Submittee: Gemai Chen
Date Submitted: 2013-11-14 14:48
Title: The 35th Annual Meeting of Alberta Statisticians
Event Type: Conference-Workshop

Location:
Mathematical Science Building 527, Department of Mathematics and Statistics, University of Calgary

---

Dates:
October 5, 2013

Topic:
Celebration of the International Year of Statistics (2013)

Organizers:
Chen, Gemai; Department of Mathematics and Statistics, University of Calgary /// Chough, Keumhee Carriere; Department of Mathematical and Statistical Sciences, University of Alberta

---

Speakers:
Dr. Zhenguo Winston Qiu; Surveillance & Reporting /C-MORE, CancerControl Alberta, Alberta Health Services // The Mixture of Cancer Projection Methods Using Age, Period, and/or Cohort Models // Cancer incidence/mortality can be projected by extrapolating past trends using statistical models. Trends in cancer incidence may be described as trends over age at diagnosis, year of diagnosis (period), and/or year of birth (cohort). Cancer rates usually increase with age. Period effects are related to events that quickly change incidence or mortality with the same order of magnitude regardless of the age group. Cohort effects involve risk factors that are shared by a specific generation as they age together. Based on the age-period-cohort analysis (Clayton & Schifflers, 1987), the best fitted model for a given data can be selected and used for projection. The candidate models are: age-only, age-period (including common trend and age-specific trend), age-cohort and age-period-cohort; negative-binomial distribution may replace the Poisson distribution when over-dispersion appears. An R-package "Canproj" was developed to undertake the analysis for cancer projection. Validation analyses using Alberta and Nova Scotia Cancer Registry data have shown that the "Canproj" mixture methods outperform other traditional used approaches, including the five-year average method, Poisson regression method (Dyba T, Hakulinen & Paivarinta, 1997), joinpoint regression method (Kim, Fay & Feuer et al. 2000), the polynomial regression & natural spline methods (Carstensen, 2007), the "Nordpred" method (Moller, 2004) and the Bayesian methods with different prior settings (Bray, 2002; Cleries, Ribes & Esteban et al, 2006). */// Dr. Ivor Cribben; Dept of Finance and Statistical Analysis and Department of Mathematical and Statistical Sciences, University of Alberta // New Methods for Detecting Granger Causality Change Points and Non-linear Causality // Identifying dynamic causal relationships in time series data has applications in many disciplines including economics, biology, neuroscience, climatology, and physics. The Granger causality (GC) test is a statistical hypothesis test for determining whether one time series is useful in predicting another time series. In this work, we

propose two new methods for discovering causality in multivariate time series data. We firstly introduce a method that detects temporal changes in GC where the number and location of the changes is unknown a priori. This new method makes use of graphical models to detect the changes in GC. We test the proposed method on simulated vector autoregression (VAR) data and high frequency financial data. Secondly, we propose a new non-parametric method to identify non-linear causality between time series. In particular, the method detects non-linear causality when moments of the underlying probability distribution of the effect time series depends instantaneously on the causal time series. We apply our method to simulated Generalized Autoregressive Conditional Heteroskedasticity (GARCH) data and show that our method performs better than other non-linear causal models. We also apply the new method to financial time series data. */// Professor Douglas Wiens; Department of Mathematical and Statistical Sciences, University of Alberta // Robustness of Design: A Survey // I intend this to be a presentation, at an elementary level, of the notions which motivate Robustness of Design. Past results and current work will be surveyed. */// Dr. Nicolas Rodrigue; Department of Mathematics and Statistics, University of Calgary // Thanks to the development of novel Monte Carlo algorithms, and the increasing capabilities of modern computing equipment, Bayesian approaches have received growing attention in the field of molecular evolution. The new found freedom to explore models of molecular evolution with non-analytical likelihood functions has lead to statistically more robust reconstructions of evolutionary relationships of extant species, while revealing important features of the evolutionary process itself. This presentation will provide an overview of such recent progress, including how infinite mixture models based on the Dirichlet process prior have addressed important problems in evolutionary genetics. Examples of on-going research into disentangling the evolutionary forces of mutation and selection will also be presented, along with potential directions for future work. */// Dr. Gemai Chen; Department of Mathematics and Statistics, University of Calgary // Big Data: Statistical Issues and Challenges // This is a personal view of the BIG Data related issues.

Links:

File Uploads:

Additional Upload 1: http://www.pims.math.ca/files/final_report/ScientificReport.pdf

---