**Title:**

Bayesian selection of best subsets via hybrid search

**Abstract:**

Over the past decades, variable selection for high-dimensional data has drawn increasing attention. With a large number of predictors, there rises a big challenge for model fitting and prediction. In this paper, we develop a new Bayesian method of best subset selection using a hybrid search algorithm that combines a deterministic local search and a stochastic global search. To reduce the computational cost of evaluating multiple candidate subsets for each update, we propose a novel strategy that enables us to calculate exact marginal likelihoods of all neighbor models simultaneously in a single computation. In addition, we establish model selection consistency for the proposed method in the high-dimensional setting in which the number of possible predictors can increase faster than the sample size. Simulation study and real data analysis are conducted to investigate the performance of the proposed method.

**Keywords:**

Bayesian variable selection

best subset selection

high-dimensional regression analysis

hybrid search algorithm

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