Symposium Speakers – Automation and Smart Machines

Dr. Andrew Stevens
Machine Learning Engineer
Sivananthan Laboratories

Compressive Sensing in Transmission Electron Microscopy: Enabling Experiment and Instrument Automation

Dr. Stevens holds a BA from William Penn University, an MS from Washington State University, and a PhD from Duke University. Prior to becoming a scientist at Sivananthan Laboratories, he was a staff scientist at Pacific Northwest National Laboratory, where he led projects on image processing, machine learning, and compressive sensing. Dr. Stevens has patents pending in electron microscopy.

Abstract:
The ability to see atoms as they move is a key enabler for understanding and control of materials and biological processes, such as the storing of charge in Li-ion batteries and drug interactions with cells to cure disease. Traditional technologies require very expensive processes and are limited to a few very stable types of static inorganic structures, such as metals, insulators, and semiconductors. The goal of our research is to enable precise, rapid, and automated sensing by developing new machine learning techniques.

Dr. Simon Mak
Professor of Practice in Entrepreneurship and Associate Director
SMU

Blockchain and the 4th Industrial Revolution

Dr. Simon Mak serves as the VP at Migratec, a Linux development software business launched and sold to investors in Japan. Priviously, Dr. Simon worked in Raytheon and Digital Equipment Corporation, and Mercury Interactive Software, a Silicon Valley venture-backed startup, IPO and sold to HP for $4.5Billion. Dr. Simon is the Moderator of SMU Blockchain Group and stay very active in related research. Dr Simon holds BS Mechanical Engineering from MIT, MBA Finance from SMU Cox School of Business, and PhD in Applied Science from SMU Lyle School of Engineering.

Abstract:
Blockchain, the open source technology that drives cryptocurrencies like Bitcoin and Ether(eum), is in the formative stage of disrupting the world order. Due to its disruptive nature, blockchain is bound to impact manufacturing, and become part of the Industry 4.0 movement. But how does distributed consensus, smart contracts, immutability, transparency, and tokenisation apply to the factory of the future? This seminar will introduce the audience to the basics of blockchain and tokenisation, and then give use cases that are rapidly adopting blockchain. Then a discussion/workshop of its application to Industry 4.0 will be addressed.
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New Reinforcement Learning Structures for Feedback Control and Multi-player Games

Dr. Frank Lewis

Distinguished Scholar Professor
Moncrief-O'Donnell Endowed Chair
The University of Texas at Arlington

F.L. Lewis, National Academy of Inventors, Fellow IEEE, Fellow IFAC, Fellow U.K. Institute of Measurement & Control, PE Texas, U.K. Chartered Engineer, is Distinguished Scholar Professor, Distinguished Teaching Professor, and Moncrief-O'Donnell Chair at The University of Texas at Arlington Research Institute. IEEE Control Systems Society *Distinguished Lecturer*. He obtained the Bachelor's Degree in Physics/EE and the MSEE at Rice University, the MS in Aeronautical Engineering from Univ. W. Florida, and the Ph.D. at Ga. Tech. He is author of 7 U.S. patents, 323 journal papers, 423 conference papers, 19 books, 48 chapters, and 11 journal special issues.

Abstract:
Recent developments in Computational Intelligence in neural networks, artificial intelligence, and bio-inspired learning shows how to advance beyond traditional Optimal and Adaptive feedback control which has been dominating engineered systems since 1960s. This talk introduced more efficient learning feedback controllers combining automatic feedback control, Computational Intelligence techniques, and efficient communication networks modeled using graph topologies. This technology can be used in applications such as electric power micro-grids and human-robot interaction systems. Future energy distribution networks, including smart building systems, are composed of interconnected small-scale microgrid systems. We present a new family of distributed multi-agent games on sparse Communication Graphs that allows frequency synchronization and voltage balance among multiple distributed generators and loads.