Department of Mechanical and Biomedical Engineering

<u>Seminar Series</u>

Physical Field-based Machine Perception for Intelligent Manufacturing

Prof. Kok-Meng LEE

Georgia Inst. of Tech., USA;
Huazhong Univ. of Sci. and Tech., China

Date	January 12, 2018 (Friday)
Time	10:30am
Venue	B6619 (MBE Conference Room), 6/F, Yeung Kin Man Academic Building

Abstract

Recent advances in sensing and perception systems (SPS), which move beyond from point measurements to field representation, enable exciting new technologies in facilitating intelligent manufacturing (IM) capable of evolving with more and more 'smart functions' that ultimately make the process a self-improved system. In machine vision, light has been commonly assumed as the medium for perception. This talk introduces new SPS methods based on physical fields as an alternative or a complement to light for IM. As an essential medium for energy-conversion and signal-processing, electromagnetic fields are widely found in actuators and sensors for in robotics and automation. The new SPS methods creatively use the existing electromagnetic fields to infer its system properties of a distributed-parameter system, and thus eliminate costly complicated external measurement systems. Along with some real-world manufacturing and robotic examples, a method to derive closed-form solutions to physics-based models, reconstruct the distributed-parameter physical fields, and infer its system properties from limited measurements for analyzing and controlling its dynamic behaviors, will be presented in this talk. This talk will conclude with a discussion on existing challenges and future opportunities in response to global calls for developing new "intelligent" technologies" to meet challenges of emerging applications.

About the Speaker

Kok-Meng Lee, received his M.S. and Ph.D. degrees in mechanical engineering from the Massachusetts Institute of Technology in 1982 and 1985, respectively. He has been with the Georgia Institute of Technology since 1985. As a Professor of mechanical engineering, his research interests include human and machine vision, robotics, automation and opto-mechatronics. He is Distinguished Professor (China National 1000 Talent Plan) with the School of Mechanical Science and Engineering at the Huazhong University of Science and Technology, and Pao Yu-Kong Chair Professor of the Zhejiang University.

Dr. Lee is a Fellow of ASME and IEEE. He is the founding Editor-in-Chief for Springer International Journal of Intelligent Robotics and Applications. He serves on the Management Committee (2015-2018, Chair 2017 and Secretary 2018) for the IEEE/ASME Transactions on Mechatronics (TMech); prior to this service, he was Editor-in-Chief (2008-2013), Technical Editor (1995-1999) and guest-edited four focused sections. He co-founded the IEEE/ASME International Conference on Advanced Intelligent Mechatronics in 1997, and serves on its Honorary Advisory Committee. He served on the Executive Committee of ASME Dynamics Systems and Control Division (2013-2107, Chair 2016). He had also held representative positions within the IEEE Robotics and Automation Society: served as Associate Editor for its Trans. on Automation Science and Engineering (2003-2005), Trans. on Robotics and Automation (1994-1998), and Robotics and Automation Magazine (1994-1996), and as Chair or Co-Chair for numerous international conferences; and founded/chaired Technical Committees on Manufacturing Automation (1996-1998) and on Prototyping for Robotics and Automation.

His awards include eight U.S. patents Presidential Young Investigator (PYI) Award, Sigma Xi Junior Faculty Award, International Hall of Fame New Technology Award, Woodruff Faculty Fellow, IEEE/ASME Transactions on Mechatronics Best Paper Award, and ICRA Kayamori Best Automation Paper Award.

_____

Enquiry: 3442 8420

All are Welcome!

MBE Seminar 2017-18/21