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Efficient MCMC schemes for robust model extensions using encompassing Dirichlet process mixture models. (English) [Zbl 1281.62070](#)

Ríos Insua, David (ed.) et al., Robust Bayesian analysis. New York, NY: Springer (ISBN 0-387-98866-1). Lect. Notes Stat. 152, 295-315 (2000).

Summary: We propose that one consider sensitivity analysis by embedding standard parametric models in model extensions defined by replacing a parametric probability model with a nonparametric extension. The nonparametric model could replace the entire probability model, or some level of a hierarchical model. Specifically, we define nonparametric extensions of a parametric probability model using Dirichlet process (DP) priors. Similar approaches have been used in the literature to implement formal model fit diagnostics [*C. Carota et al.*, *J. Am. Stat. Assoc.* 91, No. 434, 753–762 (1996; [Zbl 0868.62012](#))].

In this paper we discuss at an operational level how such extensions can be implemented. Assuming that inference in the original parametric model is implemented by Markov chain Monte Carlo (MCMC) simulation, we show how minimal additional code can turn the same program into an implementation of MCMC in the larger encompassing model, providing an alternative to traditional sensitivity analysis. If the base measure of the DP is assumed conjugate to the appropriate component of the original probability model, then implementation is straightforward. The main focus of this paper is to discuss general strategies allowing implementation of models without this conjugacy.

For the entire collection see [[Zbl 0958.00015](#)].

MSC:

[62F15](#) Bayesian inference

[60J10](#) Markov chains (discrete-time Markov processes on discrete state spaces)

[65C05](#) Monte Carlo methods

Cited in **25** Documents

Keywords:

[Dirichlet process](#); [MCMC](#); [mixtures](#)

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