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香港浸會大學
HONG KONG BAPTIST UNIVERSITY

香港浸會大學理學院
HKBU Faculty of Science

SRCC Workshop on Statistics and Applied Probability

Date : 8 August 2012 (Wednesday)

Time : 2:00 p.m. – 5:30 p.m.

Venue : FSC1217, Fong Shu Chuen Library
Ho Sin Hang Campus
Hong Kong Baptist University

Prof. Yuedong Wang (University of California, Santa Barbara)
Title: Nonparametric Nonlinear Regression Models
Abstract: Almost all of the current nonparametric regression methods such as smoothing splines, generalized additive models and varying coefficients models assume a linear relationship when nonparametric functions are regarded as parameters. In this talk we present a general class of nonparametric nonlinear models that allow nonparametric functions to act nonlinearly. They arise in many fields as either theoretical or empirical models. We propose new estimation methods based on an extension of the Gauss-Newton method to infinite dimensional spaces and the backfitting procedure. We extend the generalized cross validation and the generalized maximum likelihood methods to estimate smoothing parameters. Connections between nonlinear nonparametric models and nonlinear mixed effects models are established. Approximate Bayesian confidence intervals are derived for inference. We will also present a user friendly R function for fitting these models. The methods will be illustrated using two real data examples.

Dr. Yebin Cheng (Shanghai University of Finance and Economics)
Title: Efficient Estimation of an Additive Quantile Regression Model
Abstract: In this paper, two non-parametric estimators are proposed for estimating the components of an additive quantile regression model. The first estimator is a computationally convenient approach which can be viewed as a more viable alternative to existing kernel-based approaches. The second estimator involves sequential fitting by univariate local polynomial quantile regressions for each additive component with the other additive components replaced by the corresponding estimates from the first estimator. The purpose of the extra local averaging is to reduce the variance of the first estimator. We show that the second estimator achieves oracle efficiency in the sense that each estimated additive component has the same variance as in the case when all other additive components were known. Asymptotic properties are derived for both estimators under dependent processes that are strictly stationary and absolutely regular. We also provide a demonstrative empirical application of additive quantile models to ambulance travel times.

Dr. Gaorong Li (Beijing University of Technology)
Title: Robust Rank Correlation Based Screening
Abstract: Independence screening is a variable selection method that uses a ranking criterion to select significant variables, particularly for statistical models with nonpolynomial dimensionality or "large p, small n" paradigms when p can be as large as an exponential of the sample size n. In this paper, we propose a robust rank correlation screening (RRCS) method to deal with ultra-high dimensional data. The new procedure is based on the Kendall tau correlation coefficient between response and predictor variables rather than the Pearson correlation of existing methods. The new method has four desirable features compared with existing independence screening methods. First, the sure independence screening property can hold only under the existence of a second order moment of predictor variables, rather than exponential tails or alikeness, even when the number of predictor variables grows as fast as exponentially of the sample size. Second, it can be used to deal with semiparametric models such as transformation regression models and single-index models under monotonic constraint to the link function without involving nonparametric estimation even when there are nonparametric functions in the models. Third, the procedure can be largely used against outliers and influence points in the observations. Last, the use of indicator functions in rank correlation screening greatly simplifies the theoretical derviation due to the boundedness of the resulting statistics, compared with previous studies on variable screening. Simulations are carried out for comparisons with existing methods and a real data example is analyzed.

Dr. Yiping Yang (Chongqing Technology and Business University)
Title: Regularized t distribution and its applications
Abstract: One major goal in microarray studies is to identify genes that are differentially expressed between groups. To achieve this goal, a number of approaches to improving the hypothesis testing have emerged, e.g., the regularized t-test by Baldi and Long (2001). In this paper, we introduce the regularized t distribution and derive its properties, including the probability density function and the moments. Meanwhile, we introduce the non-central regularized t distribution as well as investigate the corresponding properties. The usefulness of the proposed distributions is demonstrated via both simulation study and real data analysis.

Dr. Xin Lai (The Chinese University of Hong Kong)
Title: A Multi-stage Single-arm Phase II Design for Mixed Response and Time-to-event Endpoints
Abstract: The objective of Phase II clinical trials is to determine if a treatment has potential efficacy that warrants further study. The efficiency of conventional Phase II trial design has been under a lot of debates in the last decade, especially when the study regimen is cytostatic in nature. In most cancer specific diseases, we have accumulated adequate data on time-to-progression for patients receiving standard therapy. Adding an endpoint using time to progression to a phase II design would increase our ability to select a more promising treatment for further development. We proposed a single-arm phase II design extending Zee's (1999) multinomial design to fully utilize mixed endpoints with response rate and time to event. The advantage of this design is the applicability to effectively screen either cytotoxic or non-cytotoxic treatments. The proposed design required smaller expected sample size than other methods, while maintaining the desirable statistical properties.

Dr. Shaoli Wang (Shanghai University of Finance and Economics)
Title: Inference for a Semi-parametric Mixture Model
Abstract: In this talk we discuss the statistical inference for a two-component mixture models. The first component has a known distribution, but little is known about the second component, except that it is symmetric about its mean. In particular, no parametric form is assumed for the second component. We refer to this model as a semi-parametric mixture model. We prove the identifiability of the model, and propose an estimator for the location and proportion parameters of the second component. Asymptotic properties of the proposed estimator are established. Simulations are given for comparison with a competitive estimator.

Dr. Jun Li (Hainan Normal University)
Title: Some New Smooth Density Estimators for Length Biased Data
Abstract: Length biased sampling occurs naturally in many statistical applications. One aspect of length biased data in which people are interested is estimating unweighted density with the observed sample. Since most length biased data is nonnegative, unweighted density has a support with a nonnegative finite end point. The current proposed kernel density estimator with symmetric kernel may not be appropriate. Here we propose some new smooth density estimators and study their asymptotic properties. Moreover, through our investigations using numerical simulation and a real length biased data example, we find that the new smooth estimators perform much better than kernel estimators.

- All interested are welcome -

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