Spring schedule for statistics seminars

All seminar talks are scheduled for 2pm, every other Friday, in Physics West seminar room 103.

25/1/13 - Dr. Silvia Liverani

Title
A new Bayesian Dependence Model for Regulatory Networks

Abstract
The usual assumption for clustering is that observations in the same cluster share the same expression profile – accounting for measurement error – and are expressed independently of observations outside their own cluster. However, when searching over certain types of data, it is unrealistic to assume independence between clusters as, for instance, in the context of microarray experiments, it is well known that genes belong to regulatory pathways and activate and inhibit each other. In this talk we present a formal methodology for developing the semantics of new Gaussian graphical models so that these are customised to be faithful to a given scientific domain. This new class of models is designed to utilize as much as possible the convenient separation properties of a Bayes cluster model whilst continuing to respect the types of dependence that scientists might conjecture exist. We demonstrate how this class of models can be generalized to encompass more credible deterministic functional dependence structures associated with regulation. We show that it is possible to search over a large number of different hypothesized regulation models, just as in Bayes cluster models, and we interpret the results in a causal framework that provides the scientist with a new hypothesis-generating tool. We demonstrate the efficacy of these methods on a class of circadian models where interest focuses on the regulatory relationships between different genes. Each member in the class can be evocatively labelled by a regulation graph closely resembling in its semantics the graphical representations of regulation familiar to biologists.

8/2/13

- Yousef Alharbi

Title
Error Variance Estimation in Nonparametric Regression Models

Abstract
Estimation of the error variance is one of the most important issues in nonparametric regression models. The estimation of the error variance is essential to assess the variability in the estimated mean function; to predict a new Y for a given x; to assess the goodness of fit of the estimated mean function or to compute its 95 % confidence interval. Our interest in this talk is to focus on the setting when the error variance is a function of x. First, we propose a new error variance estimator by smoothing $e_i Y_i$s as opposed to smoothing e_i^2s in the standard residual-based estimators. For this proposed estimator, we carry out the mean square analysis and we then discuss the optimal bandwidth for it. We also study the asymptotic behaviour of the proposed estimator and we provide simulation study to exhibit the performance of the estimator. Thus, in the finite sample, we assess the effect of the mean function and the bandwidths on the performance of the proposed estimator.

- Christopher Partlett

Title
Measuring asymmetry and testing symmetry

Abstract
We show that current tests of symmetry have an undesirable feature, namely they do not necessarily generate power that is representative of the size of asymmetry in the underlying distribution. Recent research has produced a new measure of symmetry, which has been shown to do an admiral job of quantifying the amount of asymmetry. We propose a new test based upon this measure, and the performance of this proposed test is analysed through the use of computer simulations.

22/2/13 - Prof. Wenyang Zhang

Title
Semiparametric Likelihood Estimation in the Survival Models with Informative Censoring

Abstract
Semiparametric proportional hazard regression models are the cornerstone in modern survival analysis. Most estimation methodologies developed in the literature, such as the famous partial likelihood based estimation, are built on the ground that the censoring is noninformative. However, in many applications, the censoring is indeed informative. In this paper, we study the survival regression models with an informative censoring that is easy to detect and apply. A very important problem in practice is how to estimate the survival models more efficiently with the information from the informative censoring. We propose a semiparametric maximum likelihood approach that is easily implementable to estimate both the nonparametric baseline hazard and the parametric coefficients in the survival models with informative censoring. Differently from the methods in the literature, we do not apply least informative approach to baseline, which does not work well in our simulation. We solve the difficulty in semiparametric estimation by suggesting an indirect application of local kernel smoothing to the baseline. Asymptotic theory of the proposed estimators is established under informative and noninformative likelihoods, respectively. We suggest a cross-validation method to detect the informative censoring in application. The performances of the estimators in finite samples are investigated by Monte Carlo simulation. Both asymptotic theory and simulation show that the suggested semiparametric approach provides more efficient estimators of the parameters for informative censoring, and estimates the baseline function accurately. The proposed method is applied to analyze the data about the infants hospitalized for pneumonia, which leads to interesting findings.

8/3/13 - Dr. Roya Gholami

Title
TBA.

Abstract
TBA.

22/3/13 - Dr. Guiqing Lily Yao

Title
TBA.

Abstract
TBA.