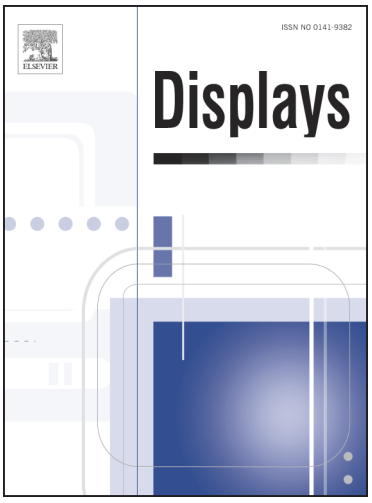

Backlight Dimming based on Saliency Map acquired by Visual Attention Analysis

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PII: S0141-9382(17)30049-5
DOI: https://doi.org/10.1016/j.displa.2017.09.008
Reference: DISPLA 1850

To appear in: *Displays*

Received Date: 10 March 2017
Revised Date: 22 September 2017
Accepted Date: 29 September 2017

Please cite this article as: Y. Deok Ahn, S-J. Kang, Backlight Dimming based on Saliency Map acquired by Visual Attention Analysis, *Displays* (2017), doi: https://doi.org/10.1016/j.displa.2017.09.008

Displays

Backlight Dimming based on Saliency Map acquired by Visual Attention Analysis

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ARTICLE INFO

Article history:

Keywords:
Backlight dimming;
Saliency map;
Liquid crystal display.

ABSTRACT

Displays have been used in various applications from mobile phones to tablets, and the low power consumption is one of their most important factors. Backlight dimming is the most promising technique to achieve this because it significantly reduces the display power by controlling only the transmittance of liquid crystal. This paper proposes a new backlight dimming algorithm using visual attention analysis. Conventional algorithms have a serious saturation error in some images when performing backlight dimming, thereby degrading image quality. In contrast, the proposed algorithm analyzes image characteristics based on the saliency map, which considers human visual attention. It then truncates the meaningless information of the saliency map using an adaptive saliency level selection approach and calculates the maximum amount of saturation error that humans will not perceive. In addition, the proposed algorithm defines the objective function and computes the optimal starting gray level in that function to calculate the saturation error. Simulation results show that the proposed algorithm using the adaptive saliency level selection approach performs best. In addition, the average peak signal-to-noise ratio of the proposed algorithm was up to 3.762 dB higher than that of the conventional algorithm while slightly increasing the power consumption.

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