



Statistical Society of Australia Inc.

Victoria Branch Newsletter: May 2006

Contents

- 1) May Meeting
- 2) April Meeting: Talk Summary
- 3) Further Meetings

1) May Meeting

This meeting will be held at 6.15pm on Monday May 29 at Monash University, Caulfield Campus. The venue is the Seminar Room H4.87, H-Block, 900 Dandenong Road, Caulfield East. The Caulfield Campus map can be found at <http://monash.edu.au/campuses/caulfield.html>

The meeting will be preceded by light refreshments at 5:45 p.m. Members and guests are invited to join the speaker for dinner at a nearby restaurant after the meeting.

Speaker

Dr Melanie Bahlo, Division of Bioinformatics, The Walter and Eliza Hall, Institute of Medical Research, Melbourne.

Topic

Using statistics to help map genes in mice

Abstract

Much of the human genome remains a mystery. The function of many of the genes that were identified when the human genome was sequenced remains unknown. Inbred laboratory animals such as the zebrafish, mouse, fly or rat are very useful for the identification of genes influencing traits of interest, such as deafness and blood disorders, because they have reduced genetic variation.

In this talk the focus will be on the statistical methods used for the localization of induced mutations in laboratory mice. I will be discussing methods such as genetic mapping with hidden Markov models, the Expectation-Maximisation (EM) algorithm and graphical methods. These are used to explore the trait distributions and trait/genotype distributions of three examples of mouse mutants.

Venue

H-Block is the new 10-storey building next to the multi-level car park on the Dandenong Rd side of the campus. Take the lift to level 4. There will be directions to the seminar room outside the lift.

Parking

Usually, there are parking spaces available in the multi-level car park at Levels 2 and above. Fee: \$2 for 2 hours, and \$4 for 5 hours. The Basement and Level 1 are reserved for staff and university vehicles.

Entry to the multi-level car park is from Princes Avenue which is off Sir John Monash Drive. There may be free parking available up to 1.5 hours in the Caulfield Plaza shopping area, next to the railway station.

Travelling by train

Exit the station and cross the road towards the Caulfield Plaza. The multi-level car park and H-Block are to the right of it. You may enter H-Block from the side facing the station or from Dandenong Road.

2) April Meeting

Talk Summary Nonparametric methods in ecological research

The speaker at the April meeting of the Victorian Branch was Professor Richard Huggins from the Department of Mathematics and Statistics, University of Melbourne. He used three interesting ecological data sets to describe the use of nonparametric methods

Using the data collected on Mountain Pygmy Possums during a mark recapture experiment, a parametric model was used to estimate the population size and the effect of the animal's size on capture probability. This resulted in misspecification which was shown to have a serious effect on estimators of the population size even though the average probability of being observed at least once is quite high. Using nonparametric models the estimated capture probabilities and the probabilities of being observed could be explained.

In a second example the speaker discussed data relating to the capture of the bird species, *Prinia flaviventris* (Yellow-bellied Prinia) at the Mai Po Nature Reserve in Hong Kong. A number of different models were discussed that tried to describe the relationship between the wing length of the captured birds with the capture probabilities. When fitting parametric models to the data, a number of problems were encountered such as capture probabilities that were too small in the left tail of the distribution, capture probabilities that decrease too rapidly as wing length increases and the population size being over or under estimated. Nonparametric models provided some improvement.

A third example relating to the monthly numbers of suicides in Hong Kong from 1981-2002 was examined to relate the suicide rate to the unemployment rate and the divorce rate. The summary of these models was that Hong Kong's social structure is changing away from the traditional Chinese family structure.

The speaker left us with a number of points to think about when modelling data.

- Nonparametric methods have a long history in regression modelling.
- Semiparametric models are well known in regression and generalized linear models. There are important applications in environmental modelling.
- You need to uncover unknown structure.
- We don't need to parametrically model background effects when using nonparametric models.

Debra Partington

3) Further Meetings

We will not be having a meeting in June. We plan to have the July meeting at Swinburne University, Hawthorn Campus and the August meeting at the University of Melbourne, Parkville Campus.

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