**Zhi Jia/ Dr Wayne Stewart Jung 28 2010 Bsc(Hons)**

**Posterior Model odds Estimation via Gibbs Sampler**

Assess the application of the Bayes factor estimation proposed by Carlin& Gibbs 1995

* Reverend Thomas Bayes (1702-1751)
* Bayes theorem Published in 1765, Pierre-Simon Laplace publish in 1814.
* Criticism on Bayes theorem, solution often impossible to obtain apart from Conjugate distributions
* MCMC techniques develop in 1940, application starts in 1990. Bayesian method is growing popular, more developments in model techniques, Frequentist approach more convenient.

Adv of Bayes

* Correct form of inference
* Allow for prior believes, hence sequential learning is possible.
* Solve high dimensional, multiple- nested models where frequentist often fail
* Bayesian model selection produces consistent results
* Posterior probability can be easier to understand (and avoided people fixate on specific numbers, we have estimations, not solutions)
* Bayesian model selection produces Occam’s razors that automatically penalizes for increase in parameter numbers.

Carlin& Gibbs 1995

* Simpler to that of direct estimation of marginal likelihoods
* Posterior model probabilities within a multiple model environment

Jeffreys 1961

* Strength of evidence indicated by Bayes Factor

Frequentist

* Based on maxium likelihood and least square. Encourages parameterization, more parameter better but has problems with overfit and cost
* Penalization of extra free parameters R2, CV, AIC etc
* These criteria are mostly ad hoc (a solution designed for a specific problem or task, non-generalizable), and may not be sufficient for decision making.

Figure 7 MCMC Estimations

Conclusion

* More complex set up compare to frequentist approach,
* Convergence of chains may significantly reduce eefciency and accuracy.

Remarks: few reference, explanations are mediocre, need more links.

**Blake M Seers / Nick Shears**

**Multivariate analysis of long term trends and drivers of costal water quality in the Auckland**

10 water quality variables, accessing region variability and long term change in water quality

* PCA showed first 3 variables, microbial, nutrients, sedimentation
* Upper Waitemata harbor highest microbial component,
* Manukau highest nutrients,
* Shelly beach highest sedimentation concentration.
* 1993-2010, water quality has been improving, Directly coincident with Mangere Treatment plant

Duh et al 2008, implementations of new technologies are considered being responsible for improvemetns of water quality over some parts of the world.

Thrush et al 2004, Increasing of sedimentations are an increasing global problem

Able to collect data from 24/27 saline sites, statistical analysis doen in R

Delphi Technique - structured communication technique or method, originally developed as a systematic, interactive forecasting method which relies on a panel of experts

Brown et al (1970) 9 variables considered appropriate

Transforming each variable according to assumptions and standards

Page 21, good plot

Seem to be more like a report like, only used basic R analysis we learnt from undergrad and some fro postgrad, but seem to have done a good job with it.

Remarks: Very well done, kind of professional, everything seem to have solid evidence and there is a clear chain of logic