



EEG preprocessing

CC SONAR++ METRIC

Steps

Name	Technique	Justifications
Filtering	• High-pass filter with a cut-off frequency at 1 Hz	Remove the DC component and slow wave drifts.
	• Low-pass filter with a cut-off frequency of 90 Hz	The upper limit of the frequency band of interest for the analysis.
	• Notch filter at 50 Hz	Remove the powerline interference.
Channels Spatial Interpolation	Spherical spline interpolation algorithm (Perrin F, 1989)	Remove and replace flat or noisy channels with interpolated signals based on the data from the remaining channels.
Re-referencing	Average reference	Eliminate some common noise to all channels and reduce lateralization bias.
Blind Source Separation	Independent Component Analysis (ICA)	Additional artifact removal (ocular, muscle, cardiac and residual artifacts).

EEG Features to compute Cognitive Load

Feature_EEG1 (Index of the task engagement indexes) - **Feature_EEG1** = $(\theta + \beta) / \alpha$

Feature_EEG2 (Power ratio between Theta and Alpha bands) **Feature_EEG2** = θ / α