

基于Curvelet多尺度几何分解的快速LHS多传感器图像融合

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摘要:

为了解决IHS变换在多光谱和高分辨遥感图像融合中存在的光谱失真等问题,提出一种基于Curvelet多尺度几何分解的快速LHS融合算法。该算法采用快速LHS以更好地保持图像的色彩,并进一步改进运行速度;引入第二代Curvelet多尺度几何分解则更有效地捕获图像中方向性的几何结构信息,并基于非平均分布间隔快速Fourier变换加快Curvelet的实现速度。实验结果表明:本文的图像融合算法在图像质量和运行速度上都获得了改进,融合图像具有较理想的空域和光谱分辨率,优于传统IHS变换、PCA,以及相应的小波变换结合快速LHS的融合结果。

关键词: 多传感器; 图像融合; 快速LHS变换; Curvelet变换

Multisensor Image Fusion Using Fast LHS Based on Curvelet Multiresolution Geometric Decomposition

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Abstract:

There is a problem of spectral distortion in multispectral and high-resolution image fusion based on IHS methods. To solve this problem, fast LHS transform is adopted to better hold the colours of source images and to improve the performance speed. On the other hand, the second generation Curvelet transform is introduced to capture the detail information effectively. Moreover, the digital transformation is based on unequally-spaced fast Fourier transform for speeding. Experimental results show that the proposed fusion method have improvements both in image quality and processing speed. The fused image is superior to that of based on IHS transform, PCA and wavelet transform combined with fast LHS transform. Our fusion results have ideal spatial and spectral resolution simultaneously both in visual and objective indexes.

Keywords: multi-sensors; image fusion; fast LHS transform; Curvelet transform

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