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Implementation of Convolutional Neural Network for Artifact Removal from EEG Signals

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Artifacts that occur during the registration of electroencephalographic signals (EEG) pose a significant problem, hindering the analysis of these signals for medical diagnosis or brain-computer interfaces (BCIs). While some artifacts can be relatively easily removed, others, such as those related to muscle activity, are more challenging to eliminate. Continuous research is being conducted to discover methods for removing physiological artifacts resulting from the natural activity of the individuals. In this article, the authors propose a method for removing electromyographic (EMG) artifacts from EEG signals using convolutional neural networks (CNNs). To accomplish this, a method for augmenting EMG and EEG signals is proposed. The authors performed artifact removal tests using a trained CNN for both real and simulated signals. The obtained results indicate that the proposed method shows promising outcomes and enables effective removal of demanding artifacts, such as jaw clenching.

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