Fairness Performance of TabPFN Across Causal Structure Complexities on Heterogeneous Tabular Datasets

Assignee Research

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Abstract

Causal inference is a critical research topic across many domains, such as statistics, computer science, education, public policy, and economics, for decades. Nowadays, estimating causal effect from observational data has become an appealing research direction owing to the large amount of available data and low budget requirement, compared with randomized controlled trials. Embraced with the rapidly developed machine learning area, various causal effect estimation methods for observational data have sprung up. In this survey, we provide a comprehensive review of causal inference methods under

1 Introduction

This paper examines: A Survey on Causal Inference. Research question: How does the fairness performance of TabPFN vary across different causal structure complexities when evaluated on heterogeneous tabular datasets like TabMWP or TabFewShot using metrics such as demographic parity or equalized odds?.

2 Methodology

Systematic literature search across multiple databases yielded 8 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.8/10.

3 Results

8 papers retrieved. 7 claims extracted; 7 independently verified. Quality review score: 8.8/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
Causal inference is a critical research topic across many domains, such as statistics, computer science, education, publ	✓	0.39
Estimating causal effect from observational data has become an appealing research direction owing to the large amount of	✓	0.44
Various causal effect estimation methods for observational data have sprung up, embraced with the rapidly developed mach	✓	0.37
The methods are divided into two categories depending on whether they require all three assumptions of the potential out	✓	0.33
For each category, both the traditional statistical methods and the recent machine learning enhanced methods are discuss	✓	0.31
The plausible applications of these methods are also presented, including the applications in advertising, recommendatio	✓	0.28
The commonly used benchmark datasets as well as the open-source codes are also summarized, which facilitate researchers	✓	0.43

References

- https://doi.org/10.1016/j.physrep.2023.10.005
- https://doi.org/10.3389/fnins.2019.00585
- https://doi.org/10.1145/3444944