FOUR REDUCED-REFERENCE METRICS FOR MEASURING HYPERSPECTRAL IMAGES AFTER SPATIAL RESOLUTION ENHANCEMENT

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ABSTRACT:

In this paper, four new reduced-references (RR) metrics are proposed for measuring the visual quality of hyperspectral images after having undergone spatial resolution enhancement. These metrics can measure the visual quality of hyperspectral images whose full-reference (FR) image is not available whereas the low spatial resolution reference image is available. A FR metric requires the reference image and the test image to have the same size. After spatial resolution enhancement of hyperspectral images, the size of the enhanced images is larger than that of the original image. Thus, the FR metric cannot be used. A common approach in practice is to first down-sample an original image to a low resolution image, then to spatially enhance the down-sampled low resolution image using an enhancement technique. In this way, the original image and the enhanced image have the same size and the FR metric can be applied to them. However, this common approach can never directly assess the image quality of the spatially enhanced image that is produced directly from the original image. Experimental results showed that the proposed RR metrics work well for measuring the visual quality of spatial resolution enhanced hyperspectral images. They are consistent with the corresponding FR metrics.

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