

EPSTEIN INSTITUTE SEMINAR ■ ISE 651

Nonparametric Modeling and Prognosis of Condition Monitoring Signals for Internet of Things (IoT) Enabled Systems

ABSTRACT – The Internet of things (IoT) enabled systems have become increasingly available in practice. In such a system, condition monitoring signals are often available from a large number of similar devices. The unprecedented data availability in such systems provides significant opportunities for smart data analytics. In this talk, we establish a non-parametric modeling framework based on transfer/multitask learning that can predict the evolution of condition/system monitoring signals through borrowing strength from historical and in-service data. This framework leverages on multivariate gaussian processes and functional graphical models to establish a unified data analytics framework. Further, a generic distributed estimation scheme for functional data that scales efficiently to high dimensions and minimizes the negative transfer of knowledge between uncorrelated functional outputs is proposed. Consistency in estimation and variable selection (oracle property) are then established. The methodologies are validated using numerical studies and a case study with real world data in the application to cloud-based vehicle health monitoring service systems.



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SPEAKER BIO – **Shiyu Zhou** is a Professor in the Department of Industrial and Systems Engineering at the University of Wisconsin-Madison. He received his B.S. and M.S. in Mechanical Engineering from the University of Science and Technology of China in 1993 and 1996, respectively, and his master's in Industrial Engineering and Ph.D. in Mechanical Engineering from the University of Michigan in 2000. His research interests include industrial analytics and system informatics by integrating statistics, system and control theory, and engineering knowledge for quality and productivity improvement. He has received numerous research grants from various federal agencies and industry companies. He is a recipient of a CAREER Award from the National Science Foundation and the Best Application Paper Award from IIE Transactions. He is a fellow of IISE, ASME, and SME.

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3:30PM – 4:50PM

USC ANDRUS GERONTOLOGY CENTER (GER), Room 206