



Model averaging for estimating treatment effects

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Abstract

The estimation of treatment effects on the response variable is often a primary goal in empirical investigations in disciplines such as medicine, economics and marketing. Typically, the investigator would select one model from a multitude of models and estimate the treatment effects based on this single winning model. In this paper, we consider an alternative model averaging approach, where estimates of treatment effects are obtained from not one single model but a weighted ensemble of models. We develop a weight choice method based on a minimisation of the approximate risk under squared error loss of the model average estimator of the conditional treatment effects. We prove that the model average estimator resulting from this criterion has an optimal asymptotic property. The results of a simulation study show that the proposed approach is superior to various existing model selection and averaging methods in a large region of the parameter space in finite samples. The proposed method is applied to a data set on HIV treatment.

Keywords Model average · Treatment effects · Causal inference · Asymptotic optimality

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