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Conditional sure independence screening by conditional marginal empirical likelihood

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Abstract In many applications, researchers often know a certain set of predictors is related to the response from some previous investigations and experiences. Based on the conditional information, we propose a conditional screening feature procedure via ranking conditional marginal empirical likelihood ratios. Due to the use of centralized variable, the proposed screening approach works well when there exist either or both hidden important variables and unimportant variables that are highly marginal correlated with the response. Moreover, the new method is demonstrated effective in scenarios with less restrictive distributional assumptions by inheriting the advantage of empirical likelihood approach and is computationally simple because it only needs to evaluate the conditional marginal empirical likelihood ratio at one point, without parameter estimation and iterative algorithm. The theoretical results reveal that the proposed procedure has sure screening properties. The merits of the procedure are illustrated by extensive numerical examples.

Keywords Empirical likelihood · Sure screening · Variable selecting · High dimensional data analysis

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