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Promoting Fairness in Treatment Effect Estimation via Optimal Transport

Treatment effect estimation lies at the core of many high-stakes decision-making applications, such as precision medicine, policy design, and optimal resource allocation. However, models trained on data with endogenous bias can produce unfair treatment effect estimates across demographic subpopulations, leading to discrimination when these estimates play a key role in decision-making. To address this issue, we employ optimal transport theory to derive treatment effect estimators that satisfy group-wise fairness constraints. We establish the consistency and asymptotic properties of the proposed fair estimator that can be used for conducting inference. Furthermore, we provide a theoretical characterization of the "price of fairness" incurred by incorporating fairness constraints into the estimation process.