Bad Electrode Detection

writeLaTeX

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1 Electrode Detection via Joint Probability

Algorithm 1 prob_badelec: Generate a probability distribution for each EEG electrode. Then, find the joint probability for each EEG electrode, and see how the joint probabilities compare. Remove probabilities that lie outside 3 standard deviations (later to be changed to a given threshold).

Input: EEG data $\mathcal{D}$ (format $electrode \times time \times trial$)
Output: Array of all bad electrode indices

1: **procedure** PROB_BADELEC($\mathcal{D}$)
2: $\mathcal{D}$ = reshape($\{\mathcal{D}\}$) ▷ Reshape 3 dim to 2 dim (electrode x (trial, time))
3: $\mathcal{P}$ = vector($numelectrodes$) ▷ Initialize prob vector to size of elec num
4: **for** $elec$ in $electrodes$ **do** ▷ iterate through elecs, get joint probs
5: $probdist$ = get_probdist($\mathcal{D}_{elec}$) ▷ generic prob dist algorithm
6: $jointprob$ = get_jointprob($\mathcal{D}_{elec}, probdist$) ▷ off of prob distribution, find joint probability
7: $\mathcal{P}_(elec)$ = $jointprob$ ▷ Put jointprob into prob array
8: $\mathcal{P}'$ = get_normdist($\mathcal{P}$) ▷ normal distribution of joint probs
9: $\mathcal{R}[i] = 1$ **if** $\bar{X}_{\mathcal{P}_{elec}} - \mu_{\mathcal{P}} > 3\tau$ ▷ Data from electrode i is more than 3 standard deviations away from data of all electrodes
10: **return** $\mathcal{R}$