

Hybrid Batch Training Ratios in Knowledge Graph-Enhanced Cross-Lingual Topic Classification Models

Assignee Research

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Abstract

Multi-label topic classification without labeled training data is a challenging task, specially when documents contain complex relational information. We present a zero-shot multi-label topic classification framework and systematically investigate how per-article knowledge graph augmentation affects its performance. The base framework classifies topics in documents without labeled training data and has four variants: article-only classification, keyword-enhanced classification, and self-consistency decoding variants of both. Then, we augment each base variant with per article knowledge graph.

1 Introduction

This paper examines: Knowledge Graph-Enhanced Zero-Shot Topic Classification: A Multi-Strategy Comparative Study. Research question: What is the effect of hybrid batch training ratios on the convergence speed and final accuracy of knowledge graph-enhanced models for cross-lingual topic classification?.

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 7.3/10.

3 Results

12 papers retrieved. 11 claims extracted; 8 independently verified. Quality review score: 7.3/10.

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
The study evaluates a zero-shot multi-label topic classification framework with four variants (AO, AK, AOS, AKS) across	✓	0.18
The study proposes a per-article knowledge graph construction pipeline adapted from KGen (Mo et al., 2025) and defines	✓	0.25
Graph augmentation consistently helps smaller models and is most effective when combined with keyword-enhanced classific	✓	0.19
Self-consistency decoding increases computational cost approximately fivefold but does not help with classification perf	✓	0.25
The study uses the English subset of the SemEval-2018 Task 1 dataset (Mohammad et al., 2018; Sarkar et al., 2023).	✓	0.23
The study compares against established sentence-encoder baselines and examines whether structured relational context imp	✓	0.21
The study includes a runtime and cost analysis showing the impact of self-consistency decoding on computational cost.	×	0.13
The study demonstrates that graph augmentation consistently helps smaller models.	✓	0.17
The study shows that graph augmentation is most effective when combined with keyword-enhanced classification with self-c	✓	0.18
The study evaluates the performance of various models on the Medical dataset, with specific F1 scores reported for diffe	×	0.03
The study evaluates the runtime and cost of various methods on the Medical dataset, with specific values reported for di	×	0.04

References

- <http://arxiv.org/abs/2406.00552v4>
- <http://arxiv.org/abs/2605.30465v1>
- <http://arxiv.org/abs/2511.13044v1>