Fall Meeting of the Montana Chapter of the American Statistical Association

Tuesday, September 18, 2012

USGS Northern Rocky Mountain Science Center
2327 University Way, Bozeman
(From campus - continue south on 11th across Kagy Blvd. It's the big building to the southwest of the football stadium. Parking is available to the east of the building.)

9:15 - 9:55 Coffee, treats, and socializing.

9:55 - 10:00 *Opening Remarks*
Dr. Mark Greenwood (Vice-president of the MT Chapter)

10:00 - 10:40 **2010 National Sample Frame**
Dr. Susan Hinkins, National Opinion Research Center

10:40 - 11:00 **Correcting for Time-of-Day to Compare Satellite Images and Ground Counts of Weddell Seals in Big Razorback Haul-Out (Erebus Bay, Antarctica)**
Katie Banner, Ph.D. Statistics student, MSU

11:00 - 11:20 **Genetic Algorithms and Generating Optimal Experimental Designs for Nonlinear Models**
Sydney Akapame, Ph.D. Statistics student, MSU

11:25 - 1:00 ******* LUNCH BREAK (No host)*******

1:00 - 1:45 **Bayes Neutral Zone Classifiers with Applications to Nonparametric Unsupervised Settings** (Keynote speaker)
Dr. Daniel R. Jeske, Professor and Chair, Department of Statistics, University of California - Riverside

1:45 - 2:00 **What can the ASA do for you?**
Dr. Daniel R. Jeske, Vice-Chair District 6 of ASA Chapters

2:00 - ?:?? Business Meeting (Dr. Steve Cherry)

Abstracts

Genetic Algorithms and Generating Optimal Experimental Designs for Nonlinear Models

Sydney Akapame
Montana State University

When a response function is nonlinear in the model parameters, the task of obtaining an optimal (or near-optimal) design is nontrivial because of the dependence of the information matrix on the unobservable parameters. The optimal experimental design literature, for a long period of time, has seen a proliferation of algorithmic strategies aimed at addressing the optimal design problem for a wide class of statistical models. These algorithms, however, have not been particularly efficient when the models in question are nonlinear. Genetic algorithms, one of a wide variety of stochastic optimization algorithms which more often than not perform better than traditional optimization algorithms, are introduced and the their application to finding an optimal design for several nonlinear models is demonstrated.

Correcting for Time-of-Day to Compare Satellite Images and Ground Counts of Weddell Seals in Big Razorback Haul-Out (Erebus Bay, Antarctica)

Katie Banner
Montana State University

This project is aimed to improve and expand upon an ongoing study of Weddell Seal (*Leptonychotes weddellii*) populations along the Antarctic coast. Ten popu- lations of seals living in Erebus Bay have been studied for the last 50 years. The proximity of McMurdo Station to Erebus bay allows scientists to easily access these seals for observation. The focus of this project concerns only the seals that use the Big Razorback (BR) site as a breeding ground. Satellite images, ground counts, and ground camera data are available from BR for the year 2010. Although the satellite images are capable of identifying seals on the ice, they were obtained at different times of the day and different days of the year than the ground counts. Therefore, these satellite counts need to be adjusted before being compared to ground counts. The objective of this project is to develop a method to accurately count adult seals using satellite imagery alone. The use of such technology includes benefits for both the ecologists and the seals alike as it is non-invasive and does not require the use of field personnel. A potential implication of this method would be the ability to estimate abundances for seal populations inaccessible to humans. This analysis could not account for all discrepancies between the satellite and ground counts, but is successful for certain satellite photos. It is believed that with a designed experiment, this results of this method can be improved. This presentation will discuss an evaluation of the feasibility of this project as well as some of the obstacles encountered along the path to building an appropriate correction factor. It will be concluded with a discussion of what was learned from this process and where future work is headed.

2010 National Sample Frame

Susan Hinkins
NORC

For many health and social science surveys, the household is the unit of interest. However, adequate sample frames for households are not generally available and can be expensive to create. This talk will describe a sample frame which is representative of over 99% of U.S. households and which is used by NORC for a variety of household surveys.

Bayes Neutral Zone Classifiers with Applications to Nonparametric Unsupervised Settings

Daniel Jeske
Department of Statistics, University of California - Riverside

Neutral zone classifiers allow for a region of neutrality when there is inadequate information to assign a predicted class with suitable confidence. A neutral zone classifier is defined by classification regions that trade off the cost of an incorrect classification against the cost of remaining neutral. In this paper, we derive a Bayes neutral zone classifier and demonstrate that it outperforms previous neutral zone classifiers with respect to the expected cost of misclassifications and also with respect to computational complexity. Our neutral zone classifier is illustrated with a microbial community profiling application in which no training data is available. Previous applications of neutral zone classifiers have only dealt with the scenario where training data exists.

Thank you to the Northern Rocky Mountain Science Center of the USGS and Dr. Kathryn Irvine for hosting the conference, the ASA for funding Dr. Daniel Jeske's travel, and Dr. Megan Higgs for assistance in organizing this conference.