

Seminars on Statistics in Marketing and Psychology, Winter 2006

Research seminars in Marketing, Psychology and Statistics on FRIDAYS 2.30-4.00pm this term, in Cockins Hall 212.

*****NOTE The seminar on Friday February 3rd will be in
Fisher Hall 500 ***

These seminars will consist mainly of ongoing research presentations and discussions of published papers. You are welcome to join us.

LIST OF SEMINARS

January 13: Trish Van Zandt, Psychology Department
A discussion of “Neural basis for deciding, choosing and acting”
by Jeffrey D. Schall The paper can be found on the website
<http://www.stat.ohio-state.edu/~amd/seminar.html>

January 20: Mario Peruggia, Statistics Department
Mario Peruggia Statistics Department.
Bayesian Analysis of Time Evolution of Earthquakes

—followed by a discussion by Thomas Otter on possible links between these models and marketing models.

The paper can be found at the JSTOR link
<http://links.jstor.org/sici?sici=0162-1459%28199609%2991%3A435%3C1209%3ABAO%3E2.0.CO%3B2-K>

We adopt a hierarchical Bayesian framework to analyzing the occurrence times of seismic events and their magnitudes and illustrate our methodology with data from the historical catalog of Italian earthquakes. This approach is attractive because (1) it allows researchers to use early, but possibly less trustworthy, catalog information from the same region or catalog information from areas considered to be geologically similar, (2) it allows researchers to derive predictive distributions for geophysical quantities of practical importance and (3) the methodology can be extended to provide simultaneous Bayesian modeling of occurrence times of seismic events, their magnitudes, and the locations of their epicenters. We follow Ogata (1988) by choosing an epidemic model for the process of occurrence times conditional on the observed magnitude values. The locations of, and dependencies between, the model parameters are determined on the basis of historical and physical information. The overall prior variability is deliberately made di use. We generate samples from the joint posterior distribution of the model parameters by using a variant of the Metropolis-Hastings algorithm (Tierney 1991). We use the results in a variety of ways including the construction of pointwise posterior con dence bands for the conditional intensity of the point process as a function of time. This is joint work with Thomas J. Santner

January 27: Shiling Ruan, Statistics Department
The Poisson Race Model and Applications in Analysis of Conjoint Choice Data

It is of great interest for marketing researchers to study people's choice behavior when a set of alternatives (products) are presented to consumers. The multinomial logit model has commonly been used to analyze choice data. However, the model does not take into account the stochastic nature of human decision process and can not describe some of the realistic choice behavior. In this talk, a new class of choice models - the Poisson race models, is going to be discussed. The race models are a special case of the sequential sampling models, which have long been employed in modeling response time in experimental psychology such as pattern recognition. These models assume the observer's decision is a process of accumulating evidence over time for the various alternatives. As soon as the evidence for one alternative exceeds some criterion value, a response is generated. In this talk, the independent Poisson race model and its implications will first be discussed. Then, a dependent Poisson race model is proposed. The dependent model is applied to conjoint choice data with Bayesian techniques. The dependent Poisson race model demonstrates superior performance in modeling dependence among alternatives, as compared with the independent race model and traditional multinomial logit models.

February 3rd in **Fisher 500** Thomas Otter, Marketing Department
Investigating endogeneity bias in conjoint models
Joint work with Qing Liu (Statistics) and Greg Allenby (Marketing).

The use of adaptive designs in conjoint analysis has been shown to lead to an endogeneity bias in part-worth estimates using sampling experiments. In this paper, we re-examine the endogeneity issue in light of the likelihood principle. The likelihood principle asserts that all relevant information in the data about model parameters is contained in the likelihood function. We show that adhering to the likelihood principle leads to analysis where the endogeneity bias becomes irrelevant. The likelihood principle is implicit to Bayesian analysis, and discussion is offered about the role of sampling experiments in Bayesian versus frequentist analysis.

February 10: Hal Arkes, Psychology Department
Do People Prefer Gifts or the Cash Value of the Gift?

Because money is more fungible than a gift of the same value, rational people should prefer the money to the gift. I will present research which shows that this prediction fails in some instances. Most of the research was collected in my lab, but I also have available in-house industry data which suggest that this surprising phenomenon is not an anomaly.

February 17th: Jessica Kohlschmidt, Statistics Department
Ranked Set Sampling: An Alternative to Simple Random Sampling

—followed by a group discussion of possible uses of ranked set sampling in marketing or psychology

Ranked set sampling (RSS) is an alternative to simple random sampling that has been receiving considerable attention in the statistics literature. Researchers have shown that ranked set sampling outperforms simple random sampling in many situations by reducing the variance of a parameter estimator, thereby providing the same accuracy with a smaller sample size than is needed in simple random sampling. Ranked set sampling involves preliminary ranking of potential sample units on the variable of interest using judgment or an auxiliary variable to aid in sample selection. Ranked set sampling prescribes the number of units from each rank order that are to be measured.

In this talk, I will first describe the most basic form of RSS, balanced RSS with perfect rankings. Then we will talk about the more usual case in which rankings are imperfect. In some situations, RSS may be of more use if we select units in a fashion that is unbalanced for each ranking group. RSS is thought to have the most benefit when the cost of actually collecting measurements on the variable of interest for each individual unit is costly. If we can use ranking to reduce the number of units needed in the sample, then we can save considerable time and money in the process of sampling.

The paper can be found on the website
<http://www.stat.ohio-state.edu/~amd/seminar.html>

February 24th: Xinyi Xu, Statistics Department
High Dimensional Predictive Densities

Commonly used statistical approaches to prediction provide a single number as a forecast of an unknown future quantity, sometimes attaching an error bound to convey the uncertainty of the prediction. A more comprehensive approach to prediction provides a complete predictive estimate that assigns probabilities to every possible outcome that may occur. Because they are more comprehensive, such descriptions of uncertainty lead to better decision making and sharper assessment of risks. In this talk, the problem of estimating the predictive density of a multivariate normal variable under Kullback-Leibler loss is considered. We show that there exist broad classes of formal Bayes rules, including Bayes rules under superharmonic priors, which dominate the best invariant minimax estimator for this problem. We also show that the class of generalized Bayes estimators is a complete class, and obtain sufficient conditions for the admissibility of formal Bayes rules. Fundamental similarities and differences with the parallel theory of estimating a multivariate normal mean under quadratic loss are described throughout.

March 3rd: Chris Hans, Statistics Department
Shotgun stochastic search for regression with many candidate predictors

Model search in regression with very large numbers of candidate predictors raises challenges for both model specification and computation, and standard approaches such as Markov chain Monte Carlo (MCMC) and step-wise methods are often infeasible or ineffective. We describe a novel shotgun stochastic search (SSS) approach that explores "interesting" regions of the resulting, very high-dimensional model spaces to quickly identify regions of high posterior probability over models. We describe algorithmic and modeling aspects, priors over the model space that induce sparsity and parsimony over and above the traditional dimension penalization implicit in Bayesian and likelihood analyses, and parallel computation using cluster computers. We discuss an example from gene expression cancer genomics, comparisons with MCMC and other methods, and theoretical and simulation-based aspects of performance characteristics in large-scale regression model search. We also provide software implementing the methods.

LOOKING AHEAD TO THE SPRING TERM

Ling-Jing Kao, Marketing Department, will give an updated version of her job talk. There will be some guest speakers from outside the three departments and we will try to isolate some new problems and research teams.

Qing Liu and Angela Dean, Statistics Department
Criteria for designs for hierarchical and other models