Statistical Detection of Phase Transitions in EEG via Microstate Analysis and Sequential Testing

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Abstract

We propose a statistical framework to detect latent phase transitions in EEG signals by combining microstate segmentation with sequential testing. Microstates offer a spatial decomposition of neural dynamics, while CUSUM-type statistics identify temporal changes in their structure. To reinforce the detection of transition points, we incorporate spectral analysis to capture deviations from stationarity in the frequency domain. This integration of spatial, temporal, and spectral features enables a rigorous, data-driven approach to identifying cognitive state shifts in meditation and resting-state EEG.

References

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