

EPSTEIN INSTITUTE SEMINAR ▪ ISE 651

Data Fusion and Transfer Learning in Patient Care Life Cycle – From Diagnosis to Care to System-Level Decision Making

ABSTRACT – Technology advancements in diagnostic imaging, remote and smart sensing, and health information systems have resulted in a Big Data environment in health care. It is now possible to track every piece of information related to a patient’s diagnosis, treatment, and care. This offers a great opportunity for Precision Medicine, i.e., to offer the right treatment to the right person at the right time. On the other hand, the size and complexity of the data overwhelm the modeling capability of existing statistical methods. In ASU-Mayo Clinic Imaging Informatics Laboratory (AMIIL), we conduct research that innovates data fusion and statistical machine learning models to tackle emerging problems across the patient care life cycle from diagnosis, treatment, care, through to system-level decision making.

In this talk, Dr. Li will focus on the methodological development of transfer learning, a class of machine learning models, and the application on several health care problems AMIIL is working on in collaboration with clinical collaborators, including migraine subtype discovery and Parkinson’s disease telemonitoring. Transfer learning is a basic learning ability of human beings. It refers to the ability that people can intelligently apply knowledge previously learned in one domain to solve the problem in a related new domain faster or with better solutions. Transfer learning, as a statistical modeling approach, has a similar nature. It refers to methods that integrate knowledge of old domains and the data of a new domain, in order to develop a model for the new domain that is better than using the data of the new domain alone. Transfer learning is an optimal approach for Precision Medicine, in which patient-specific models need to be established to provide diagnosis, care, and treatment plans optimized for each patient’s unique characteristics.

SPEAKER BIO – Dr. Jing Li is an associate professor in Industrial Engineering at Arizona State University. She received her B.S. from Tsinghua University in China, and an M.A. in Statistics and a Ph.D. in Industrial and Operations Engineering from the University of Michigan. Her research interests are data fusion and statistical machine learning intersecting with health care domains having complex data structures, such as multi-source, multi-level, multi-task, high-dimensionality, and heterogeneity. Her methodological development emphasizes integration of data-driven approaches with domain knowledge. Dr. Li’s research is sponsored by NSF, NIH, DOD, Arizona State, and Mayo Clinic.



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3:30PM – 4:50PM

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