

NOVEL METHOD TO REMOVE ELECTRICAL STIMULATION ARTIFACTS IN NEURAL SIGNALS

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Value Proposition: *Software tool that uses a novel denoising method to remove electrical stimulation artifacts from electrophysiology data while preserving physiological signals.*

Technology Description

Researchers at Washington University in St. Louis have developed novel denoising method to remove electrical stimulation artifacts in neural signals with Linear Baseline-integrated Removal of Artifacts (LIBRA). Electrical stimulation is a commonly implemented modality in both clinical and research settings. The main drawback of electrical stimulation is that it introduces a stimulation artifact in electrophysiology data, making it hard to extract neural responses during the stimulation period. Current technologies and methods primarily attempt to remove stimulation artifacts only during the stimulation period and will introduce new artifacts to the data.

The LIBRA approach overcomes these limitations by performing interpolation on both non-stimulation and stimulation periods, thus maintaining relative changes in the data while eliminating the artifacts generated by LIBRA itself.

Stage of Research

In development

Publications

Xie T, Foutz TJ, Adamek M, Swift JR, Inman CS, Manns JR, Leuthardt EC, Willie JT, Brunner P. Single-pulse electrical stimulation artifact removal using the novel matching pursuit-based artifact reconstruction and removal method (MPARRM). *J Neural Eng.* 2023 Dec 27;20(6):066036. doi: 10.1088/1741-2552/ad1385. PMID: 38063368; PMCID: PMC10751949.

Applications

- Removal of electrical stimulation artifacts in neural signals

Key Advantages

- Interpolates data during both stimulation and baseline periods, ensuring consistency
- Conserves physiological effects better than other high-frequency artifact removal methods

- Offers flexibility with various interpolation methods such as linear interpolation
- Allows users to tailor artifact removal to the specific characteristics of their electrophysiological data

Patents

Patent application filed

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