



Department of Systems Engineering
and Engineering Management

香港城市大學
City University of Hong Kong

Seminar Series

Hurdle Blockmodels for Sparse Network Modeling

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Date: 19 December 2019 (Thursday)

Time: 10:30 am - 11:30 am

Venue: P7303, Yeung Kin Man Academic Building (YEUNG), City University of Hong Kong

Abstract

A variety of random graph models have been proposed in the literature to model the associations within an interconnected system and to realistically account for various structures and attributes of such systems. In particular, much research has been devoted to modeling the interaction of humans within social networks. However, such networks in real-life tend to be extremely sparse and existing methods do not adequately address this issue. In this work we propose an extension to ordinary and degree corrected stochastic blockmodels that accounts for a high degree of sparsity. Specifically, we propose hurdle versions of these blockmodels to account for community structure and degree heterogeneity in sparse networks. We use simulation to ensure parameter estimation is consistent and precise, and we propose the use of likelihood ratio-type tests for model selection. We illustrate the necessity for hurdle blockmodels with a small research collaboration network as well as the infamous Enron email exchange network. Methods for determining goodness-of-fit and performing model selection are also proposed.

About the Speaker

Nathaniel is an Assistant Professor of Statistics at the University of Waterloo (UW) in the Department of Statistics and Actuarial Science. From 2015-2018 Nathaniel held a faculty position in the Department of Mathematics and Statistics at the University of San Francisco where he served as Program Director for the undergraduate data science program. Prior to this, Nathaniel earned BMATH (2010), MMATH (2011) and PhD (2015) degrees in Statistics from the University of Waterloo. His research interests lie at the intersection of data science and industrial statistics. His publications span topics including experimental design and A/B testing, process monitoring and social network surveillance, network modeling, survival and reliability analysis, and the assessment and comparison of measurement systems.

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