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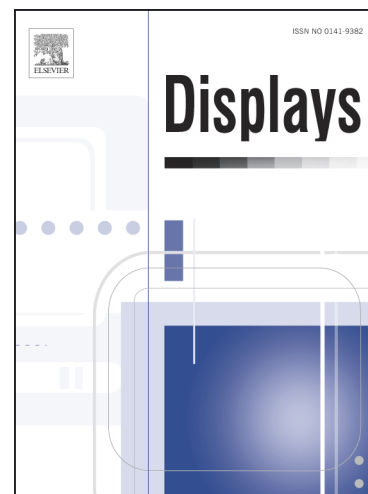
Perceptual Brightness-based Inverse Tone Mapping for High Dynamic Range Imaging

Gwon Hwan An, Yong Deok Ahn, Siyeong Lee, Suk-Ju Kang

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Displays

Perceptual Brightness-based Inverse Tone Mapping for High Dynamic Range Imaging

Gwon Hwan An, Yong Deok Ahn, Siyeong Lee, Suk-Ju Kang*

Department of Electronic Engineering, Sogang University, Seoul 04107, Korea

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ABSTRACT

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Keywords:

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This paper proposes a novel high dynamic range imaging method based on inverse tone mapping for generating a high dynamic range image from a single low dynamic range image. With the increasing expectations for image quality, displays providing high dynamic range images have been released. However, although low dynamic range images are currently commonly used, they do not use the high representation capability of high dynamic range displays. Moreover, high dynamic range contents are scarce. Therefore, high dynamic range imaging techniques are gaining attention. The proposed method involves adaptive specular region detection to determine the bright and dark areas for high dynamic range imaging, output mapping range decision to consider perceptual brightness, final mapping-level decision to prevent degradation of perceptual image quality, and inverse pixel mapping for luminance mapping. The simulation results of the proposed method yielded an HDR-VDP-2 quality score of 59.51, which was higher than that of the conventional methods. Furthermore, the execution time of the proposed algorithm was 0.66 s, which had the lowest complexity compared to the conventional methods. For subjective performance evaluation, we analyzed the perceived image quality on the display with the DRIM, which confirmed the superiority of the proposed method over the conventional methods.

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* Corresponding author. Tel.: +82-02-705-8466; fax: +82-02-705-8016; e-mail: sjkang@sogang.ac.kr.

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