

Department of Systems Engineering and Engineering Management

Seminar Series

Exploring Population Heterogeneity: A Bayesian Nonparametric Approach

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Date	31 May 2018 (Thursday)
Time	2:30pm - 3:30pm
Venue	P7303, 7/F, Yeung Kin Man Academic Building

Abstract

Conventional statistical modeling often assumes a homogenous population of units (e.g., products, patients, etc.) while in many real applications, the overall population can be quite heterogeneous. For instance, failure-time data of products (e.g., integrated circuits, automobiles, etc.) often exhibit heterogeneity due to a variety of design and manufacturing issues, such as material quality inhomogeneity, unverified design changes, and manufacturing defects. Neglecting such heterogeneity may result in inaccurate reliability assessment and ineffective maintenance decisions. In healthcare application, due to the highly varied characteristics among elderly people, their functional limitation and performance degradation are also heterogeneous, thus generating heterogeneous needs of different long-term care settings. Successful modeling heterogeneous aging population will help develop more proactive and adaptive long-term care preparedness decisions. Motivated by the above application examples, in this talk, I will introduce a Bayesian nonparametric approach in modeling different types of heterogeneous data structures, namely time-to-event data and longitudinal data. The proposed model formulation relaxes the conventional modeling assumption of pre-specifying a fixed number of sub-populations. Bayesian sampling algorithms are also developed to address a

series of model estimation difficulties, such as complex dependency, infinite dimensionality and prior non-conjugacy. The resulting estimation algorithm will further allow joint model parameters estimation and sub-population number identification in a one-step procedure.

About the Speaker

Dr. Mingyang Li an Assistant Professor in the Department of Industrial and Management Systems Engineering at the University of South Florida. He received his PhD in Systems and Industrial Engineering from the University of Arizona. His research interests focus on data analytics and system informatics with diverse applications in reliability & quality, healthcare, energy, homeland security, manufacturing, etc. He develops and applies sophisticated statistical methodologies and computational tools, integrated with domain knowledge, to tackle complex problems (e.g., modeling, prediction, design, monitoring, diagnostics, prognostics, planning, scheduling, control, etc.) in a complex data environment and meet with challenges in a Big Data era. His research has been published in high quality journals, such as ISE Transactions, IEEE Transactions on Reliability, Reliability Engineering & System Safety, Journal of Quality Technology and Quality Engineering.

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All are Welcome!