

Enhancing Decision Making with Causal Inference and Unmeasured Confounders in a Bayesian Framework

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Abstract:

Effectively navigating decision-making demands a comprehensive understanding of causal relationships, especially with unmeasured confounders in the environment. Traditional causal inference methods often rely on auxiliary data sources to identify true causal effects, such as instrumental variables or proxies. Unfortunately, such data might be difficult or impractical to acquire in observational studies, leading to potential inaccuracies and incomplete inference. To address this limitation, we propose a novel approach that integrates Bayesian joint modeling with causal inference for effective decision-making under the presence of unmeasured confounding. By taking advantage of proper model design and assumptions, the proposed framework can identify true causal effects without the reliance on additional data sources, thereby leading to more informed and effective decisions in complex real-world observational scenarios.