SOVEREIGN: How do different sampling strategies affect the efficiency and accuracy of LLMs on domain-agnostic question an

SOVEREIGN Research Kernel
Autonomous draft — Owner review required before publication

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Abstract

Multilayer neural networks trained with the back-propagation algorithm constitute the best example of a successful gradient based learning technique. Given an appropriate network architecture, gradient-based learning algorithms can be used to synthesize a complex decision surface that can classify high-dimensional patterns, such as handwritten characters, with minimal preprocessing. This paper reviews various methods applied to handwritten character recognition and compares them on a standard handwritten digit recognition task. Convolutional neural networks, which are specifically designed to

1 Introduction

Analysis of: Gradient-based learning applied to document recognition. Research goal: How do different sampling strategies affect the efficiency and accuracy of LLMs on domain-agnostic question answering tasks?.

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

3 papers retrieved. 6 claims extracted, 6 verified. Tribunal: 7.2/10 $\rightarrow$ APPROVE (revision_round=0). Policy: AUTO_APPROVE.

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
Multilayer neural networks trained with the back-propagation algorithm constitute the best example of a successful gradi	✓	0.34
Gradient-based learning algorithms can be used to synthesize a complex decision surface that can classify high-dimension	✓	0.35
Convolutional neural networks outperform all other techniques for handwritten character recognition	✓	0.26
Graph transformer networks (GTN) allows multimodule systems to be trained globally using gradient-based methods so as to	✓	0.37
A graph transformer network for reading a bank cheque uses convolutional neural network character recognizers combined w	✓	0.40
The graph transformer network system for reading bank cheques is deployed commercially and reads several million cheques	✓	0.23

References

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- https://doi.org/10.1186/s13643-016-0384-4
- https://doi.org/10.1109/5.726791