

Comparison of Alpha Power obtained with Online vs Offline artifact correction for Real-time EEG/fMRI Neurofeedback

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Introduction

During EEG-fMRI neurofeedback (NF), the accuracy of the score is crucial for the performance and immersion of the subject. In a recent and novel real-time EEG correction that removes both the gradient and the pulse artifact. We wanted to establish its performance regarding the analysis of the alpha power that can be used for EEG-NF studies. The comparison has been done between this particular correction and an offline correction.

Methods

Eleven healthy young individuals participated in the EEG-fMRI study (motor-imagery task), on a 3T MRI system (Siemens) using an MR-compatible 32-channels EEG system (Brain Products). fMRI data were acquired using T2*-weighted 2D multi-slice EPI (2.2 mm isotropic voxels, $TR/TE = 1260/30$ ms, Flip Angle = 70° , SMS-3, GRAPPA-2) over 286 volumes. The calculation of the alpha power for every TR was performed using *bandpower* and *corr* for the Pearson correlation, both from Matlab.

Results

We found a high correlation between the alpha power time series ($Mean\ r=0.39$, $std=0.26$, $p<0.0001$), which relates that this novel real-time correction could be suitable for NF studies.

Acknowledgments

This project was funded by the Portuguese Foundation for Science and Technology (Fundação para a Ciência e Tecnologia) through FCT CEECIND/01073/2018, the LARSyS - FCT Project UIDB/50009/2020, the NeurAugVR project (PTDC/CCI-COM/31485/2017), and the MIG N2Treat Project (LISBOA-01-0145-FEDER-029675)

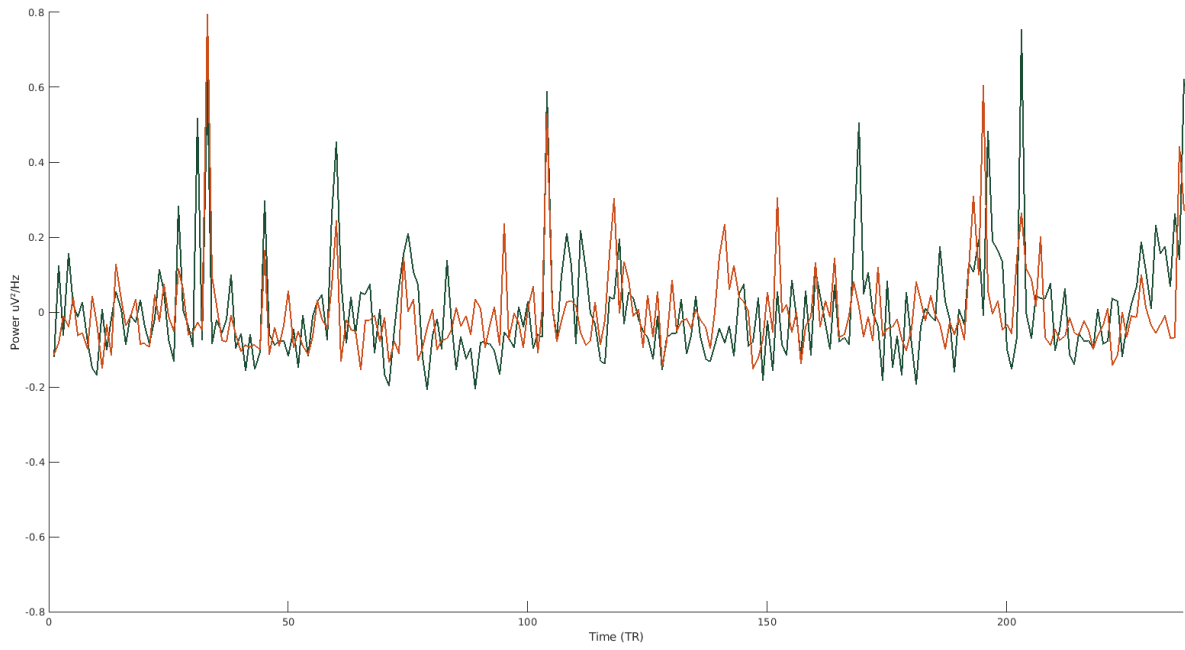


Figure 1. Alpha power from online correction and offline correction from a specific subject. High correlation can be found between online and offline correction across all subjects (Mean $r=0.39$, $std=0.26$).