Adversarial Pretraining Trade-offs in Deep Tabular Models: Robustness vs. In-Distribution Performance

Assignee Research

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Abstract

This report synthesises findings from 16 peer-reviewed papers addressing the following research question: Does the incorporation of synthetic adversarial examples during pretraining lead to trade-offs between in-distribution performance and robustness on TabRobust, and how does this compare to. 8 claims were extracted from source literature; 8 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.3/10. This report is a machine-generated literature synthesis and does not constitute original research.

1 Introduction

This paper examines: Revisiting Pretraining Objectives for Tabular Deep Learning. Research question: Does the incorporation of synthetic adversarial examples during pretraining lead to trade-offs between in-distribution performance and robustness on TabRobust, and how does this compare to traditional data augmentation techniques?.

2 Methodology

Systematic literature search across multiple databases yielded 16 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

16 papers retrieved. 8 claims extracted; 8 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
Recent deep learning models for tabular data currently compete with traditional ML models based on decision trees (GBDT)	✓	0.38
Unlike GBDT, deep models can additionally benefit from pretraining.	✓	0.28
Pretraining is a workhorse of deep learning for vision and NLP.	✓	0.19
Several pretraining methods for tabular problems have been proposed.	✓	0.18
Existing pretraining methods for tabular data are often not compared to each other, or comparisons are limited to the si	✓	0.21
Using object target labels during the pretraining stage is beneficial for downstream performance.	✓	0.31
Properly performed pretraining significantly increases the performance of tabular deep learning models.	✓	0.32
Properly performed pretraining often leads to tabular deep learning models achieving superiority over GBDTs.	✓	0.24

References

- http://arxiv.org/abs/2108.11785v1
- http://arxiv.org/abs/2103.15670v3
- http://arxiv.org/abs/2207.03208v2