Single Image Super-Resolution via Adaptive Sparse Representation and Low-Rank Constraint

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Abstract

Sparse representation theory shows effectiveness in single image super-resolution (SR). Existing image super-resolution methods usually make use of l_1-regularization, l_2-regularization or their combination to restrict the sparsity. However, the nonlocal similarity of images, which can be helpful to image SR, is often neglected. In order to utilize the nonlocal similarity and improve SR results in this paper, we propose a new single image super-resolution method by combining the adaptive sparse representation and robust principal component analysis (RPCA). Furthermore, we adopt the self-similarity learning framework to construct the dictionary pair. In our method, we first compute the sparse coefficient of each testing image patch through adaptive sparse representation with the constructed dictionary. Then, for each testing image block, we search for its similar patches and use RPCA as a low-rank optimization strategy to the corresponding coefficients. Extensive experiment results

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