Conference:

Third Annual Conference of the International Society for Clinical Biostatistics, Utrecht Aug 22nd 2015. I will attend this conference, but maybe another (Bayesian) meeting might be more suitable?
    Conference Website
    Call for Abstracts

Title:

Interactive graphical analysis, exploration and posterior predictive checking of multi-level hierarchical Bayesian models (140 characters max)

Abstract

(1,750 characters max or 1,250 with one illustration) **One illustration (simple photograph/table/figure) may be uploaded for inclusion in the abstract. The maximum length of the abstract then becomes 1,250 characters, including spaces.**

Background:

Exploratory and confirmatory data analyses complement each other in the comparison of data to implicit or explicit statistical models, but in practice can be cumbersome to realize and interpret in the face of complex hierarchical models and modern Markov chain Monte Carlo (MCMC) algorithms (e.g. Hamiltonian Monte Carlo). The availability of drastically increased computer power and advanced graphical software routines allows novel approaches to integrate exploratory and confirmatory analysis for complex hierarchical models.

Materials and methods:

We developed ShinyStan, an open source software package for graphical exploratory and confirmatory analysis of Bayesian models implemented in Shiny, a softwarepackage for interactive web based visualization in the statistical software environment RStudio/R.

Results:

Computation of graphics and aggregate statistics for large MCMC data limited the responsiveness of our application to the user and we had to strike a fine balance between startup and responsive computation. 3D visualization of asymmetric distribution of prior and posterior statistics on the log scale against the log likelihood offered new insight into model misspecifications for example explaining slow model convergence and low effective sample size in Hamiltonian MCMC while offering practical indications on how to overcome these by non-centered parametrization.

Conclusions:

3D graphical exploration of hierarchical models may provide novel means to detect model misspecification in hierarchical Bayesian inference and improve convergence diagnostics by detecting and demonstrating unexpected deviations from implicit model assumptions.