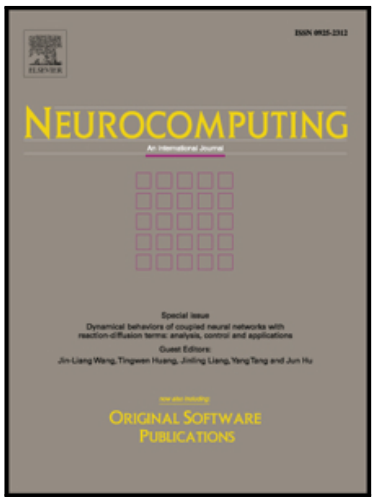

Learning Picture Quality from Visual Distraction: Psychophysical Studies and Computational Models

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Learning Picture Quality from Visual Distraction: Psychophysical Studies and Computational Models

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Abstract

Visual saliency has been increasingly studied in relation to image quality assessment. Incorporating saliency potentially leads to improved ability of image quality metrics to predict perceived quality. However, challenges to optimising the combination of saliency and image quality metrics remain. Previous psychophysical studies have shown that distortion occurring in an image causes visual distractions, and alters gaze patterns relative to that of the image without distortion. From this, it can be inferred that the measurable changes of gaze patterns driven by distortion may be used as a proxy for the likely variation in perceived quality of natural images. In this paper, rather than using saliency as an add-on to image quality metrics, we investigate the plausibility of approximating picture quality based on measuring the deviation of saliency induced by distortion. First, we designed and conducted a large-scale eye-tracking experiment to clarify the knowledge on the relationship between the deviation of saliency and the variability of image quality. We then used the results to devise an algorithm which predicts perceived image quality based on visual distraction. Experimental results demonstrate this can provide good results of image quality prediction.

Keywords: Picture quality, visual distraction, saliency, eye-tracking, statistical learning

1. Introduction

Image quality metrics (IQMs) form the basis of algorithms that can automatically assess perceived quality of image material. They are nowadays widely available in many digital imaging

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