

Independent component analysis via nonparametric maximum likelihood estimation

Richard J. Samworth, Ming Yuan

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Independent Component Analysis (ICA) models are very popular semiparametric models in which we observe independent copies of a random vector $X = AS$, where A is a non-singular matrix and S has independent components. We propose a new way of estimating the unmixing matrix $W = A^{-1}$ and the marginal distributions of the components of S using nonparametric maximum likelihood. Specifically, we study the projection of the empirical distribution onto the subset of ICA distributions having log-concave marginals. We show that, from the point of view of estimating the unmixing matrix, it makes no difference whether or not the log-concavity is correctly specified. The approach is further justified by both theoretical results and a simulation study.

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