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Perceptual quality evaluation for image defocus deblurring

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Abstract

Blur is one of the most common distortion types in image acquisition. Image deblurring has been widely studied as an effective technique to improve the quality of blurred images. However, little work has been done to the perceptual evaluation of image deblurring algorithms and deblurred images. In this paper, we conduct both subjective and objective studies of image defocus deblurring. A defocus deblurred image database (DDID) is first built using state-of-the-art image defocus deblurring algorithms, and subjective test is carried out to collect the human ratings of the images. Then the performances of the deblurring algorithms are evaluated based on the subjective scores. With the observation that the existing image quality metrics are limited in predicting the quality of defocus deblurred images, a quality enhancement module is proposed based on Gray Level Co-occurrence Matrix (GLCM), which is mainly used to measure the loss of texture naturalness caused by deblurring. Experimental results based on the DDID database demonstrate the effectiveness of the proposed method.

Keywords: Image quality assessment, no-reference, defocus deblurring, texture naturalness, gray level co-occurrence matrix