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A Weighted Full-Reference Image Quality Assessment Based on Visual Saliency

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Abstract

In full reference image quality assessment (IQA), the images without distortion are usually employed as reference, while the structures in both reference images and distorted images are ignored and all pixels are equally treated. In addition, the role of human visual system (HVS) is not taken account into subjective IQA metric. In this paper, a weighted full-reference image quality metric is proposed, where a weight imposed on each pixel indicates its importance in IQA. Furthermore, the weights can be estimated via visual saliency computation, which can approximate the subjective IQA via exploiting the HVS. In the experiments, the proposed metric is compared with several objective IQA metrics on LIVE release 2 and TID 2008 database. The results demonstrate that SROCC and PLCC of the proposed metric are 0.9647 and 0.9721, respectively,which are higher than other methods and it only takes 427.5 seconds, which is lower than that of most other methods.

Keywords: visual saliency computation, weighted image quality assessment, human visual system

1. Introduction

In recent years, with the increasing image-based applications, image quality assessment (IQA) becomes a hotspot in image and video processing. In fact, in the process of image acquisition, compression, transmission and denoising, an image is subject to different distortions and the quality of an image can be degraded at different levels. Therefore, it is significant to develop several metrics to evaluate image quality. In contrast, they also benefits for the improvement of image processing technique. Therefore, IQA has shown its values in academical and commercial fields.

Generally, an image is assessed by human eyes and the human give the subject mean opinion score (MOS) [1, 2] according to their subjective feeling and satisfaction on the image. The subjective feeling or satisfaction from bad to excellent is evaluated by a score ranged from 1 to 9. However, this subjective

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