

Dimensionality Reduction Methods in Independent Subspace Analysis for Signal Detection

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ABSTRACT

In the last few years an important family of methods for single-channel signal separation has been developed using tools from time-frequency analysis. Given a mixture of signals $f = \sum_i f_i$, the task is to estimate the components f_i using specific assumptions on their time-frequency or statistical characteristics. A well known strategy, denominated *independent subspace analysis* (ISA), is to reduce the embedding dimension of the time-frequency representation of f , prior to the application of independent component analysis (ICA). In these methods, a standard strategy for dimensionality reduction is principal component analysis (PCA), but also nonlinear methods have recently been proposed. This talk provides insight into basic principles of ISA, where we compare different dimensionality reduction methods for single channel signal separation in the context of ISA. Our focus is on signals with transitory components, and the objective is to detect the locations in time where each individual signal f_i is activated.

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