MCMCpack: An Evolving R Package for Bayesian Inference

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MCMCpack is an R package that allows researchers to conduct Bayesian inference via Markov chain Monte Carlo. While MCMCpack should be useful to researchers in a variety of fields, it is geared primarily toward social scientists. We propose to discuss the design philosophy of MCMCpack, the functionality in the current version (0.4-7) of MCMCpack, and plans for future releases of MCMCpack. We also hope to use the useR! forum to learn what features current and potential MCMCpack users would like to see in future releases.

MCMCpack is premised upon a five point design philosophy: a) widespread, free availability; b) model-specific, computationally efficient MCMC algorithms; c) use of compiled C++ code to maximize computational speed; d) an easy-to-use, standardized model interface that is very similar to the standard R model fitting functions; and e) compatibility with existing code wherever possible.

MCMCpack currently offers model fitting functions for 14 models. Some of these models are quite common (linear regression, logistic regression) while other are more specialized (Wakefield's baseline model for ecological inference, a factor analysis model for mixed ordinal and continuous responses). In addition, MCMCpack makes use of the coda library for posterior analysis and has a number of helper functions that are useful for manipulating the MCMC output.

In future releases we hope to: add support for additional models, allow researchers to specify a wider range of prior distributions, add an instructional module, improve the documentation, and to include a number of C++ and R template files that will help researchers write code to fit novel models.

We hope to use useR! to learn more about the preferences and goals of the (potential) MCMCpack user-base. In addition, we hope to learn how new features of R (such as namespaces and S4 classes) can be exploited to improve MCMCpack.

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