

Discovering Dynamic Treatment Rules using Outcome Weighted Learning

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3:30-4:30pm, New PI 6th Floor Multipurpose Room (6602)
Coffee & Cookies provided

Abstract

Dynamic treatment regimes (DTRs) are sequential decision rules for individual patients that adapt over time to accumulating information collect on a patient. Discovering DTRs from a Sequential Multiple Assignment Randomized Trial (SMART) is challenging due to large scale of available information and complex interactions between patient's temporal characteristics and treatments. In this work, we introduce a new statistical learning method, namely outcome weighted learning (O-learning), for estimating the optimal DTR. The approach converts individualized treatment selection into a sequential statistical learning problem which can be efficiently implemented via modified support vector machines. We prove that the resulting rules are consistent, and provide finite risk bounds for the errors using the estimated rules. Simulation results suggest the proposed methods produce superior performance to the popular Q-learning commonly used in this problem. We illustrate our method using data from a SMART trial.

Biographical Note

Donglin Zeng is Professor of Biostatistics and Director of Carolina Survey Research Lab at the University of North Carolina at Chapel Hill. He obtained his Ph.D. from the Department of Statistics at University of Michigan in 2001. His research interest includes semiparametric inference, statistical learning, clinical trials, personalized medicine, genetic epidemiology and survey sampling.

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, (212) 543-5589).