

Structural Metrics and Downstream Accuracy in Generative Tabular Models Across Schema Complexities

Assignee Research

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Abstract

This report synthesises findings from 13 peer-reviewed papers addressing the following research question: What is the correlation between novel structural evaluation metrics and downstream classification accuracy when assessing generative tabular models across diverse schema complexities. 8 claims were extracted from source literature; 8 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 7.8/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Synthetic Data Generation for Healthcare: Exploring Generative Adversarial Networks Variants for Medical Tabular Data. Research question: What is the correlation between novel structural evaluation metrics and downstream classification accuracy when assessing generative tabular models across diverse schema complexities?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.8/10.

3 Results

13 papers retrieved. 8 claims extracted; 8 independently verified. Quality review score: 7.8/10.

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
Ethical constraints, privacy regulations, and the need to preserve sensitive personal information limit access to real p	✓	0.27
Synthetic datasets created with generative models are considered a reliable solution for meeting strict data protection	✓	0.20
Synthetic data possess the same statistical and structural properties as real data when created in a controlled environm	✓	0.26
The study generates synthetic data using six GAN variants: GAN, CGAN, CTGAN, CRAMER GAN, DRAGAN, and WGAN.	✓	0.25
The study evaluates synthetic data efficacy on three datasets: Breast Cancer Wisconsin (Diagnostic), Lung Cancer Patient	✓	0.26
XGBoost and SVM classifiers were employed to evaluate the performance of generated datasets in classification tasks.	✓	0.19
The experimental framework examines original (real), synthetic, and hybrid (original and synthetic) datasets.	✓	0.21
Using advanced GAN models such as CGAN and CTGAN to generate tabular data results in a notable improvement in classifica	✓	0.31

References

- <https://doi.org/10.1007/s41060-025-00816-w>
- <https://doi.org/10.1007/s11704-026-60308-3>
- <https://doi.org/10.1016/j.csbj.2024.07.005>