BAYESIAN MRF−BASED BLIND SOURCE SEPARATION OF CONVOLUTIVE MIXTURES OF IMAGES (TueAmOR5)

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Abstract :

This paper deals with the recovery of clean images from a set of their noisy convolutive mixtures. In practice, this problem can be seen as the one of simultaneously separating and restoring source images that have been first degraded by unknown filters, then summed up and added with noise. We approach this problem in the framework of Blind Source Separation (BSS), where the unknown filters, in our case FIR filters in the form of blur kernels, must be estimated jointly with the sources. Assuming the statistical independence of the source images, we adopt Bayesian estimation for all the unknowns, and exploit information about local correlation within the individual sources through the use of suitable Gibbs priors, accounting also for well−behaved edges in the images. We derive an algorithm for recovering the blur kernels that make the estimated sources fit the known properties of the original sources. The method is validated through numerical experiments in a simplified setting, which is however related to real application scenarios.

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