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遥感应用

基于对象关系特征的高分辨率光学卫星影像水上桥梁目标识别方法

摘要：

利用卫星遥感技术对大中型桥梁进行识别定位，在民用上和军事上都具有很重要的意义。本研究提出了一套利用基元对象关系特征提取高分辨率卫星影像中水上桥梁的技术方法。首先利用多尺度分割算法对高分辨率卫星影像进行分割，利用水体指数或GLCM 同质性纹理特征区分河水和陆地；其次，利用对象形状特征和相邻的关系特征提取桥梁潜在区；将河流片段和桥梁潜在区专题二值化，利用数学形态学算子实现河流水面的连续化；最后利用叠加分析的方法获得最终的桥梁目标。本方法充分利用了桥梁与河流相邻和相交的空间关系特征，利用QuickBird和IKONOS高分辨率卫星影像进行实验，证明所提出的方法可以高精度的实现大中型水上桥梁的识别定位。

关键词： 高分辨率遥感 桥梁 多尺度分割 关系特征 数学形态学

Research on Extracting Bridges from High Resolution Satellite Remote Sensing Image Based on Class related Feature

Abstract:

Compared to remote sensing images of medium or low spatial resolution，high resolution remote sensing images can provide observation data containing more detailed information for georesearch.Accordingly，an important issue for current computer and geoscience experts is to develop useful methods or technology to extract information from these high resolution satellite images.As part of series of research into object extraction，this paper focuses mainly on the extraction of bridges over water from high resolution satellite images.Since bridges over water is the characteristic of obviously adjacent and intersect to water in remote sensing images，this paper proposes a practical bridge extraction method based on related feature between bridges and water from remote sensing images of high spatial resolution.The steps involved are: knowledge rule based water extraction by normalized difference water index（NDWI）or Grey Level Concurrence Matrix（GLCM）homogeneity texture feature calculated from segment unit in a larger scale；the underlying region including bridges extraction by combining multi scale object feature，especially class related feature.River water is jointed by Mathematical Morphology.Finally，the bridges are acquired by overlaying jointed river binary image and underlying region including bridges.Two tests are described based on IKONOS merge image with a 1m resolution and QuickBird multispectral image with a 2.44m respectively.The experimental results show that the proposed method is very suitable to extraction of bridges over water from high spatial resolution remote sensing images.

Keywords: high resolution remote sensing bridges multi resolution segment spatial relation feature

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