

Functional Communities in EEG Data from a Face ecognition Task

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The brain is a complex system with interconnected regions that communicate and interact to perform various cognitive functions. Network analysis provides a framework to study these interactions by representing the brain's regions as nodes and their connections as edges in a graph. In our research, we are interested in detecting functional communities and analyzing their variation across different conditions, subjects, and frequency bands. We utilized a publicly accessible dataset sourced from OpenNeuro. This dataset encompasses EEG, MEG, and MRI data obtained from 16 healthy adults engaged in a simple task while viewing images of familiar faces, unfamiliar faces, and scrambled face stimuli. While our project primarily centers on EEG data analysis, the methodologies and insights could potentially extend to encompass MEG and even MRI data. In this project, we use the debiased weighted Phase Lag Index (dwPLI) to detect the coordination among signals received by EEG electrodes. We have completed the first part of this project, which is to identify the functional communities across all participants and conditions for the alpha-beta frequency band.

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