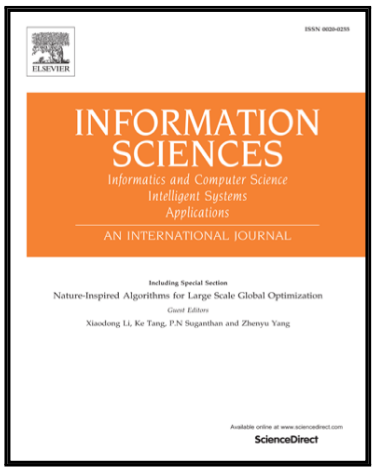

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Sparse Representation Based Stereoscopic Image Quality Assessment Accounting for Perceptual Cognitive Process

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Abstract

In this paper, we propose a sparse representation based Reduced-Reference Image Quality Assessment (RR-IQA) index for stereoscopic images from the following two perspectives: 1) Human visual system (HVS) always tries to infer the meaningful information and reduces uncertainty from the visual stimuli, and the entropy of primitive (EoP) can well describe this visual cognitive progress when perceiving natural images. 2) Ocular dominance (also known as binocularity) which represents the interaction between two eyes is quantified by the sparse representation coefficients. Inspired by previous research, the perception and understanding of an image is considered as an active inference process determined by the level of "surprise", which can be described by EoP. Therefore, the primitives learnt from natural images can be utilized to evaluate the visual information by computing entropy. Meanwhile, considering the binocularity in stereo image quality assessment, a feasible way is proposed to characterize this binocular process according to the sparse representation coefficients of each view. Experimental results on LIVE 3D image databases and MCL database further demonstrate that the proposed algorithm achieves high consistency with subjective evaluation.

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