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James L Carroll* (j1carroll@lanl.gov), 1126 Cheyenne St., Los Alamos, NM 87544. *Turning Bayesian Model Averaging Into Bayesian Model Combination.*

Bayesian model averaging is generally considered the standard model for creating ensembles of learners using Bayesian methods, but this technique is often outperformed by more ad hoc methods in empirical studies. The reason for this failure has important theoretical implications for our understanding of why ensembles work. It has been proposed that Bayesian model averaging struggles in practice because it accounts for uncertainty about which model is correct but still operates under the assumption that only one of them is. In order to more effectively access the benefits inherent in ensembles, Bayesian strategies should therefore be directed more towards model combination rather than the model selection implicit in Bayesian model averaging. This work provides empirical verification for this hypothesis using several different Bayesian model combination approaches tested on a wide variety of classification problems. We show that even the most simplistic of Bayesian model combination strategies outperforms the traditional ad hoc techniques of bagging and boosting, as well as outperforming BMA over a wide variety of cases. (Received August 24, 2011)