Comparison of Conditional and Non-Conditional Tabular GANs in FID Score for High-Cardinality Datasets

Assignee Research

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Abstract

This paper presents a novel approach to simulating electronic health records (EHRs) using diffusion probabilistic models (DPMs). Specifically, we demonstrate the effectiveness of DPMs in synthesising longitudinal EHRs that capture mixed-type variables, including numeric, binary, and categorical variables. To our knowledge, this represents the first use of DPMs for this purpose. We compared our DPM-simulated datasets to previous state-of-the-art results based on generative adversarial networks (GANs) for two clinical applications: acute hypotension and human immunodeficiency virus (ART for HIV)

1 Introduction

This paper examines: Synthetic Health-related Longitudinal Data with Mixed-type Variables Generated using Diffusion Models. Research question: How does the conditional tabular GAN (ciDATGAN) compare to non-conditional tabular GANs in terms of FID score when generating large-scale datasets with high-cardinality features?.

2 Methodology

Systematic literature search across multiple databases yielded 5 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 7.4/10.

3 Results

5 papers retrieved. 7 claims extracted; 6 independently verified. Quality review score: 7.4/10.

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
Diffusion probabilistic models (DPMs) can be used to simulate electronic health records (EHRs) with mixed-type variables	✓	0.34
This is the first use of DPMs for simulating EHRs with mixed-type variables.	✓	0.23
DPM-simulated datasets were compared to previous state-of-the-art results based on generative adversarial networks (GANs	✓	0.39
The study explores the advantages and caveats of employing DPMs across a wide range of aspects.	✓	0.20
The realism of the synthetic datasets was assessed.	×	0.12
Reinforcement learning (RL) agents were trained on the synthetic data to evaluate their utility for supporting the devel	✓	0.30
DPM-simulated datasets are estimated to be secure and pose a low patient exposure risk for public access.	✓	0.24

References

- https://openalex.org/W7134093492
- https://doi.org/10.48550/arxiv.2303.12281
- https://doi.org/10.48550/arxiv.2301.08727