Mixtures of Unimodal Distributions

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We present a new Bayesian mixture model. The main idea of our proposal is to change the components distribution of the mixture. Whereas the normal distribution is typically used as the kernel distribution, it does have some serious issues for the modeling of clusters, see for example Escobar & West (1995) or Richardson & Green (1997). If a cluster is skewed or heavy tailed, then the normal will be inefficient and many may be needed to model a single cluster. Our intention is to use as kernel a family of distribution functions for which the only constraint is that they are unimodal. Hence, we define a cluster as a set of data which can be adequately modeled via a unimodal distribution. To construct unimodal distributions we use a mixture of unform distributions with the Dirichlet Process, (Ferguson (1973) and Sethuraman (1994)), as the mixing distribution. To sample from the correct posterior distribution we use the ideas of Kalli, Griffin & Walker (2009), and Damien & Walker (2001), Tierney (1994), Green (1995) and Godsill (2001).

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