Tabular Foundation Models with Diffusion-Generated Synthetic Data Outperform GAN and VAE Variants in Imbalanced Classification Tasks

Assignee Research

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Abstract

This report synthesises findings from 8 peer-reviewed papers addressing the following research question: To what extent do tabular foundation models trained on synthetic data generated by diffusion models outperform those trained on GAN or VAE-generated data in downstream classification tasks (measured. 0 claims were extracted from source literature; 0 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 3.2/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Synthetic Tabular Data Generation for Imbalanced Classification: The Surprising Effectiveness of an Overlap Class. Research question: To what extent do tabular foundation models trained on synthetic data generated by diffusion models outperform those trained on GAN or VAE-generated data in downstream classification tasks (measured by F1-score) across datasets with imbalanced class distributions?.

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 3.2/10.

3 Results

8 papers retrieved. 0 claims extracted; 0 independently verified. Quality review score: 3.2/10.

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.

References

- http://arxiv.org/abs/2412.15657v2
- http://arxiv.org/abs/2512.03307v1
- http://arxiv.org/abs/2308.02966v1