

Bayesian adaptive Lasso

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Abstract We propose the Bayesian adaptive Lasso (BaLasso) for variable selection and coefficient estimation in linear regression. The BaLasso is adaptive to the signal level by adopting different shrinkage for different coefficients. Furthermore, we provide a model selection machinery for the BaLasso by assessing the posterior conditional mode estimates, motivated by the hierarchical Bayesian interpretation of the Lasso. Our formulation also permits prediction using a model averaging strategy. We discuss other variants of this new approach and provide a unified framework for variable selection using flexible penalties. Empirical evidence of the attractiveness of the method is demonstrated via extensive simulation studies and data analysis.

Keywords Bayesian Lasso · Gibbs sampler · Lasso · Scale mixture of normals · Variable selection