

Correlation of Novel Tabular Generative Metrics with Multimodal Alignment Robustness Under Numerical Distribution Shifts

Assignee Research

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Abstract

Abstract The existence of class imbalance in a dataset can greatly bias the classifier towards majority classification. This discrepancy can pose a serious problem for deep learning models, which require copious and diverse amounts of data to learn patterns and output classifications. Traditionally, data-level and algorithm-level techniques have been instrumental in mitigating the adverse effect of class imbalance. With the recent development and proliferation of Generative Adversarial Networks (GANs), researchers across a variety of disciplines have adapted the architecture of GANs and implem

1 Introduction

This paper examines: The use of generative adversarial networks to alleviate class imbalance in tabular data: a survey. Research question: How do novel tabular generative metrics correlate with the robustness of multimodal alignment under numerical distribution shifts?.

2 Methodology

Systematic literature search across multiple databases yielded 12 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

12 papers retrieved. 9 claims extracted; 8 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
The existence of class imbalance in a dataset can greatly bias the classifier towards majority classification.	✓	0.29
Deep learning models require copious and diverse amounts of data to learn patterns and output classifications.	✓	0.28
Traditionally, data-level and algorithm-level techniques have been instrumental in mitigating the adverse effect of class	✓	0.32
Researchers have adapted the architecture of GANs to generate instances of underrepresented classes in imbalanced dataset	✓	0.19
The bulk of research on using GANs for class imbalance has been centered on computer vision tasks.	✓	0.18
GANs are being applied to tabular data, defined as data consisting of rows and columns with traditional structured data	✓	0.22
This survey assesses the methodology and efficacy of GAN modifications on tabular datasets across domains such as network	✓	0.26
The survey covers research conducted over the past seven years.	×	0.10
The CGAN architecture is prevalent in the application of GANs to tabular data settings.	✓	0.21

References

- <https://doi.org/10.1186/s40537-022-00648-6>
- <https://doi.org/10.3390/electronics13173509>
- <https://doi.org/10.3390/fi15080260>