

HORSES: Hexagonal Operator for Regression with Shrinkage and Equality Selection

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Identifying homogeneous subgroups of variables can be challenging in high dimensional data analysis with highly correlated predictors. We consider a new method called HORSES (Hexagonal Operator for Regression with Shrinkage and Equality Selection), which simultaneously select positively correlated variables and identify them as predictive clusters. Our regularization involves a linear combination of the L1 penalty for coefficients and another L1 penalty for pairwise differences of the coefficients. We also propose an efficient (GPU-based) algorithm to solve the HORSES. The proposed method is shown to achieve high performance in terms of prediction error and model complexity with on simulated and real data sets.

Key Words: fMRI study, GPU computing, prediction, regularization, spatial correlation, supervised clustering, variable selection