

“Adaptive Model Selection via Generalized Degrees of Freedom and Data Perturbation”

Bo Zhang, Ph.D.
University of Minnesota

Abstract:

Random effects models are commonly used models in the analysis of correlated data. Selection of covariates and the variance-covariance structure is crucial to the accuracy of estimation and prediction in random effects models. Most selection procedures used for random effects models (for example, AIC, BIC, and RIC) penalize increasing model size through a fixed penalty parameter. We derive generalized degrees of freedom (GDF) for linear random effects models and use the GDF to define a data-adaptive complexity penalty for model selection. Data perturbation is employed to estimate the GDF of linear random effects models. The data-adaptive procedure outperforms information theoretical criteria both for large and for small models. Simulation and real data examples support the effectiveness of the new procedure.