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# Quality assessment method based on exposure condition analysis for tone-mapped high-dynamic-range images

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**Abstract:** Tone-mapping operators (TMOs) can be used to transform the data format of high-dynamic-range (HDR) images to traditional low-dynamic-range (LDR) image data format. Hence, the performance of a TMO is crucial for applying HDR images in widely-used LDR image processing systems at this stage. In this work, we propose an exposure condition analysis based quality assessment method for tone-mapped HDR images. Firstly, a purpose-designed HDR exposure segmentation model is used to divide HDR images by analyzing local exposure property. Then, we extracted two new low-complexity quality features (abnormal exposure ratio and exposure residual energy) and a color-based feature in different exposure regions. Finally, the quality assessment model was obtained by regression training. Experiments demonstrate the ability of our method to predict the quality of tone-mapped HDR images. The Pearson linear correlation coefficients are higher than 0.88; thus, the proposed method is highly consistent with human visual perception.

**Keywords**: image processing, quality assessment, image segmentation, tone-mapping.

## 1 Introduction

Lately, the application of high-dynamic-range (HDR) images have gradually becomes a popular