

Cross-lingual NER Performance via Annotation Projection vs. Multilingual Language Models in Low-Resource Languages

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 cross-lingual NER models trained via annotation projection compare to that of multilingual language models like mBERT or XLM-R on the CoNLL-2003 benchmark when evaluated in low-resource languages?.

2 Methodology

Systematic literature search across multiple databases yielded 13 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.5/10.

3 Results

13 papers retrieved. 21 claims extracted; 18 independently verified. Quality review score: 8.5/10.

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 evaluation was performed across a total of 57 languages using the XTREME (39 languages) and MasakhaNER2 datasets (18	✓	0.16
The evaluation encompasses the full pipeline, considering both translation and source NER model performance.	✓	0.20
The heuristic word-to-word alignment-based approach outlined by Garca-Ferrero et al. (2022) was reimplemented and enha	✓	0.28
The EasyProject method was reimplemented, which performs back-translation of labelled source sentences using the NLLB-20	✓	0.21
NLLB200-3.3B3 was employed as a translation model for all experiments.	×	0.13
The XLM-R-Large model, fine-tuned on the English split of the CONLL2003, served as both the source model and for target	✓	0.20
MISC entities predicted by the XLM-R-Large model were ignored in the first set of experiments since this class does not	✓	0.23
SimAlign and non-finetuned AWESoME neural aligners with the default settings were used for computing word-to-word alignm	×	0.14
All models are from the HF Hub.	×	0.12
The evaluation involved full pipelines, and the resulting metrics were influenced by both translation quality and the pe	✓	0.15
The same models for translation and source labelling were employed throughout all experiments for a fair and consistent	✓	0.16
For tasks involving the proposed integer linear programming (ILP) formulation of the projection problem, a greedy approx	✓	0.21
Candidate matching methods consistently deliver strong performance.	✓	0.16
The proposed approach involving n-gram candidates extraction provides comparable or superior results while offering grea	✓	0.22
The paper introduces two key enhancements to the annotation projection step in cross-lingual NER for low-resource langua	✓	0.38
The first enhancement explores refining word alignments using back-translation to4mprove accuracy.	✓	0.20
The second enhancement presents a novel formalized projection approach of matching source entities with extracted target	✓	0.23
The findings highlight the robustness of projection-based data transfer as an alternative to model-based methods for en	✓	0.44

References

- <http://arxiv.org/abs/2310.10378v5>
- <http://arxiv.org/abs/2303.09306v2>
- <http://arxiv.org/abs/2501.18750v1>