

Learning Ensembles for Optimal Individualized Treatment Rules with Time-to-Event Outcomes

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In this talk I will discuss estimation of an optimal individualized treatment rule when a high-dimensional vector of baseline variables is available. The optimality criterion is with respect to delaying expected time to occurrence of an event of interest. I will propose two estimators of the optimal rule, which arise from considering two loss functions aimed at directly estimating the conditional treatment effect, and recasting the problem in terms of weighted classification using the 0–1 loss function. The estimated rules are ensembles that minimize the cross-validated risk of a linear combination in a user-supplied library of candidate estimators. I will discuss doubly robust oracle inequalities bounding the finite-sample excess risk of the estimator. The bounds depend on the excess risk of the oracle selector and a doubly-robust term related to estimation of the nuisance parameters. I will present an illustration of the methods in the analysis of a phase III randomized study testing the efficacy of a new therapy for the treatment of breast cancer.