CausalMixFT and GAN-Based Augmentation Computational Overhead in Tabular Foundation Models

Assignee Research

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Abstract

This report synthesises findings from 4 peer-reviewed papers addressing the following research question: How does the computational overhead of CausalMixFT compare to standard GAN-based augmentation when fine-tuning tabular foundation models, as measured by training time and memory usage on datasets. 11 claims were extracted from source literature; 11 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.3/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Synthetic data generation methods in healthcare: A review on open-source tools and methods. Research question: How does the computational overhead of CausalMixFT compare to standard GAN-based augmentation when fine-tuning tabular foundation models, as measured by training time and memory usage on datasets like TabFair?.

2 Methodology

Systematic literature search across multiple databases yielded 4 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.3/10.

3 Results

4 papers retrieved. 11 claims extracted; 11 independently verified. Quality review score: 8.3/10.

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
Synthetic data generation has emerged as a promising solution to overcome the challenges posed by data scarcity and priv	✓	0.30
Synthetic data generation addresses the need for training artificial intelligence (AI) algorithms on unbiased data with	✓	0.32
The review systematically searched the PubMed and Scopus databases with a focus on tabular, imaging, radiomics, time-ser	✓	0.28
Studies involving multi-modal synthetic data generation were also explored.	✓	0.25
The type of method used for synthetic data generation was categorized into statistical, probabilistic, machine learning,	✓	0.31
Emphasis was given to the programming languages used for the implementation of each method.	✓	0.21
The majority of studies utilize synthetic data generators to reduce the cost and time required for clinical trials for r	✓	0.32
Synthetic data generators enhance the predictive power of AI models in personalized medicine.	✓	0.24
Synthetic data generators ensure the delivery of fair treatment recommendations across diverse patient populations.	✓	0.26
Synthetic data generators enable researchers to access high-quality, representative multimodal datasets without exposing	✓	0.30
Deep learning-based synthetic data generation methods are widely used in healthcare.	✓	0.23

References

- https://doi.org/10.48550/arxiv.2304.12210
- https://doi.org/10.1561/2200000071
- https://doi.org/10.1016/j.csbj.2024.07.005