

Temporal Characteristics of Human Perception to Significant Variation of Block Structures

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Abstract : In the latest research efforts, the structures of the image in the spatial domain have been successfully analyzed and proved to deduce the visual masking for accurately estimating the visibility thresholds of the image. If the structural properties of the video sequence in the temporal domain are taken into account to estimate the temporal masking, the improvement and enhancement of the as-sessing spatio-temporal visibility thresholds are reasonably expected. In this paper, the temporal characteristics of human perception to the change in block structures on the time axis are analyzed. The temporal characteristics of human perception are represented in terms of the significant variation in block structures for the analysis of human visual system (HVS). Herein, the block structure in each frame is computed by combined the pattern masking and the contrast masking simultaneously. The contrast masking always overestimates the visibility thresholds of edge regions and underestimates that of texture regions, while the pattern masking is weak on a uniform background and is strong on the complex background with spatial patterns. Under considering the significant variation of block structures between successive frames, we extend the block structures of images in the spatial domain to that of video sequences in the temporal domain to analyze the relation between the inter-frame variation of structures and the temporal masking. Meanwhile, the subjective viewing test and the fair rating process are designed to evaluate the consistency of the temporal characteristics with the HVS under a specified viewing condition.

Keywords : temporal characteristic, block structure, pattern masking, contrast masking

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