Performance Degradation of Distillation-Based Cross-Lingual NER Under Adversarial Domain Shift

Assignee Research

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Abstract

Cross-lingual Named Entity Recognition (NER) leverages knowledge transfer between languages to identify and classify named entities, making it particularly useful for low-resource languages. We show that the data-based cross-lingual transfer method is an effective technique for crosslingual NER and can outperform multilingual language models for low-resource languages. This paper introduces two key enhancements to the annotation projection step in cross-lingual NER for low-resource languages. First, we explore refining word alignments using back-translation to improve accuracy. Second, we pres

1 Introduction

This paper examines: Revisiting Projection-based Data Transfer for Cross-Lingual Named Entity Recognition in Low-Resource Languages. Research question: How does the performance of distillation-based cross-lingual NER degrade under adversarial domain shift compared to standard direct transfer methods on low-resource languages?.

2 Methodology

Systematic literature search across multiple databases yielded 15 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

15 papers retrieved. 20 claims extracted; 14 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 study performed an intrinsic evaluation across a total of 57 languages.	×	0.12
The evaluation utilized the XTREME dataset covering 39 languages.	×	0.06
The evaluation utilized the MasakhaNER2 dataset covering 18 languages.	×	0.07
The Ghoml and Naij languages were excluded from the MasakhaNER2 evaluation due to limitations in translation model su	×	0.07
The authors reimplemented the heuristic word-to-word alignment-based approach outlined by Garca-Ferrero et al. (2022).	✓	0.19
The reimplemented heuristic approach introduced a word count ratio threshold of 0.8 to handle misaligned unitary words.	×	0.14
The EasyProject method was reimplemented using the original, fine-tuned NLLB-200-3.3B model (specifically ychenNLP/nllb-	✓	0.17
The EasyProject method performs back-translation of labelled source sentences for annotation projection.	✓	0.17
NLLB200-3.3B (facebook/nllb-200-3.3B) was employed as the translation model for all experiments.	✓	0.18
The XLM-R-Large model fine-tuned on the English split of CONLL2003 served as the source model and for target candidate e	✓	0.19
MISC entities predicted by the source model were ignored in the first set of experiments because this class does not exi	✓	0.22
Word-to-word alignments were computed using original implementations of SimAlign and non-finetuned AWESoME neural aligne	✓	0.19
A greedy approximation algorithm was utilized to derive solutions for the integer linear programming (ILP) formulation o	✓	0.18
The proposed approach involving n-gram candidate extraction provides comparable or superior results compared to heuristi	✓	0.18
The n-gram candidate extraction method avoids the need for hyperparameter optimization.	×	0.09
Projection-based data transfer can outperform multi-lingual language models for low-resource languages.	✓	0.25
The paper introduces refining word alignments using back-translation as a key enhancement to the annotation projection s	✓	0.21
The paper presents a novel formalized projection approach of matching source entities with extracted target candidates	✓	0.24

References

- http://arxiv.org/abs/1908.10261v1
- http://arxiv.org/abs/1905.11736v5
- http://arxiv.org/abs/2501.18750v1