Subband Spectral Complexity Distance for Cortical Health Evaluation and Monitoring in Ischemic Brain Injury

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Abstract:

A quantitative electroencephalogram (qEEG) index for the evaluation and monitoring of cortical health in ischemic brain injury is presented. The proposed qEEG index, called the subbands spectral complexity distance (SSCD), measures the distance between a vector of subbands spectral complexities computed from the investigated EEG and a one computed from normal EEG. For the computation of the SSCD, the spontaneous power spectral density of the EEG signal is estimated using the time-varying autoregressive (TV-AR) model, decomposed into subbands and the spectral complexity of each subband is computed. Results of evaluating human EEG data are presented to show the usefulness of the proposed SSCD index. It is shown that the index increases during the time-segments of ischemic brain injury while decreases during the normal and recovery segments. This can be explained by the fact that the ischemic brain injury may increase the irregularity of the EEG signal and therefore the power spectral density becomes more complex with ischemic brain injury.

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