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Blind Image Splicing Detection via Noise Level Function

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Abstract

With the wide use of sophisticated image editing tools, digital image manipulation becomes very convenient and easy, which makes the detection of image tampering operations significant. Image splicing, which refers to a selected region from an image is cut and pasted onto another image, is a ubiquitous image tampering operation. In this paper, based on the finding that the textures and edges can affect the local estimation of noise variance, we propose a novel image splicing detection method via noise level function. Specifically, the test image is first segmented into non-overlapping blocks and the noise variance and the sharpness of each block are calculated. Then, the noise level function, which reflects the relationship between the noise variances and the sharpness of blocks is estimated. The goal of this function is to generate a distance map to describe the minimum distances from the blocks to the fitted curve. The blocks which not be constrained by this estimated noise level function will be distinct in the distance map so that they can be regarded as spliced regions. Finally, contextual information is additionally used to refine the detection result. Extensive experiments demonstrate the superiority of our proposed method in both quantitative and qualitative metrics when compared with the state-of-the-art approaches.

Keywords: Image forensics, image splicing detection, noise level function, noise variance estimation

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