information theory and entropy based techniques Neural Networks and Machine Learning classification problems etc. He has published more than 10 research papers in reputed Journals based on above techniques and has completed few research projects in this area.

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