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IMPOSING INDEPENDENCE CONSTRAINTS TO THE CP-MODEL

Data-driven decomposition techniques (like Independent Component Analysis (ICA), Canonical Correlation Analysis (CCA), Canonical Decomposition/PARAFAC (CP)) received in the last decades an increasing amount of attention as an exploratory tool in biomedical signal processing as opposed to model-driven techniques. Recently, 'tensor-ICA', a combination of ICA and the CP model was introduced as a new concept for the decomposition of functional Magnetic Resonance data (fMRI) (Beckmann et al, 2005). The trilinear structure was in that study imposed after the computation of the independent components. We propose another algorithm to compute a trilinear decomposition with supposed independence in one mode. In this algorithm, independent component and trilinear structure constraints are imposed at the same time. We also show that this new algorithm outperforms the previously proposed tensor-ICA.

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