

Resource Summary Report

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Blind Source Separation and Independent Component Analysis

RRID:SCR_002812

Type: Tool

Proper Citation

Blind Source Separation and Independent Component Analysis (RRID:SCR_002812)

Resource Information

URL: <http://perso.telecom-paristech.fr/~cardoso/guidesepsou.html>

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Description: Blind Source Separation and Independent Component Analysis (ICA) algorithms including: An efficient batch algorithm: JADE and Adaptive algorithms: relative gradient algorithms. Associated papers / documentation are included as well as thoughts on Multi-dimensional independent component analysis. * An efficient batch algorithm: JADE - For off-line ICA, an algorithm has been developed based on the (joint) diagonalization of cumulant matrices. "Good" statistical performance is achieved by involving all the cumulants of order 2 and 4 while a fast optimization is obtained by the device of joint diagonalization. JADE has been successfully applied to the processing of real data sets, such as found in mobile telephony and in airport radar as well as to bio-medical signals (ECG, EEG, multi-electrode neural recordings). The strongest point of JADE for applications of ICA is that it works off-the-shelf (no parameter tuning). They advocate using the code provided as a plug-in replacement for PCA (whenever one is willing to investigate if such a replacement is appropriate). The weakest point of the current implementation is that the number of sources (but not of sensors) is limited in practice (by the available memory) to something like 40 or 50 depending on your computer. The JADE algorithm was originally developed to process complex signals, motivated by applications to digital communications. Another implementation is now available which is tuned to process more efficiently real-valued signals. * Adaptive algorithms: relative gradient algorithms - For adaptive source separation, they have developed a class of equivariant algorithms. This means that their performance is independent of the mixing matrix. They are obtained as stochastic relative gradient algorithms. * Multi-dimensional independent component analysis - Performing ICA on ECG signals with the JADE algorithm, it was realized that an interesting extension of the notion of independent component analysis would be to consider an analysis into linear components that would be "as independent as possible" as in ICA, but would be "livin" in

subspaces of dimension greater than 1. This could be called "MICA" for Multi-dimensional Independent Component Analysis.

Abbreviations: ICA/BSS, BSS/ICA,

Synonyms: ICA / BSS, BSS / ICA, BSS and ICA

Resource Type: data processing software, source code, data analysis software, software resource, software application

Keywords: algorithm, analysis, blind, component, separation, signal, source separation, plugin, ecg, eeg, multi-electrode, neural recording, independent component analysis, equivariant algorithm, equivariant, relative gradient, multi-dimensional, matlab, octave, python, c, joint diagonalization, real-valued signal, complex-valued signal

Availability: Free, Freely available, Available for download

Resource Name: Blind Source Separation and Independent Component Analysis

Resource ID: SCR_002812

Alternate IDs: nif-0000-24771

Old URLs: <http://www.tsi.enst.fr/icacentral/index.html>

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Ratings and Alerts

No rating or validation information has been found for Blind Source Separation and Independent Component Analysis.

No alerts have been found for Blind Source Separation and Independent Component Analysis.

Data and Source Information

Source: [SciCrunch Registry](#)

Usage and Citation Metrics

We have not found any literature mentions for this resource.