

Review of: "Artifact Subspace Reconstruction (ASR) for electroencephalography artifact removal must be optimized for each unique dataset"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

It is desirable to test the ASR method for rejecting artifacts. The current paper has a sound methodology, but the results fall short of expectations. First, the gold standard for assessing data rejection quality is inter-rater reliability (basically, several humans performing manual rejection). Another good metric is the number of trials necessary to obtain a significant effect (bootstrapping trials and computing statistics). The author used neither of these methods. The fact that the main ASR parameter should be above 100 for the current data to be comparable to manual rejection by one human expert is of interest. Still, it would probably not warrant a peer-reviewed publication.

Some other comments:

The author should release the data or perform their tests on data that are publicly accessible.

For ASR, mention the version of the `clean_rawdata` plugin

"Another drawback is that the infomax ICA can drastically alter the EEG signal when used to remove EOG artifacts ([Pontifex et al., 2017](#)). " This is for good reasons, so the artifacts are removed.

"For the full preprocessing pipeline, see the appendix." There is no appendix.

"As such, eyeblinks should be rejected prior to ICA for information theoretic techniques." This is an opinion that should be supported by data.

"Artifact subspace reconstruction (ASR)" This section is misleading because the author does not seem to use the reconstruction part of the ASR algorithm, only the rejection part (e.g., the data is never corrected, always rejected). This should be made clearer. Also, the author should make clear that "BurstCriterion" is the parameter that is optimized.

"The 'Ncomp' variable" With 128 channels, the author should probably use full rank decomposition (assuming there is enough data). It is usually considered bad practice to use PCA before ICA (Artori, F., Delorme, A., & Makeig, S. (2018). Applying dimension reduction to EEG data by Principal Component Analysis reduces the quality of its subsequent Independent Component decomposition. *NeuroImage*, 175, 176–187. <https://doi.org/10.1016/j.neuroimage.2018.03.016>)

“Multivariate autoregressive (MVAR) model fitting” This section is unclear as SIFT has several methods to assess the optimal model order. Also, these methods are visuals, and sometimes, there is no minimum. Which method was used?