

Reproduction of Perceptual Reality in Standard-Dynamic-Range (SDR) Environments Using High-Dynamic-Range (HDR) Images Compressed by Global Tone Mapping: Further Analysis and Subjective Evaluation of Reproduced Images

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Abstract

In order to display HDR images or videos, quite dark rooms are conventionally required to avoid the picture quality degradation caused by viewing flare from illumination sources in the room. The next step is, therefore, converting HDR images/videos into Standard-Dynamic-Range (SDR) images/videos that retain their Perceptual Reality (PR), i.e., reducing the impairments caused by flare, for comfortably utilizing HDR contents in daily life often. Tone Mapping Operators (TMOs) are now being used to compress HDR into SDR images. One common technique, the local-operator, provides detailed information at the pixel level and improves image quality by enhancing local details [1] for still- or nonlinear video-image editing. Our previously proposed method for converting HDR into SDR uses global tone mapping and preserves perceptual reality. In this paper, we describe a more precise analysis of its conversion characteristics and a subjective evaluation. The results suggest that our proposed method offers quality sufficient for practical use. Therefore, our proposal is unique and quite effective for both still- and video-images.

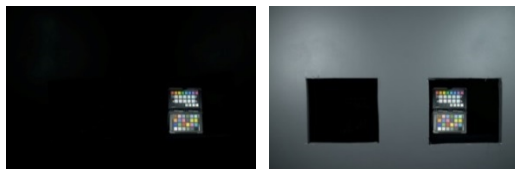


Figure. HDR images viewed with typical flare approximately 5%

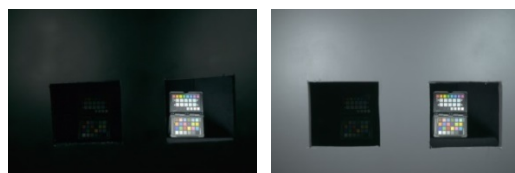


Figure. Images reproduced by proposed method

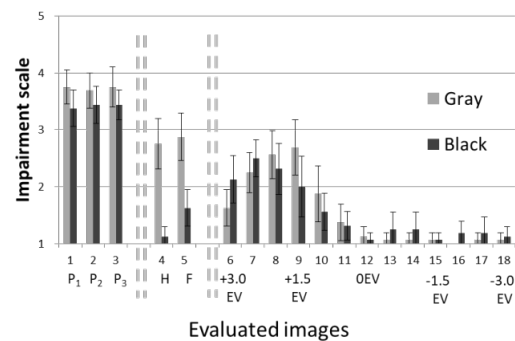


Figure. Subjective experiment results (Error bar shows 95% confidence limit)

References

1. R. Fattal, et al.: "Gradient domain high dynamic range compression," ACM Transactions on Graphics, vol. 21, no. 3, pp. 249-256, 2002.

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