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More than a Quick User Study: Perception in Computer Graphics

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Abstract

Human visual perception is playing an increasingly important role in computer graphics. This often takes the form of a rudimentary perceptual study to validate the utility of a given algorithm. Nonetheless, this field has several further implications for computer graphics. Aside from giving tools to measure visual quality, there exist computational models of human vision which can be directly leveraged, particularly in tone reproduction and colour appearance modeling. We have also gained insights in the link between natural images and human vision, which can be useful in several applications such as deblurring images and colour transfer.

Further, human visual perception allows us to solve computational problems that would otherwise be very difficult to tackle. For instance, many high-level image edits require an analysis of the image, recovering a basic understanding of the shape of objects. On the basis of a single image, this is an under-constrained problem. To make headway in solving such problems, human visual perception has emerged as a powerful tool. By requiring perceptual plausibility rather than physical accuracy, practical solutions to such image edits are possible. This has led to several interesting applications, including image-based material editing.

In summary, the utility of visual perception goes much further than incorporating the obligatory perceptual study in many graphics papers. This point will be illustrated by means of practical examples.

Biography

Erik Reinhard received his Ph.D. in Computer Science from the University of Bristol in 2000, having worked on his Ph.D. for three years at Delft University of Technology, prior to a further three years in Bristol. Following a post-doctoral position at the University of Utah (2000-2002) and assistant professor at the University of Central Florida (2002-2005), he returned to Bristol as a lecturer in January 2006 to become senior lecturer in 2007. Erik founded the prestigious ACM Transactions on Applied Perception, and has been Editor-in-Chief since its inception in 2003, until early 2009. He is lead author of two books: 'High Dynamic Range Imaging: Acquisition, Display, and Image-Based Lighting' and 'Color Imaging: Fundamentals and Applications'. His interests are in the application of knowledge from perception and neuroscience to help solve problems in graphics and related fields.

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