MIXTURE OF GAUSS-MARKOV WITH HIDDEN POTTS-MARKOV RANDOM FIELD ODELS FOR IMAGE RECOVERY FROM THE FOURIER TRANSFORM MAGNITUDE

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Abstract

The present paper consists of reconstructing an image from a partial knowledge of its Fourier transform. By partial knowledge we mean either partial support and/or the knowledge of only the module and by uncertain, we mean both uncertainty of the model and the errors on the data. For example, this inverse problem arises in many applications such as: electron microscopy [1], radio astronomy [2], medical imaging [3]. In this paper, we consider the cases where the images to be reconstructed are assumed to be composed of finite number of homogeneous regions. We propose then an appropriate Gauss-Markov with a hidden Potts (Markov Random Field) to model such images. The whole *a priori* model is then hierarchical Markov model. Such modeling has been previously presented in [4]. However, in that work, the pixels in each region are assumed to be independent. In many applications, this hypothesis is not valid. In this work, we account for local dependency of the pixels through a Gauss-Markov model.

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