Label-Aware Multi-Level Contrastive Learning for Cross-Lingual Intent Recognition in Low-Resource Languages on XTREME

Assignee Research

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Abstract

Despite the great success of spoken language understanding (SLU) in high-resource languages, it remains challenging in low-resource languages mainly due to the lack of labeled training data. The recent multilingual code-switching approach achieves better alignments of model representations across languages by constructing a mixed-language context in zero-shot cross-lingual SLU. However, current code-switching methods are limited to implicit alignment and disregard the inherent semantic structure in SLU, i.e., the hierarchical inclusion of utterances, slots and words. In this paper, we propose

1 Introduction

This paper examines: Label-aware Multi-level Contrastive Learning for Cross-lingual Spoken Language Understanding. Research question: To what extent can label-aware multi-level contrastive learning improve cross-lingual intent recognition in non-English low-resource languages when evaluated on the XTREME benchmark?.

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 8.8/10.

3 Results

13 papers retrieved. 10 claims extracted; 10 independently verified. Quality review score: 8.8/10.

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
Spoken language understanding (SLU) has achieved great success in high-resource languages.	✓	0.25
SLU remains challenging in low-resource languages mainly due to the lack of labeled training data.	✓	0.27
Recent multilingual code-switching approaches achieve better alignments of model representations across languages by con	✓	0.39
Current code-switching methods are limited to implicit alignment.	✓	0.27
Current code-switching methods disregard the inherent semantic structure in SLU, specifically the hierarchical inclusion	✓	0.30
The proposed method models the utterance-slot-word structure using a multi-level contrastive learning framework at the u	✓	0.32
The proposed multi-level contrastive learning framework facilitates explicit alignment.	✓	0.24
Novel code-switching schemes are introduced to generate hard negative examples for the contrastive learning framework.	✓	0.34
A label-aware joint model was developed that leverages label semantics to enhance implicit alignment and feed into contr	✓	0.32
The proposed methods significantly improve performance compared with strong baselines on two zero-shot cross-lingual SLU	✓	0.38

References

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- https://doi.org/10.1109/jstsp.2022.3207050
- https://doi.org/10.1016/j.foodres.2017.07.022