

应用

基于非负矩阵分解的多波段SPOT图像融合及其应用

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摘要:

SPOT遥感图像多光谱波段信息丰富, 在土地覆盖、环境变化等诸多领域中得到广泛应用。图像融合近几年来成为学术界研究的热点, 可以有效去除多光谱图像中的冗余, 保留有用信息。对不同时段多光谱图像的融合进行地物变化检测, 在灾害监测工作中具有重要的应用价值。文章利用基于非负矩阵分解的分时融合方法, 对不同时段SPOT多波段图像进行融合, 通过构造差值影像对变化区域进行检测。利用本文方法得到的图像可以清晰地表示出目标的变化区域, 且正确率较高。结果表明, 首先利用非负矩阵分解对不同时段图像进行融合, 可以分别得到更为准确的融合图像, 从而提高变化检测结果的精度。实验结果与传统方法进行了分析对比, 证明了该方法的有效性。

关键词: 变化检测 非负矩阵分解 图像融合

SPOT image fusion and application based on Non-negative Matrix Factorization

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Abstract:

Change detection has attracted much attention for the application of disaster monitoring. Multi-band SPOT remote sensing images are widely used because of the abundant spectrum information. But the data redundancy needs to be eliminated using image fusion technique, which has developed rapidly. Non-negative matrix factorization (NMF) has been proven to be a very effective image fusion tool to extract useful information. In this paper, a time-sharing fusion method based on NMF is proposed for the purpose of change detection. First, the 3 band SPOT images of the same time were fused using NMF algorithm for different time period, respectively. Then the residual image, which was generated using the fused images of different time, was used to indicate the changed area. The results are able to present changed area clearly and show better performance compared to the traditional methods. It demonstrates that first using image fusing for images of different time period is able to exclude redundancy and keep useful information which helps to detect the changed area with higher accuracy.

Keywords: Change detection Non-negative matrix factorization Image fusion

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1. 王广学, 黄晓涛, 周智敏. UWB SAR叶簇遮蔽目标中的变化检测技术[J]. 信号处理, 2010,26(3): 327-331
2. 易正俊, 宋瑞晶, 李华锋. 基于非采样Contourlet变换的图像融合算法[J]. 信号处理, 2010,26(6): 875-879
3. 胡谋法, 陈尚锋, 肖山竹, 张志勇. 一种低能见度下红外机场区域识别新方法[J]. 信号处理, 2011,27(11): 1687-1690

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