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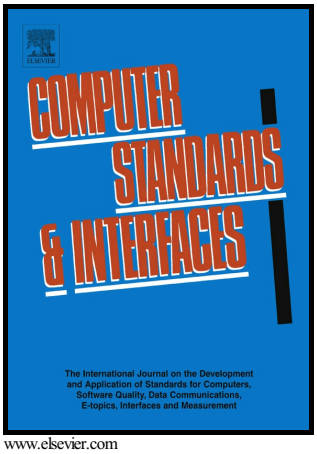

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A New Full-Reference Image Quality Metric Based on Just Noticeable Difference

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Abstract

An Image Quality Metric (IQM) is used to measure how the image on which modifications are carried out is distorted. Knowing the distortion scale of the image is of significance for the intended purposes (compression, forensic, medical, etc.). The amount of distortion has different implications for each of the application and whether the image is convenient for the relevant application by using the IQM. One of the most basic approaches in the literature which is used in measuring the amount of the distortion is the Full-Reference Image Quality Metric (FR-IQM). The FR-IQM needs both the original and distorted image in the phase of comparison. In this study, taking into consideration the Human Vision System (HVS), a new full-reference image quality metric based on Just Noticeable Difference (JND) has been presented. Through this new metric, the HVS' s physiological (color and light sensitivity) and psycho-physiological (texture and edge sensitivity) characteristics have been taken into consideration. Through the JND, the inclusion of the unintended modifications that cannot be sensed by the HVS has been prevented. The near-zero quality results points out the more quality image. The experimental results have showed that the metric in question demonstrates a higher level of performance for the HVS when compared with its counterparts.

Keywords: `image quality metric, full-reference image quality metric, human vision system, just noticeable difference`

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