

From signal to insight: Introduction to EEG data analysis

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EEG, or electroencephalography, is a non-invasive method used to record the electrical activity of the brain. This technique offers valuable real-time insights into brain processes but there are various approaches to analyze EEG signals, each serving a specific purpose. In this workshop, our focus will be on one of the conventional analysis methods called ERP analysis. We will explore how to use open-source software, EEGLab [1], to transform raw EEG signals into a collection of ERP components.

During the workshop, participants will delve into the intricacies of EEG analysis and gain a deeper understanding of the underlying principles. We will explore the significance of preprocessing steps in order to enhance the quality of EEG data and mitigate potential artifacts or noise. The workshop will cover various preprocessing techniques, such as artifact removal, filtering, and referencing, which play a vital role in preparing the EEG data for further analysis. Participants will learn how to identify and address common artifacts, such as eye blinks, muscle activity, and environmental interference, ensuring the reliability of subsequent analyses. Once the data is preprocessed, we will dive into ERP analysis, which focuses on extracting event-related potentials from the EEG signal. Through hands-on exercises, participants will have the opportunity to apply the knowledge gained and practice transforming raw EEG signals into ERP components.

By the end of the workshop, participants will not only possess a foundation in EEG preprocessing and ERP analysis but will also be equipped with practical skills to tackle the EEG signal analysis on their own.

References

[1] A. Delorme and S. Makeig, *J. Neurosci. Methods* (2004). DOI: [10.1016/j.jneumeth.2003.10.009](https://doi.org/10.1016/j.jneumeth.2003.10.009)