Invited Overview Session

Session: TP1-1.2
Time: Thursday, December 17, 14:30 - 15:00
Place: Room Y301
Chair: Kenneth K.M. Lam, The Hong Kong Polytechnic University (Hong Kong)

Perceptual Coding: Hype or Hope?

Speaker: C.-C. Jay Kuo, University of Southern California, U.S.A.

Abstract
There has been a significant progress in image/video coding in the last 50 years, and many visual coding standards have been established, including JPEG, MPEG-1, MPEG-2, H.264/AVC and H.265, in the last three decades. The visual coding research field has reached a mature stage, and the question "is there anything left for image/video coding?" arises in recent years. One emerging R&D topic is "perceptual coding". That is, we may leverage the characteristics of the human visual system (HVS) to achieve a higher coding gain. For example, we may change the traditional quality/distortion measure (i.e., PSNR/MSE) to a new perceptual quality/distortion measure and take visual saliency and spatial-temporal masking effects into account. Recent developments in this area will be reviewed. Then, one may ask furthermore "Is it sufficient to keep visual coding research vibrant and prosperous for another decade with such a modification?" It is probably not. On the other hand, we may formulate the coding problem dramatically differently from the past - making it fundamentally different with an HVS centric approach. The notion of Just-Noticeable-Differences (JND) will be introduced in this context, and numerous new R&D opportunities will arise accordingly.

Biography
Dr. C.-C. Jay Kuo received his Ph.D. degree from the Massachusetts Institute of Technology in 1987. He is now with the University of Southern California (USC) as Director of the Media Communications Laboratory and Dean's Professor in Electrical Engineering-Systems. His research interests are in the areas of digital media processing, compression, communication and networking technologies. Dr. Kuo was the Editor-in-Chief for the IEEE Trans. on Information Forensics and Security in 2012-2014. He was the Editor-in-Chief for the Journal of Visual Communication and Image Representation in 1997-2011, and served as Editor for 10 other international journals. Dr. Kuo received the National Science Foundation Young Investigator Award (NYI) and Presidential Faculty Fellow (PFF) Award in 1992 and 1993, respectively. He was an IEEE Signal Processing Society Distinguished Lecturer in 2006, and the recipient of the Electronic Imaging Scientist of the Year Award in 2010 and the holder of the 2010-2011 Fulbright-Nokia Distinguished Chair in Information and Communications Technologies. Dr. Kuo is a Fellow of AAAS, IEEE and SPIE. Dr. Kuo has guided 126 students to their Ph.D. degrees and supervised 23 postdoctoral research fellows. He is a co-author of about 230 journal papers, 870 conference papers and 13 books.