Piotr Didyk, J Comput Eng Inf Technol 2017, 6:6(Suppl)
DOI: 10.4172/2324-9307-C1-016

Piotr Didyk

Saarland University, Germany

Perceptually-driven inputs for new display devices

There has been a tremendous increase in quality and number of new display devices, such as stereo and automultiscopic screens or virtual and augmented reality headsets. Some of them have already entered the mass production and gained a lot of users' attention; others will follow this trend promptly. Unfortunately, abilities of these emerging technologies outperform capabilities of methods and tools for creating content. Existing displays have a number of limitations, which make it difficult to reproduce real-world appearance; discrete pixels are used to represent images, the output luminance range is smaller than in the real world, and only two dimensions are available to reproduce a three-dimensional scene. Furthermore, the efficiency of content creation techniques struggles to keep up with high quality demands. On the other hand, the human visual system has many limitations, like those imposed by the density of photoreceptors, imperfections in the eye optics, or non-uniform sensitivity to spatial and depth details across the visual field. I argue that the current level of understanding of how new displays technologies influence user experience is insufficient to exploit their advantages fully. In this talk, I will show that careful combinations of new hardware, computation, and models of human perception are crucial for providing best visual quality. Taking limitations of the human visual system into account and using perceptual effects enable designing methods which overcome the physical display limitations and enhance apparent image qualities. I will start my talk by showing a perceptually-driven optimization that improves the spatial resolution of displays beyond their physical capabilities. Next, I will discuss techniques for overcoming limitations of 3D displays, including content creation, adjustment, and hardware design. I will also talk about our recent work on foveated rendering. I will conclude by giving an overview of the perceptual-driven methodology and discussing other applications.

Biography

Piotr Didyk is an independent research Group Leader at the Excellence Cluster for "Multimodal Computing and Interaction" at Saarland University where he is the Head of "Perception, Display, and Fabrication Group". Prior to this, he spent two years as a Postdoctoral Associate at Massachusetts Institute of Technology. In 2012, he obtained his PhD from the Max Planck Institute for Informatics and the Saarland University for his work on Perceptual Displays. He has published over 20 technical papers in top computer graphics journals, including 16 at Siggraph/Siggraph Asia. His research interests include novel display technologies and computational fabrication.

pdidyk@mmci.uni-saarland.de

Notes: