

基于非子采样Contourlet变换的遥感图像融合算法

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摘要

针对人类视觉特性, 以及全色高分辨图像和多光谱遥感自身的特点, 提出一种非下采样 Contourlet (NSCT) 域的图像融合新策略. NSCT 具有好的多分辨、移不变和多方向等特性, 能对图像中的边缘和围线信息给出渐近最优表示. 为了更好地保持空间分辨率和颜色分量, 引入基于 LHS 变换的亮度成分叠加策略. 实验结果表明: 本文提出的融合方法在提高空间分辨率的同时较好地保持了光谱信息. 与传统的 PCA 方法、基于 IHS 的融合方法、基于小波加权的融合方法, 以及同样采用本文的融合策略、分别基于小波变换和基于 Contourlet 变换的融合策略相比较, 本文方法在视觉效果和客观衡量指标两方面都有所改善.

关键词 [图像融合](#) [非下采样Contourlet变换](#) [LHS变换](#) [亮度成分叠加](#)

分类号

Fusion Algorithm for Remote Sensing Images Based on Nonsampled Contourlet Transform

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Abstract

Considering human visual system and characteristics of images, a novel image fusion strategy is presented for panchromatic high resolution image and multispectral image in nonsampled contourlet transform (NSCT) domain. The NSCT can give an asymptotic optimal representation of edges and contours in image by virtue of its characteristics of good multiresolution, shift-invariance, and high directionality. An intensity component addition strategy based on LHS transform is introduced into NSCT domain to preserve spatial resolution and color content. Experiments show that the fusion method proposed can improve spatial resolution and keep spectral information simultaneously, and that there are improvements both in visual effects and quantitative analysis compared with the traditional principle component analysis (PCA) method, intensity-hue-saturation (IHS) transform technique, wavelet transform weighted fusion method, corresponding wavelet transform-based fusion method, and contourlet transform-based fusion method.

Key words [image fusion](#) [nonsampled contourlet transform \(NSCT\)](#) [LHS transform](#) [intensity component addition](#)

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