Title: Signal refinement: principal component analysis and wavelet transform of visual evoked response

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Abstract: This study presents an analysis on Visual Evoked Potentials (VEPs) recorded mainly from the occipital area of the brain. Accumulation of segmented windows (time locked averaging), Coiflet wavelet decomposition with dyadic filter bank and Principle Component Analysis (PCA) of three stages were utilized in order to decompose the recorded VEPs signal, to improve the Signal to Noise Ratio (SNR) and to reveal statistical information. The results shown that the wavelet transformation offer a significant SNR improvement at around four times compared to PCA as long as the shape of the original signal is retained. These techniques show significant advantages of decomposing the EEG signals into its details frequency bands.