

Where Industry and Academia Meet

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EI06: 3D VIDEO PROCESSING TECHNIQUES FOR IMMERSIVE ENVIRONMENTS**Instructor:** Yo-Sung Ho, Gwangju Institute of Science and Technology (Republic of Korea) | **Sunday January 28, 8:00 AM – 12:15 PM****Course Level:** Intermediate | **Fee:** Member: \$275/ Non-member: \$300 / Student: \$95 (*prices for all increase by \$50 after January 8, 2018)

With the emerging market of 3D imaging products, 3D video has become an active area of research and development in recent years. 3D video is the key to provide more realistic and immersive perceptual experiences than the existing 2D counterpart. There are many applications of 3D video, such as 3D movie and 3DTV, which are considered the main drive of the next-generation technical revolution. Stereoscopic display is the current mainstream technology for 3DTV, while auto-stereoscopic display is a more promising solution that requires more research endeavors to resolve the associated technical difficulties. This short course lecture covers the current state-of-the-art technologies for 3D contents generation. After defining the basic requirements for 3D realistic multimedia services, we cover various multi-modal immersive media processing technologies. Also addressed is the depth estimation problem for natural 3D scenes and several challenging issues of 3D video processing, such as camera calibration, image rectification, illumination compensation, and color correction. The course discusses MPEG activities for 3D video coding, including depth map estimation, prediction structure for multi-view video coding, multi-view video-plus-depth coding, and intermediate view synthesis for multi-view video display applications.

Benefits:

- Understand the general trend of 3D video services.
- Describe the basic requirements for realistic 3D video services.
- Identify the main components of 3D video processing systems.
- Estimate camera parameters for camera calibration.
- Analyze the captured data for image rectification and illumination compensation.
- Apply image processing techniques for color correction and filtering.
- Estimate depth map information from stereoscopic and multi-view images.
- Synthesize intermediate views at virtual viewpoints.
- Review MPEG and JCT-3V activities for 3D video coding.
- Design a 3D video system to handle multi-view video-plus-depth data.
- Discuss various challenging problems related to 3D video services.

Intended Audience: Scientists, engineers, technicians, or managers who wish to learn more about 3D video and related processing techniques. Undergraduate training in engineering or science is assumed.

Instructor: **Yo-Sung Ho** has been developing video processing systems for digital TV and HDTV, first at Philips Labs in New York and later at ETRI in Korea. He is currently a professor at the school of electrical and computer engineering at Gwangju Institute of Science and Technology (GIST) in Korea, and also Director of Realistic Broadcasting Research Center at GIST. He has given several tutorial lectures at various international conferences, including the 3DTV Conference, the IEEE International Conference on Image Processing (ICIP), and the IEEE International Conference on Multimedia & Expo (ICME). He earned his PhD in electrical and computer engineering at the UC Santa Barbara. He has been an associate editor of *IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)*.

SYMPOSIUM PLENARY TALKS

Monday: Overview of Modern Machine Learning and Deep Neural Networks – Impact on Imaging and the Field of Computer Vision, **Greg Corrado, co-founder of Google Brain and Principal Scientist at Google**

Tuesday: Fast, Automated 3D Modeling of Buildings and Other GPS Denied Environments, **Avideh Zakhor, Qualcomm Chair & Professor at UC Berkeley**

Wednesday: Ubiquitous, Consumer AR Systems to Supplant Smartphones, **Ronald T. Azuma, Intel Labs Researcher and Augmented Reality Pioneer**

SYMPOSIUM HIGHLIGHTS

- 18 conferences featuring 30 keynote talks by world reknown experts
- 3D Theatre
- Tours of Stanford University Labs
- Industry Exhibition
- Meet the Future: Showcase of Student and Young Professional Research
- Demonstration Session
- Poster Session
- Welcome Reception
- Women in Electronic Imaging Breakfast
- Human Vision in Electronic Imaging 30th Year Banquet

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