Submittee: Jacob Mortensen
Date Submitted: 2017-10-18 10:01
Title: Fall 2017 UBC-SFU Joint Statistics Seminar
Event Type: Conference-Workshop

Location:
Simon Fraser University, Harbour Centre, Room 7000

Dates:
14 October 2017

Topic:
Statistical topics included Poisson point processes, determinantal point processes, Markov decision processes, a Bayesian approach for diagnosing the quality of a Laplace approximation, Proportional hazards models, analysis plans for clinical trials, and Bayesian topic models. In addition to statistical presentations there were several more practical talks about topics such as getting the most out of graduate school and how to find a job after graduation.

Methodology:
The seminar consisted primarily of research presentations, from both students and professionals, followed by time for questions and answers.

Organizers:
Mortensen, Jacob, Department of Statistics and Actuarial Science, Simon Fraser University
Ju, Xiaomeng, Department of Statistics, University of British Columbia
Zhang, Qiong, Department of Statistics, University of British Columbia

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Speakers:
Speaker 1: Jacob Mortensen
Department: Statistics and Actuarial Science
Institution: Simon Fraser University
Title: From Markov models to Poisson point processes: modeling ball movement in the NBA
Abstract: When considering movement in space, a useful tool is a Markov model, where the position of the agent at time t + 1 depends only on their position at time t. In this paper we build on existing theory to show that as the number of spatial locations in a bounded region approaches infinity, a Markov model can be represented by a Poisson point process, a popular type of spatial model that accounts for correlation between nearby locations. Using SportVu player tracking data provided by the National Basketball Association we show how this relationship can be leveraged to produce distinct maps of player movement for each team in the NBA. By comparing these maps, we can understand the tendencies of each team and how teams utilize court space differently.

Speaker 2: Wayne Wang

Department: Statistics
Institution: University of British Columbia
Title: Determinantal point processes with application to spatial design
Abstract: In environmental statistics, observations of a certain environmental process are usually taken from a set of monitoring stations. Maintaining all stations is costly and infeasible, and one may need to select only a subset of them. In this talk, I will introduce a class of spatial point processes called Determinantal Point Processes (DPP), which are elegant probabilistic models that first studied in quantum physics and random matrix theory, and show how they can be applied to the design of spatial sampling networks. I will discuss how DPPs can be used as a randomized alternative for the space-filling designs as well as its connection to the maximum entropy designs.

Speaker 3: Nathan Sandholtz
Department: Statistics and Actuarial Science
Institution: Simon Fraser University
Title: Replaying the NBA: testing shot policies using Markov decision processes
Abstract: Last year, the Cleveland Cavaliers took 329 contested mid-range jump shots with over 10 seconds remaining on the shot clock. What couldâ€™ve happened if they had taken these shots 20% less frequently over the season? We attempt to answer these types of questions by modeling possessions from the 2015-2016 NBA regular season as Markov chains realized from team-specific Markov decision processes. To account for the dynamic nature of a basketball possession over the shot clock, we model the transition probabilities as a tensor exhibiting correlation in time. We assume the observed transition counts are multinomially distributed, governed by latent multivariate Gaussian distributions in order to explicitly impose a temporal covariance structure. We fit our model with STAN, using STATS SportVU optical tracking data. The draws from the transition probability tensor posterior distribution then serve as inputs in our regular season simulator for the 2015-1016 Cleveland Cavaliers.

We validate our simulation method by showing that we accurately recover the 2015-2016 transition counts for all intermediary and terminal states when simulating under the Cavs observed shot policy. To culminate, we simulate seasons under â€œalteredâ€• shot policies proposed within the basketball analytics community and explore the net changes in production under these alternative shot policies.

Speaker 4: Nelson Chen
Department: Statistics
Institution: University of British Columbia
Title: Reflections on my job hunting journey: lessons and experience
Abstract: The talk will be divided into two parts: in the first part, I will reflect on my job hunting experience. I will focus on the technical interviews and some experience and lessons will be shared. If time permits, I will share some of my internship experience as a data scientist in a local IT company in the second part. The purpose of the talk is to shed lights on how to better prepare a job interview, especially for PhD and Master students from the statistics department. Opinions expressed are solely my own.

Speaker 5: Charlie Zhou
Department: Statistics and Actuarial Science
Institution: Simon Fraser University
Title: The Bayesian approach for diagnosing the quality of a Laplace approximation
Abstract: Latent Gaussian Model (LDM) is used on various field such as ecology, cancer study, and stock market. The model is usually used on high dimensional data, and it Integrated Laplace Approximation(INLA) is an advanced approach to inference LDM. Compare to the traditional method (Monte Carlo Markov Chain), it has much better performance on running speed and error rate. However, one main assumption of using INLA is that the data comes from a Gaussian Markov random fields (GMRF). In this paper, we present a method to diagnose the normality assumption of

LDM in high dimensions. This method uses Probabilistic Integrator with Bayesian Approach.

Speaker 6: Derek Ouyang
Department: Statistics
Institution: University of British Columbia
Title: Multi-arm randomized clinical trials in which patients are allocated to receive treatment for different durations may be used to determine the optimal duration of treatments. In these trials, patients in different arms receive the same treatment for a period. This overlaps make the conventional pair-wise intent to treat comparisons problematic. In this talk, I will identify the issues with conventional ITT analysis (when the outcomes are survival outcomes) and purpose a better analysis plan for this kind of trials.

Speaker 7: Arnab Bhadury
Institution: Flipboard
Title: Applying Bayesian topic modeling at scale in industry -- what I learned (and what I wish I had learned in school)
Abstract: NA

Speaker 8: Derek Bingham
Department: Statistics and Actuarial Science
Institution: Simon Fraser University
Title: NA

Links:
http://vanjss.ca
