

Academic Seminar

Toward Interpretable and Sustainable AI

Rapid advances in artificial intelligence (AI) and machine learning (ML) have been attributed to the wide applications of deep learning (DL) technologies. There are however concerns with this AI wave. DL solutions are a black box (i.e., not interpretable) and vulnerable to adversarial attacks (i.e., unreliable). Besides, the high carbon footprint yielded by large DL networks is a threat to our environment (i.e., not sustainable). It is important to find alternative AI technologies that are interpretable and sustainable. To this end, I have conducted research on green AI/ML since 2015. Low carbon footprints, small model sizes, low computational complexity, and mathematical transparency characterize green AI/ML models. They differ completely from DL models since they have neither computational neurons nor network architectures. They are trained efficiently in a feedback manner without backpropagation. Green AI/ML models offer energy-effective solutions in cloud centers and mobile/edge devices. They consist of three main modules: 1) unsupervised representation learning, 2) supervised feature learning, and 3) decision learning. Green AI/ML has been successfully applied to various applications. I will use several examples to demonstrate their effectiveness and efficiency.



Dr. C.-C. Jay Kuo

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Dr. C.-C. Jay Kuo received his Ph.D. from the Massachusetts Institute of Technology in 1987. He is now with the University of Southern California (USC) as William M. Hogue Professor, Distinguished Professor of Electrical and Computer Engineering and Computer Science, and Director of the Media Communications Laboratory. His research interests are in visual computing and communication. He is a Fellow of AAAS, ACM, IEEE, NAI, and SPIE and an Academician of Academia Sinica.

Dr. Kuo has received a few awards for his research contributions, including the 2010 Electronic Imaging Scientist of the Year Award, the 2010-11 Fulbright-Nokia Distinguished Chair in Information and Communications Technologies, the 2019 IEEE Computer Society Edward J. McCluskey Technical Achievement Award, the 2019 IEEE Signal Processing Society Claude Shannon-Harry Nyquist Technical Achievement Award, the 72nd annual Technology and Engineering Emmy Award (2020), and the 2021 IEEE Circuits and Systems Society Charles A. Desoer Technical Achievement Award. Dr. Kuo was Editor-in-Chief for the IEEE Transactions on Information Forensics and Security (2012-2014) and the Journal of Visual Communication and Image Representation (1997-2011). He is currently the Editor-in-Chief for the APSIPA Trans. on Signal and Information Processing (2022-2023). He has guided 173 students to their Ph.D. degrees and supervised 31 postdoctoral research fellows.

Date: 4 December 2023 (Monday)

Time: 11:00am – 12:00noon

Venue: SEK 210, 2/F, Simon & Eleanor Kwok Building

Language: English



**** ALL ARE WELCOME ****