

MultiPL-E Parameter-Efficient Fine-Tuning for Cross-Lingual Code Generation with Intermediate Tasks

Assignee Research

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Abstract

Zero-shot cross-lingual knowledge transfer enables the multilingual pretrained language model (mPLM), finetuned on a task in one language, make predictions for this task in other languages. While being broadly studied for natural language understanding tasks, the described setting is understudied for generation. Previous works notice a frequent problem of generation in a wrong language and propose approaches to address it, usually using mT5 as a backbone model. In this work, we test alternative mPLMs, such as mBART and NLLB-200, considering full finetuning and parameter-efficient finetuning wi

1 Introduction

This paper examines: Empirical study of pretrained multilingual language models for zero-shot cross-lingual knowledge transfer in generation. Research question: How does the choice of intermediate language understanding task (e.g., NLI, QA) impact zero-shot cross-lingual code generation performance in MultiPL-E when combined with parameter-efficient fine-tuning?.

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 7.5/10.

3 Results

12 papers retrieved. 8 claims extracted; 7 independently verified. Quality review score: 7.5/10.

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
mBART with adapters performs similarly to mT5 of the same size	✓	0.24
NLLB-200 can be competitive in some cases	✓	0.22
Tuning learning rate used for finetuning helps to alleviate the problem of generation in the wrong language	✓	0.37
With too small or too large LR the model performance is suboptimal	×	0.12
Standard finetuning with lr=0.001 achieves higher rouge2 score for French than lr=0.0001 at 20000 training steps	✓	0.23
Mix-in target langs with lr=0.001 achieves higher lang correct rate for French than lr=0.0001 at 20000 training steps	✓	0.31
Standard finetuning with lr=0.001 achieves higher f1 score for Russian than lr=0.0001 at 20000 training steps	✓	0.24
Mix-in target langs with lr=0.001 achieves higher lang correct rate for Russian than lr=0.0001 at 20000 training steps	✓	0.32

References

- <http://arxiv.org/abs/2310.09917v3>
- <http://arxiv.org/abs/2506.15415v1>
- <http://arxiv.org/abs/2101.10649v1>