ML Methods for KW Weights

– Notes on simulation plan –

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1 Outline

Simulate over different selection models (cohort/ survey; q)

1. A linear and additive function of $\mathbf{x}$
   - $\rightarrow$ All methods (see below) should work well
2. A mildly non-linear and non-additive function of $\mathbf{x}$ (one interaction, quadratic term)
   - $\rightarrow$ All methods except 1. should work well
3. A strongly non-linear and non-additive function of $\mathbf{x}$ (see e.g. RP Model 2 in Buskirk and Kolenikov 2015)
   - $\rightarrow$ ML methods should outperform 1. and 2.
4. A strongly non-linear and non-additive function of $\mathbf{x}$ and z
   - $\rightarrow$ ML methods should outperform 1. and 2. but on a lower absolute level

Simulate over different methods for estimating propensity scores

1. Logistic regression, main effects only
2. Logistic regression, main effects and all second-order terms
3. Model-based recursive partitioning
4. Random forests
5. Extremely randomized trees
6. Gradient boosting

7. Model-based boosting

- All methods use all x-variables, but not z as input
- ML methods setup
  - Default values for tuning parameters
  - Tuning parameter setting that optimizes covariate balance between pseudo-weighted cohort and survey (see Ridgeway et al. 2017)?

Adjustment methods

- only KW?

References

Buskirk, T. D. and Kolenikov, S. (2015). Finding respondents in the forest: A comparison of logistic regression and random forest models for response propensity weighting and stratification. Survey Methods: Insights from the Field. `https://surveyinsights.org/?p=5108`.

Ridgeway, G., McCaffrey, D. F., Morral, A. R., Griffin, B. A., and Burgette, L. (2017). twang: Toolkit for weighting and analysis of nonequivalent groups. r package version 1.5. Technical report, `https://CRAN.R-project.org/package=twang`.