Comparing different propensity score estimation methods for estimating the marginal causal effect through standardization to propensity scores. (English) Zbl 07549502

Summary: Hernan and Robins proposed a method for calculating marginal causal effect of treatment using standardization to propensity scores.

Data adaptive methods have been suggested as alternatives to logistic regression for the estimation of propensity scores. We examined the performance of various data mining methods using simulated data. The estimators’ performance was evaluated in terms of relative bias, 95% CI coverage rate, and mean squared error.

All methods (except CART and GBM) displayed generally acceptable performance. However, under the conditions of moderate non-additivity and moderate nonlinearity, ANN and SL outperformed logistic regression with better bias reduction and more consistent 95% CI coverage.

MSC: 62-XX Statistics

Keywords: propensity scores; data mining; standardization; simulation; data adaptive methods; risk difference

Software: SuperLearner; glmnet; gbm

Full Text: DOI

References:

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[34] Robins, J., A new approach to causal inference in mortality studies with a sustained exposure period—application to control of the healthy worker survivor effect, 1986. Mathematical Modelling, 7, 9, 1393-1512 - Zbl 0614.62136
[40] Sato, T.; Matsuyama, Y., Marginal structural models as a tool for standardization, 2003. Epidemiology, 666-68
[42] Sinisi, S. E., Super learning: an application to the prediction of HIV-1 drug resistance, 2007. Statistical Applications in Genetics and Molecular Biology, 6, 1 - Zbl 1166.92315

[49] Young, J. G.; Tchetgen Tchetgen, E. J., Simulation from a known Cox MSM using standard parametric models for the g-formula, 2014. Statistics in Medicine, 33, 6, 1001-1014

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