Tone Mapping Optimization Seminar Presentation

March 16, 2018 (2:30 pm - 3:30 pm)

Jodrey School of Computer Science

SEMINAR PRESENTATION

Friday, March 16, 2018

2:30 PM

Carnegie Hall 113

Tone Mapping Optimization for HDR Images

Stephen Brooks

Abstract

High dynamic range (HDR) images provide the capacity to represent the luminance of real scenes with much higher precision than standard image formats. With advances in hardware and computer graphics technologies, HDR images are rapidly becoming more commonplace, and they have successfully been used for many applications, such as digital photography, physical-based rendering, and virtual reality. But to visualize HDR images on contemporary display devices, the dynamic range needs to be reduced to the much smaller range of the devices. This is accomplished through tone mapping, with the goal of reproducing the visual appearance of HDR scenes.

However, it remains challenging to objectively assess the quality of tone mapped images and optimize tone mapping operators with automated algorithms. Using virtual photographs to bridge the gap of HDR images and tone mapped images in image feature analysis, we developed feature-based quality metrics for tone mapped images, which measure the distortion of important image features that affect the perceived quality of human observers. Subjective and numerical experiments indicate that the proposed feature-based quality metrics can yield more reliable predictions than the alternative approaches.

And once suitable quality metrics are defined, there emerges an opportunity to automate the tuning of existing tone mapping operators. Moreover, based on the quality prediction of our metrics, we proposed an

automated blended tone mapping algorithm which blends images from multiple operators with varying weights to leverage the strengths of each of operators considered. Experiments with a broad range of HDR scenes and statistical analysis demonstrate the effectiveness of the tone mapping optimization algorithms.

About the Presenter

Stephen Brooks is a Professor in the Faculty of Computer Science at Dalhousie University. He received a Ph.D. in Computer Science from the University of Cambridge in 2004, a M.Sc. from the University of British Columbia in 2000 and a B.Sc. from Brock University in 1998. He is a member of IEEE, ACM, and Canadian Information Processing Society (CIPS). His research interests include Computer Graphics, Image Processing Visualization, and is a co-founder of the GEM Lab. His primary interest outside academia, visual arts, complements and drives his interest in computer graphics.

Everyone is welcome to attend

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