RUTGERS
School of Arts and Sciences

Department of Statistics

DEPARTMENT OF STATISTICS

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Renewable Estimation and Incremental Inference with Streaming Data

March 27, 2019
3:20 – 4:20pm
Light refreshments will be served
110 Frelinghuysen Road
Hill Center, Room 552

Abstract: I will present a new statistical paradigm for the analysis of streaming data based on renewable estimation and incremental inference in the context of generalized linear models. Our proposed renewable estimation enables us to sequentially update the maximum likelihood estimation and inference with current data and summary statistics of historic data, but with no use of any historic raw data themselves. In the implementation, we design a new data flow, called the Rho architecture to accommodate the data storage of current and historic data, as well as to communicate with the computing layer of the Spark system in order to facilitate sequential learning. We establish both estimation consistency and asymptotic normality for the renewable estimation and incremental inference for regression parameters. We illustrate our methods by numerical examples from both simulation experiments and real-world analysis. This is a joint work with Lan Luo.

Bio: Dr. Song is Professor of Biostatistics and Associate Chair for Research at the Department of Biostatistics, School of Public Health in the University of Michigan, Ann Arbor. He received his PhD in Statistics from the University of British Columbia, Vancouver, Canada in 1996. He was a faculty member at the Department of Statistics and Actuarial Science, University of Waterloo, Canada (2004-2007) and a faculty member at the Department of Mathematics and Statistics, York University, Toronto, Canada (1996-2004). Dr. Song's research interests include big data analytics, high-dimensional data analysis, longitudinal data analysis, meta-analysis, missing data problems, spatiotemporal modeling, and statistical methods in omics data analysis. He is interested in data science applications in the areas of asthma, environmental health sciences, nephrology and nutritional sciences. Dr. Song was awarded to prestigious John von Neumann's Professorship at Technical University of Munich, Germany in 2013. He is ASA Fellow and Elected Member of International Statistical Institute. Dr. Song now serves as an Associate Editor of Journal of American Statistical Association, Canadian Journal of Statistics, and Journal of Multivariate Analysis, and previously served as Associate Editor of Statistica Sinica, Journal of Statistical Planning and Inference, and Sankhya. Dr. Song's research is being currently funded by 9 active NIH and NSF grants.