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A Novel Reversible Data Hiding Method with Image Contrast Enhancement

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Abstract

Recently, several image contrast enhancement methods have been proposed such that the original image can be recovered from its contrast-enhanced version. Hence a flexibility in changing image contrast can be provided when needed. However, the artificial distortions may be introduced into the image content after adopting these methods. Meanwhile, there is lack of using the adequate image quality metrics for performance evaluation. In this paper, a novel reversible data hiding method is proposed for image contrast enhancement. To better preserve image quality, it is restricted that only the adjacent bins in the original image histogram may be merged in the pre-processing. The proposed method has been applied to two image sets and compared with the previous methods. For image quality assessment, the PSNR, SSIM and three no-reference metrics have been adopted in performance evaluation. The experimental results have clearly shown that better visual quality can be achieved with the proposed method. Besides recovering the original images, extra data can be hidden into the contrast-enhanced images and correctly extracted.

Keywords:
Contrast enhancement, reversible data hiding, image quality, histograms, adjacent bin

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