

## **Estimating Optimal Treatment Regimes from a Classification Perspective**

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A treatment regime maps observed patient characteristics to a recommended treatment. Recent technological advances have increased the quality, accessibility, and volume of patient-level data; consequently, there is a growing need for powerful and flexible estimators of an optimal treatment regime that can be used with either observational or randomized clinical trial data. We propose a novel and general framework that transforms the problem of estimating an optimal treatment regime into a classification problem wherein the optimal classifier corresponds to the optimal treatment regime. We show that commonly employed parametric and semi-parametric regression estimators, as well as recently proposed robust estimators of an optimal treatment regime can be represented as special cases within our framework. Furthermore, our approach allows any classification procedure that can accommodate case weights to be used without modification to estimate an optimal treatment regime. This introduces a wealth of new and powerful learning algorithms for use in estimating treatment regimes. We illustrate our approach using data from an alcohol treatment trial.

**Keywords:** Dynamic treatment regimes, model misspecification, classification