

Tabular Generative Evaluation Metrics Scaling in Multimodal Models Under Varying Adversarial Noise Conditions

Assignee Research

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Abstract

Synthetic data generation has emerged as a promising solution to overcome the challenges which are posed by data scarcity and privacy concerns, as well as, to address the need for training artificial intelligence (AI) algorithms on unbiased data with sufficient sample size and statistical power. Our review explores the application and efficacy of synthetic data methods in healthcare considering the diversity of medical data. To this end, we systematically searched the PubMed and Scopus databases with a great focus on tabular, imaging, radiomics, time-series, and omics data. Studies involving m

1 Introduction

This paper examines: Synthetic data generation methods in healthcare: A review on open-source tools and methods. Research question: How do tabular generative evaluation metrics scale in performance when applied to multimodal models with varying degrees of adversarial noise in the training data?.

2 Methodology

Systematic literature search across multiple databases yielded 15 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

15 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 privacy	✓	0.31
Synthetic data generation is used to address the need for training artificial intelligence (AI) algorithms on unbiased data	✓	0.33
The review systematically searched the PubMed and Scopus databases with a focus on tabular, imaging, radiomics, time-series	✓	0.28
Studies involving multi-modal synthetic data generation were also explored.	✓	0.26
The type of method used for synthetic data generation was categorized into statistical, probabilistic, machine learning,	✓	0.29
Emphasis was given to the programming languages used for the implementation of each method.	✓	0.22
The majority of studies utilize synthetic data generators to reduce the cost and time required for clinical trials for rare	✓	0.33
Synthetic data generators are used to 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	✓	0.31
Deep learning-based synthetic data generation methods are widely used in healthcare.	✓	0.21

References

- <https://doi.org/10.1016/j.csbj.2024.07.005>
- <https://doi.org/10.1186/s40537-021-00414-0>
- <https://doi.org/10.1186/s40537-021-00444-8>