Compressed Sensing Image Reconstruction Based on Joint Statistical and Structural Priors

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***Abstract*— Due to proper use of the image sparsity, CS (compressed sensing) image compression has made great achievements in the field of image compression without the constraint of Nyquist sampling law. A great deal of researches indicate that there exist obvious statistical and structural priors regularity for image information distribution, while traditional CS image compression algorithms only use the sparse characteristic of the image information. In this paper, we propose a CS image reconstruction algorithm based on the joint statistical and structural priors which can achieve efficient image reconstruction via a small amount of measurements. With the full use of inter-scale and intra-scale relations of the sparse coefficients, we optimize the iterative hard thresholding CS algorithm specifically by building a GSM model to constrain the local coefficients distribution statistically, and a tree model to constrain the global coefficients distribution structurally. Extensive simulations have been conducted and the results show that the proposed method has achieved a considerable promotion both on the speed and the PSNR gain of image reconstruction, compared with the traditional recovery algorithms under the same compression ratio**.

***Keyword*— Compressed sensing, Statistical priors, Structural priors, GSM, Wavelet tree model**

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