Covariate Balancing Propensity Score

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Light refreshments provided

Abstract

The propensity score plays a central role in a variety of causal inference settings. In particular, matching and weighting methods based on the estimated propensity score have become increasingly common in observational studies. Despite their popularity and theoretical appeal, the main practical difficulty of these methods is that the propensity score must be estimated. Researchers have found that slight misspecification of the propensity score model can result in substantial bias of estimated treatment effects. This workshop introduces a simple and yet powerful new methodology, covariate balancing propensity score (CBPS) estimation, which significantly improves the empirical performance of propensity score methods. The CBPS simultaneously optimizes the covariate balance and the prediction of treatment assignment by exploiting the dual characteristics of the propensity score as a covariate balancing score and the conditional probability of treatment assignment. The CBPS is shown to dramatically improve the poor empirical performance of propensity score matching and weighting methods reported in the literature. In addition, the CBPS can be extended to a number of other important settings, including the estimation of the generalized propensity score for non-binary treatments, the generalization of experimental estimates to a target population, and causal inference in the longitudinal settings with marginal structural models. The open-source R package, CBPS, is available for implementing the proposed methods.

Biography

Kosuke Imai is Professor in the Department of Politics at Princeton University and directs the Program in Statistics and Machine Learning. He is also an executive member of the Committee for Statistical Studies and the Program for Quantitative and Analytical Political Science (Q-APS). After obtaining a B.A. in Liberal Arts from the University of Tokyo (1998), Imai received an A.M. in Statistics (2002) and a Ph.D. in political science (2003) from Harvard University. Imai's research area is political methodology and more generally applied statistics in the social sciences. He has extensively worked on the development and applications of statistical methods for causal inference with experimental and observational data. Other areas of his research are survey methodology and the application of Bayesian statistical methods to social science

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[1] The PI Biostatistics Seminar Series is held on Tuesdays at New York State Psychiatric Institute. If you are interested in receiving regular announcements for our seminars in the future, or if you need further information, please contact Jina James (jamesji@nyspi.columbia.edu, (646)774-7929.

research. Imai has published more than thirty peer-refereed journal articles in political science, statistics, economics, and psychology. He has won several awards including the Miyake Award (2006), the Warren Miller Prize (2008), the Pi Sigma Alpha Award (2013), the Stanley Kelley, Jr. Teaching Award (2013), and is the inaugural recipient of Society of Political Methodology's Emerging Scholar Award (2011). Imai's research has been supported by several National Science Foundation grants as well as grants from other agencies.