Building and Applying Visual Attention Models for Multimedia Systems

SPEAKER

Dr Weisi LIN

Associate Professor
School of Computer Engineering
Nanyang Technological University
Singapore

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VENUE CS Seminar Room, Y6405
6th Floor, Yellow Zone
Yeung Kin Man Academic Building
City University of Hong Kong
83 Tat Chee Avenue
Kowloon Tong

ABSTRACT

Human visual attention (VA) is a result of several million years of human evolution, as the cognitive process of selectively concentrating on certain visual aspects in a scene that are most interesting (e.g. we pay more attention to a colorful flower among green leaves in a picture), and has attracted continuous research effort since William James' time. It is beneficial to model VA computationally and incorporate appropriate models in signal evaluation and processing, since the human is the final receiver and appreciator for most (if not all) such processed signals, and the scarce system resource is better to be utilized in user-centric manners. In addition, there is an increasing need for harmonious human-machine interaction (imagining that robots act as caregivers of senior citizens and salespersons in a future shopping mall), and therefore it would be good if machines possess similar attention mechanisms as humans. Furthermore, VA is effective and efficient, so its computational emulation enables technical advantages in system design (like fast target identification).

In this talk, we will first introduce the research problems associated with VA, as well as the relevant physiological and psychological ground. Afterwards, we are going to discuss the principle of computational VA modelling and the recent advances in the area, including the bottom-up, top-down and combined approaches. Meaningful applications in perceptual quality assessment, image retargeting, video coding, computer graphics, and target identification, as well as the related industrial deployment, are then demonstrated. This talk will also present our opinions toward possible future research and development.

BIOGRAPHY

Dr Lin Weisi is a well-recognized researcher in image processing, perception-based signal modelling and assessment, video compression, and multimedia communication systems. In the said areas, he has published 180+ international journal papers and 230+ international conference papers, 7 patents, 9 book chapters, 2 authored books and 3 edited books, as well as excellent track record in leading and delivering more than 10 major funded projects (with over S$6.5m research funding). He earned his Ph.D. from King's College, University of London. He had been the Lab Head, Visual Processing, in Institute for Infocomm Research (I2R). Currently, he is an Associate Professor in School of Computer Science and Engineering, Nanyang Technological University, where he served as the Associate Chair (Graduate Studies) in 2013-2014.

He is a Fellow of IEEE and IET, and an Honorary Fellow of Singapore Institute of Engineering Technologists. He has been elected as a Distinguished Lecturer in both IEEE Circuits and Systems Society (2016-17) and Asia-Pacific Signal and Information Processing Association (2012-13), and given keynote/invited/tutorial/panel talks to 20+ international conferences during the past 10 years. He has been an Associate Editor for IEEE Trans. on Image Processing, IEEE Trans. on Circuits and Systems for Video Technology, IEEE Trans. on Multimedia, IEEE Signal Processing Letters, Quality and User Experience, and Journal of Visual Communication and Image Representation. He was also the Guest Editor for 7 special issues in international journals, and chaired the IEEE MMTC QoE Interest Group (2012-2014); he has been a Technical Program Chair for IEEE Int'l Conf. Multimedia and Expo (ICME 2013), International Workshop on Quality of Multimedia Experience (QoMEX 2014), International Packet Video Workshop (PV 2015), Pacific-Rim Conf. on Multimedia (PCM 2012) and IEEE Visual Communications and Image Processing (VCIP 2017). He has been awarded Zukunftskolleg Mentorship (2014) by University of Konstanz (Germany), Distinguished Overseas Professorship (2014) by Xidian University (China), and High Impact Research (HIR) Icon (2016) by University of Malaya. He has served as a voting member of 7 IEEE Technical Committees, and on the IEEE ICME Steering Committee (2014-2015). He has been also elected to the European Network on QoE in Multimedia Systems and Services (QUALINET) from a Non-COST Country Institution, based on scientific merits. He believes that good theory is practical, and has delivered 9 major systems and modules for industrial deployment with the technology developed.

All are welcome!