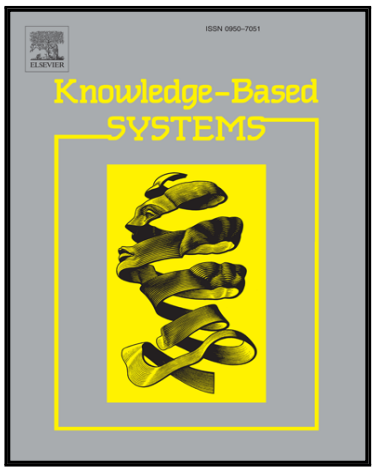

Image Super-Resolution via Adaptive Sparse Representation

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Image Super-Resolution via Adaptive Sparse Representation

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Abstract

Existing methods for image super-resolution (SR) usually use ℓ_1-regularization and ℓ_2-regularization to emphasize the sparsity and the correlation, respectively. In order to coordinate the sparsity and correlation synthetically, this paper proposes an adaptive sparse coding based super-resolution method, named ASCSR method, by means of establishing a regularization model, which effectively integrates sparsity and correlation as a regularization term in the model, and adaptively harmonizes the sparse representation and the collaborative representation. The method can balance the relation between the sparsity and collaboration adaptively via producing a suitable coefficient. To approximate the optimal solution of the model, we adopt a current popular and effective method, i.e., the alternating direction method of multipliers (ADMM). Compared with some other existing SR methods, the experimental results demonstrate that the proposed ASCSR method possesses outstanding performance in term of reconstruction effect, stability to the dictionary, and the noise immunity.

Keywords: Super-resolution; sparse representation; collaborative representation; alternating direction method of multipliers (ADMM)

1. Introduction

1.1. Background

Image super-resolution (SR) aims to restore high resolution (HR) images from a single or several low resolution (LR) images [3, 16]. It has become a hot topic because of its widely applications in areas of electronic images such as remote sensing [51], medical imaging [26], biometric identification [37, 39], and so on.

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