# Grouped Variable Selection via Nested Spike and Slab Priors

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In this paper we study grouped variable selection problems by proposing a specified prior, called the nested spike and slab prior, to model collective behavior of regression coefficients. At the group level, the nested spike and slab prior puts positive mass on the event that the l2-norm of the grouped coefficients is equal to zero. At the individual level, each coefficient is assumed to follow a spike and slab prior. We carry out maximum a posteriori estimation for the model by applying blockwise coordinate descent algorithms to solve an optimization problem involving an approximate objective modified by majorization-minimization techniques. Simulation studies show that the proposed estimator performs relatively well in the situations in which the true and redundant covariates are both covered by the same group. Asymptotic analysis under a frequentist's framework further shows that the l2 estimation error of the proposed estimator can have a better upper bound if the group that covers the true covariates does not cover too many redundant covariates. In addition, given some regular conditions hold, the proposed estimator is asymptotically invariant to group structures, and its model selection consistency can be established without imposing irrepresentable-type conditions.

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