A Regularization Approach to Nonlinear Variable Selection

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An approach to variable selection is presented in which the regression function, which is assumed to depend nonlinearly on a few input variables, is learned from examples. The proposed method yields a consistent regularized least square estimator by penalizing large values of partial derivatives. The underlying variational problem is solved by means of a provably convergent iterative procedure — based on proximal gradient descent — which returns the estimator and the list of selected variables. Experiments on synthetic and real data sets show that the presented approach compares favorably with respect to benchmark algorithms for variable selection.