

EMVS: The EM Approach to Bayesian Variable Selection

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Despite rapid developments in stochastic search algorithms, the practicality of Bayesian variable selection methods has continued to pose challenges. High-dimensional data are now routinely analyzed, typically with many more covariates than observations. To broaden the applicability of Bayesian variable selection for such high-dimensional linear regression contexts, we propose EMVS, a deterministic alternative to stochastic search based on an EM algorithm which exploits a conjugate mixture prior formulation to quickly and posterior modes. Combining a spike-and-slab regularization diagram for the discovery of active predictor sets with subsequent rigorous evaluation of posterior model probabilities, EMVS rapidly identifies promising sparse high posterior probability submodels. External structural information such as likely covariate groupings or network topologies is easily incorporated into the EMVS framework. Deterministic annealing variants are seen to improve the effectiveness of our algorithms by mitigating the posterior multi-modality associated with variable selection priors.

The usefulness the EMVS approach is demonstrated on real high-dimensional data, where computational complexity renders stochastic search to be less practical. (Joint work with Edward George)

**Thursday
March 13, 2014
at 3:30pm**

**Sidney Smith
Hall, Room
1074**

***Refreshments
will be served
at 3:15pm***