BLIND SEPARATION OF MORE THAN TWO SOURCES BASED ON HIGH−CONVERGENCE ALGORITHM COMBINING ICA AND BEAMFORMING (MonAmOR5)

Author(s) :

Tsuyoki Nishikawa (Nara Institute of Science and Technology, Japan)
Hiroshi Saruwatari (Nara Institute of Science and Technology, Japan)
Kiyohiro Shikano (Nara Institute of Science and Technology, Japan)

Abstract :

We propose a new blind source separation (BSS) algorithm for multiple source signals. In the proposed algorithm, independent component analysis (ICA) and beamforming are combined to resolve the slow−convergence problem through optimization in ICA. The proposed method consists of the following three parts: (a) frequency−domain ICA with direction−of−arrival (DOA) estimation using a Lloyd clustering algorithm, (b) null beamforming based on the estimated DOA, and (c) integration of (a) and (b) based on the algorithm diversity in both iteration and frequency domain. The separation matrix obtained by ICA is temporally substituted by the matrix based on null beamforming through iterative optimization, and the temporal alternation between ICA and beamforming can realize fast− and high−convergence optimization. The results of the source separation experiments reveal that the source−separation performance of the proposed algorithm is superior to that of the conventional ICA−based BSS method, even under reverberant conditions.

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