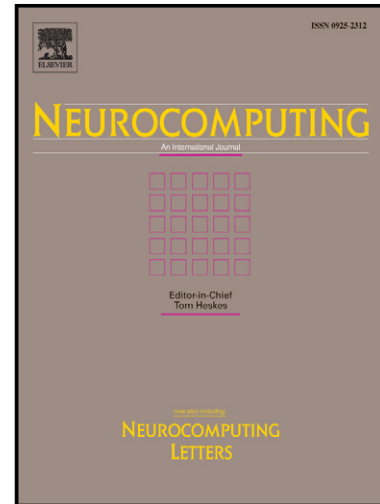


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Distributed compressed sensing-based pan-sharpening with hybrid dictionary

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Abstract: Spectral correlation between each band of multispectral (MS) image is an important characteristic. In this paper, a novel pan-sharpening method inspired by distributed compressed sensing (DCS) theory is presented, which considers the correlation characteristic among the MS bands as prior information in the restoration model. Two basic image formation models reflecting the relationships of the low-resolution multispectral (LRMS) image and the high-resolution panchromatic (HRP) image to the unknown high-resolution multispectral (HRMS) image are constructed. In order to exactly recover the HRMS image from the measurements, a joint sparsity model (JSM) is employed to solve the ill-posed inverse problem. The basic assumption of JSM is that each HRMS spectral band shares a sparse common component and a sparse innovation component. The choice of dictionaries that are used to sparsely represent the common and innovation components is very important. The common component can be sparsely coded by a dictionary, which is learned from the source HRP image patches. Each innovation component can be sparsely represented by a hybrid dictionary, which is composed of discrete cosine transform (DCT) bases, Gabor bases, wavelet 'db1' bases, ridgelet bases and the learned dictionary atoms. By solving the l_1 -norm optimization problem, the unknown HRMS image can be estimated. The proposed method and the state-of-the-art methods are performed on simulated and real remote sensing images. Experimental results demonstrate that the proposed pan-sharpening method shows better performance than other well-known methods in terms of quantitative assessment and visual analysis.

Keyword: Image fusion, low-resolution multispectral (LRMS) image, high-resolution panchromatic (HRP) image,

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