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Blind noisy mixture separation for independent/dependent sources through a regularized criterion on copulas

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Abstract

The paper introduces a new method for Blind Source Separation (BSS) in noisy instantaneous mixtures of both independent or dependent source component signals. This approach is based on the minimization of a regularized criterion. Precisely, it consists in combining the total variation method for denoising with the Kullback-Leibler divergence between copula densities. This latter takes advantage of the copula to model the structure of the dependence between signal components. The obtained algorithm achieves separation in a noisy context where standard BSS methods fail. The efficiency and robustness of the proposed approach are illustrated by numerical simulations.

Keywords: Blind source separation; Noisy instantaneous mixtures; Copulas; Total variation; Mutual information; Kullbak-Leibler divergence between copulas.

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