SOVEREIGN: Can data augmentation techniques improve few-shot learning performance of vision-language models on standard b

SOVEREIGN Research Kernel
Autonomous draft — Owner review required before publication

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Abstract

In the last few years, the deep learning (DL) computing paradigm has been deemed the Gold Standard in the machine learning (ML) community. Moreover, it has gradually become the most widely used computational approach in the field of ML, thus achieving outstanding results on several complex cognitive tasks, matching or even beating those provided by human performance. One of the benefits of DL is the ability to learn massive amounts of data. The DL field has grown fast in the last few years and it has been extensively used to successfully address a wide range of traditional applications. More i

1 Introduction

Analysis of: Review of deep learning: concepts, CNN architectures, challenges, applications, future directions. Research goal: Can data augmentation techniques improve few-shot learning performance of vision-language models on standard benchmarks like COCO and Flickr30k?.

2 Methodology

Multi-query arXiv search (4 parallel queries, Relevance-sorted). TF-IDF cosine semantic verification (bigrams, threshold=0.15). NIM nv-embedqa-e5-v5 (dim=1024) for semantic indexing. Tribunal v2: 3-role parallel review (SKEPTIC/VALIDATOR/SYNTHESIZER) with revision round if score $<$ 6.5.

3 Results

10 papers retrieved. 10 claims extracted, 4 verified. Tribunal: 5.7/10 $\rightarrow$ REVISE (revision_round=1). Policy: ESCALATE_TO_OWNER.

4 Uncertainties

NIM free tier latency varies. TF-IDF verification is a weak signal. arXiv Relevance ranking is query-dependent. Tribunal consensus is LLM-based and prompt-sensitive.

5 Extracted Claims

Claim	Verified	Confidence
Deep learning has been deemed the Gold Standard in the machine learning community in recent years.	✓	0.15
Deep learning has become the most widely used computational approach in the field of machine learning.	✓	0.20
Deep learning has achieved results on complex cognitive tasks that match or exceed human performance.	×	0.13
One of the benefits of deep learning is the ability to learn from massive amounts of data.	✓	0.17
Deep learning has outperformed well-known machine learning techniques in cybersecurity.	×	0.11
Deep learning has outperformed well-known machine learning techniques in natural language processing.	×	0.15
Deep learning has outperformed well-known machine learning techniques in bioinformatics.	×	0.11
Deep learning has outperformed well-known machine learning techniques in robotics and control.	×	0.14
Deep learning has outperformed well-known machine learning techniques in medical information processing.	✓	0.16
Previous review works on the state-of-the-art in deep learning have only tackled one aspect of the field.	×	0.14

References

- https://doi.org/10.1186/s40537-021-00444-8
- https://doi.org/10.1109/cvpr52729.2023.00278
- https://doi.org/10.1109/tmi.2014.2377694