

### 基于小波域自然影像统计特性的无参考遥感影像质量评价

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## No-reference Remote Sensing Image Quality Assessment Based on Natural Scene Statistical in Wavelet Domain

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摘要

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**摘要** 遥感影像的获取往往受到模糊和噪声的共同影响,使得遥感影像的降质难以归到某一单一降质方式,从而给遥感影像的评价带来困难。在遥感影像小波域统计特性,即子带系数均值呈近似线性关系的基础上,通过对噪声、模糊对影像此线性关系的影响方式及破坏程度的定量分析,来判定影像的噪声和模糊强度,最后,利用二者的加权和作为遥感影像的最终质量评价指标。实验表明,与峰值信噪比指标PSNR相比,该文指标与结构相似性指标SSIM具有更好的一致性,对噪声影像、模糊影像以及同时存在噪声和模糊的遥感影像能够进行有效的、准确的评价。

**关键词:** 无参考遥感影像质量评价 影像统计特性 小波变换 噪声和模糊

**Abstract:** Remote sensing images are most likely affected by both blur and noise, which makes the quality of them are difficult to obtain for they can not come down to one certain distortion type. Based on the natural scene statistical feature of natural image, the means of wavelet subbands coefficient amplitudes decrease approximately linearly with scale index. This linear feature can be destroyed by both noise and blurriness in different ways, according to the quantitative analysis of the destroyed degree, both blur strength and noise strength of an image can be obtained. Finally, the weighted sum of them are considered as the eventual quality index of the remote sensing image. The experiment shows that, compare with the Peak Signal-Noise Rate (PSNR) index, the proposed index has better consistence with the Structure SIMilarity (SSIM) index, and can make an effective and correct evaluation of noise image, blur image or image with both noise and blur.

**Keywords:** No-reference remote sensing image quality assessment Image statistical model Wavelet transformation Noise and blur

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