Data Science Seminar

Hosted by Department of Mathematical Sciences

- Date: Tuesday, April 27 , 2021
- Time: 12:00pm – 1:00pm
- Room: Via Zoom
- Speaker: Melody Ghahramani (The University of Winnipeg)
- Title: Time Series Regression for Zero-Inflated and Overdispersed Count Data: A Functional Response Model Approach

Abstract

Count time series data feature prominently in epidemiology, business, and environmental sciences. Often, such data exhibit zero-inflation and overdispersion in addition to serial dependence. Parametric models such as the negative binomial distribution are employed to account for overdispersion. In practice, the conditional variance structure may be unknown or may not be negative binomial. In this paper, a distribution-free approach for estimation of regression parameters of conditionally overdispersed and zero-inflated time series models is developed. Parameter estimates are optimal in the Godambe-information sense. Simulation studies indicate that our method is robust to model misspecification with small relative bias and nearly the same efficiency as that of the MLE for some observation-driven count time series processes. A case study comparing our method with fully parametric methods using weekly syphilis counts from 2007–2010 in Virginia, USA, illustrates the benefit of our method.

Bio

Melody Ghahramani is Professor in the Department of Mathematics & Statistics at the University of Winnipeg. She earned her Ph.D. from University of Manitoba in 2007. Her research interests include time series analysis, theory of estimating functions, James-Stein shrinkage estimation, and Generalized Additive Mixed Models, with applications in health statistics and environmetrics.