

Computer Science Seminar Series

National Capital Region

Order-Restricted Inference for Clustered ROC Data with Application to Fingerprint Data

Speaker: Dr. Larry Tang
George Mason University
Friday, November 17, 2017
1:00PM- 2:00PM, NVC T3

Abstract

Estimating the receiver operating characteristic (ROC) curve has been an important problem in diagnostic medicine, biometric recognition, signal detection, and others. In a variety of applications, the data are generally collected under two or more ordered experimental conditions, which accordingly results in a natural stochastic ordering among the observations under these different experimental conditions. More importantly, statistical inference incorporating such a stochastic ordering condition is expected to improve estimation efficiency. In this talk, we propose an ordered restricted estimator for the ROC curve, as well as the area under the curve and the partial area under the curve to accommodate the clustered and correlated data structure. We derive asymptotic properties of the proposed order-restricted estimators and theoretically show that they possess lower mean-squared errors than the existing estimators. Simulation studies demonstrate better performance of the newly proposed estimators over existing methods for finite samples. The proposed method is further illustrated using the fingerprint matching data from the National Institute of Standards and Technology Special Database 4.

Biography



Larry Tang is an associate professor in the Department of Statistics at George Mason University. He is a statistician specializing in statistical methodology and collaborative research. His current methodological research areas include statistical methods in forensics, diagnostic medicine, group sequential designs and substance abuse research and criminology. He received his Ph.D. in Statistics from Southern Methodist University in 2005. He did postdoctoral training in the Department of Biostatistics at University of Washington.