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成像技术与图像处理

基于非下采样轮廓波变换的全色图像与多光谱图像融合方法研究

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摘要: 为了同时改善遥感图像的空间分辨率和光谱分辨率, 提高遥感图像信息量, 提出了一种基于非下采样轮廓波变换的全色图像与多光谱图像的融合方法。首先, 对多光谱图像进行HIS变换, 获取其亮度分量; 分别对多光谱图像的亮度分量和全色图像进行非下采样轮廓波变换, 获取其高低频系数; 采用脉冲耦合神经网络算法和加权融合对高低频系数进行选取; 最后, 经过逆HIS变换和逆非下采样轮廓波变换获得最终融合后图像。实验结果表明, 本文融合方法处理后遥感图像的光谱失真少, 信息量和清晰度都优于其他传统遥感图像融合方法。

关键词: 图像融合 非下采样轮廓波变换 脉冲耦合神经网络

Panchromatic and Multispectral Image Fusion Method Based on Nonsampled Contourlet Transform

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Abstract: A novel panchromatic and multi-spectral image fusion method based on non-sampled Contourlet Transform(NSCT) was proposed for the purpose of improving spatial and spectral resolution of remote sensing images. Firstly, HIS transformation was applied in multi-spectral image for getting its intensity component. Then, NSCT was used both in the intensity component of multi-spectral image and panchromatic image in order that the high frequency and low frequency coefficients were acquired. Furthermore, pulse-coupled neural network (PCNN) and the weighted fusion were used in the high and low frequency coefficients independently. Finally, inverse HIS transform and inverse NSCT were applied to get the fusion image. The experiment results show that many contrast experiments were made. In conclusion, space resolution and information amount of the fused image were both greatly improved.

Keywords: image fusion NSCT PCNN

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