

Virtual Environments 2015

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Keynote

How Does Human Interpret Images? – Weak Points of Our Visual Systems Learned by Mathematical Study of Optical Illusion

Kokichi Sugihara

Professor and Vice President of the Meiji Institute for Advanced Study of Mathematical Sciences, Meiji University

Abstract

We usually feel that we can interpret images of three-dimensional objects easily and correctly. From a mathematical point of view, however, images do not contain depth information, and hence what we feel we can interpret is nothing but just the result of guessing. Indeed, we can easily cheat our brains by showing unusual objects that look usual. In this talk, we show many examples of this kind of new optical illusion including “impossible objects”, “impossible motions” and “ambiguous cylinders”, obtained by our mathematical study of optical illusion, and discuss about the advantages as well as dangers of our visual systems.

Short Biography

Kokichi Sugihara received Doctor’s degree in Mathematical Engineering in 1980 from the University of Tokyo. He once worked at Electrotechnical Laboratory, Nagoya University, the University of Tokyo, and has been in a current position since 2009. Research interests include mathematical engineering, computational geometry, computer vision and computer graphics. He discovered solids that realize so-called pictures of impossible objects in his research on computer vision, and has extended his research areas to optical illusion. He is now a leader of a research project titled “Computational Illusion”, and opened Illusion Museum in downtown Tokyo. He is the first-prize winner in the Best Illusion Contest of the Year in 2010 and 2013.

Keynote

Shape of Things to Come

Sriram Subramanian

Professor, School of Engineering & Informatics, University of Sussex, UK

Abstract

One of the visions on my research is to deliver novel experiences to users without instrumenting them with wearable or head-mounted displays. My team has been exploring various technical solutions to creating systems that can deform and transform into new objects or shapes while still supporting the display of visual content. For example, we created shape-changing tablets that can show maps with topographical information and morphing mirrors that can enable new forms of augmentation. In this talk, I will present some of our recent projects on this topic and conclude with the use of acoustic radiation forces to create shape-shifting atoms.

Short Biography

Sriram Subramanian is a Professor of Informatics at the University of Sussex where he leads a research group on novel interactive systems. Before joining Sussex, he was a Professor of Human-computer Interaction at the University of Bristol (till July 2015) and prior to this a senior scientist at Philips Research Netherlands. He holds an ERC Starting Grant and has received funding from the EU FET-open call. In 2014 he was one of 30 young scientists invited by the WEF to attend their Summer Davos. Subramanian is also the co-founder of Ultrahaptics a spin-out company that aims to commercialise the mid-air haptics enabled by his ERC grant. In 2015, Ultrahaptics won the CES 2015 top pick award for Best Enabling Technology. Prof. Subramanian's research has been featured in several news media outlets around the world including CNN, BBC and Fox-News.

Keynote

Lessons Learnt from the Invisible Part of Virtual Reality

Hiroo Iwata

Professor, Department of Intelligent Interaction Technologies, University of Tsukuba

Abstract

This talk introduces history of Iwata's haptics research during a quarter century. The research includes sense of touch and walking. His activity expands to a new art form named "Device Art" in which interface devices become essence of expression. In 2014, he launched the Ph.D. program in Empowerment Informatics. Empowerment Informatics has three pillars; supplementation, harmony and extension of human. Haptics is a key technology in these areas. More over Device Art greatly contribute to extension of human.

Short Biography

Hiroo Iwata is a professor in the Graduate School of Systems and Information Engineering of the University of Tsukuba, where he is teaching human interface and leading research projects on virtual reality. His research interests include haptic interface, locomotion interface and spatially immersive display. He received B.S., M.S., and Ph.D. degree in engineering from the University of Tokyo in 1981, 1983 and 1986, respectively. He is a vice president of the Virtual Reality Society of Japan from 2010. He exhibited his work at the Emerging Technologies venue of the SIGGRAPH every year from 1994 to 2007, as well as Ars Electronica Festival 96,97,99, and 2001. He was the general chair of the World Haptics Conference 2007 and Asia Haptics 2014.

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