Discrete Mathematics Seminar

Time: Friday, 21 October 2011, 12:30-1:30 PM
Room: 238 Derrick Hall
Title: Doubly Robust Nonparametric Multiple Imputation for Missing Data
Speaker: Dr. Qi Long, Department of Biostatistics and Bioinformatics, Emory University

Abstract:

Missing data are common in medical and social science studies and often pose a serious challenge in statistical analysis. We propose a new nonparametric multiple imputation approach for ignorable missing data which uses two working models to achieve dimension reduction and define the imputing sets for the missing observations. Compared with existing nonparametric imputation procedures, our approach can better handle covariates of high dimension, and is doubly robust in the sense that the resulting estimator remains consistent if either of the working models is correctly specified. Compared with existing semiparametric doubly robust methods, our nonparametric MI approach is more robust to the misspecification of both working models; it also avoids the use of inverse-weighting and hence is less sensitive to missing probabilities that are close to 1. We propose a sensitivity analysis for evaluating the validity of the working models, allowing investigators to choose optimal weights so that the resulting estimator relies either completely or more heavily on the working model that is likely to be correctly specified and achieves improved efficiency. We investigate the asymptotic properties of the proposed estimator, and perform simulation studies to show that the proposed method compares favorably with some existing methods in finite samples. The proposed method is further illustrated using data from a colorectal adenoma study.