Determination of the number of components in a blind source separation problem

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Abstract

The number of sources in a blind source separation (BSS) problem is an important issue as the estimation of both the unobservable sources and the mixing matrix depend drastically on this number. Several approaches for the determination of that particular number have been proposed [1,2], however this problem is still open.

In this work we will try to explore the Bayesian estimation framework for the estimability and/or estimation of this parameter (the number of sources). Since the problem is nothing but a model selection problem, the natural way to do that in the Bayesian theory is through evidence comparisons. This can be however computationally very expensive. A second approach would be to jointly explore the different parameters spaces of different dimensions and to estimate those parameters using sampling techniques like the reversible jump monte carlo Markov chain (RJMCMC) methods [3]. However the latter can suffer from the lack of sufficiently visiting all the possible different dimensionality spaces to provide low variance estimates of the parameters. We will then combine both evidence comparison and RJMCMC techniques in order to be able to assess the estimability of the latent number of sources in a blind source separation problem.

References:

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