Efficient Unseen Language Adaptation for Multilingual Pre-Trained Language Models

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https://github.com/MiuLab/UnseenAdapt
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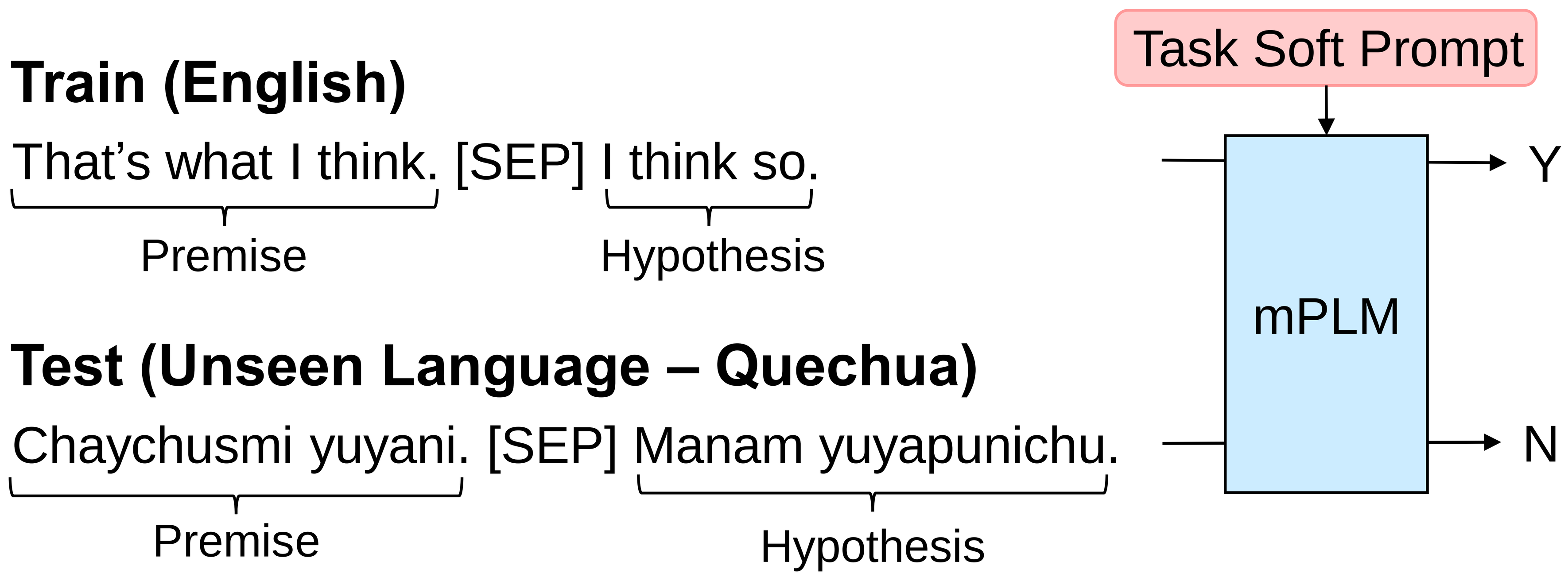
Motivation

- Apply machine learning application to **low-resource** language
- Issues
  - The lack of labeled data in low-resource language
    - ⇒ Zero-shot cross-lingual transfer is needed
  - Low-resource languages are **unseen** by most mPLMs
    - ⇒ Language adaptation is needed
  - The corpora of low-resource languages are small and mPLMs are large
    - ⇒ A data-efficient and parameter-efficient method is needed

Paper Idea

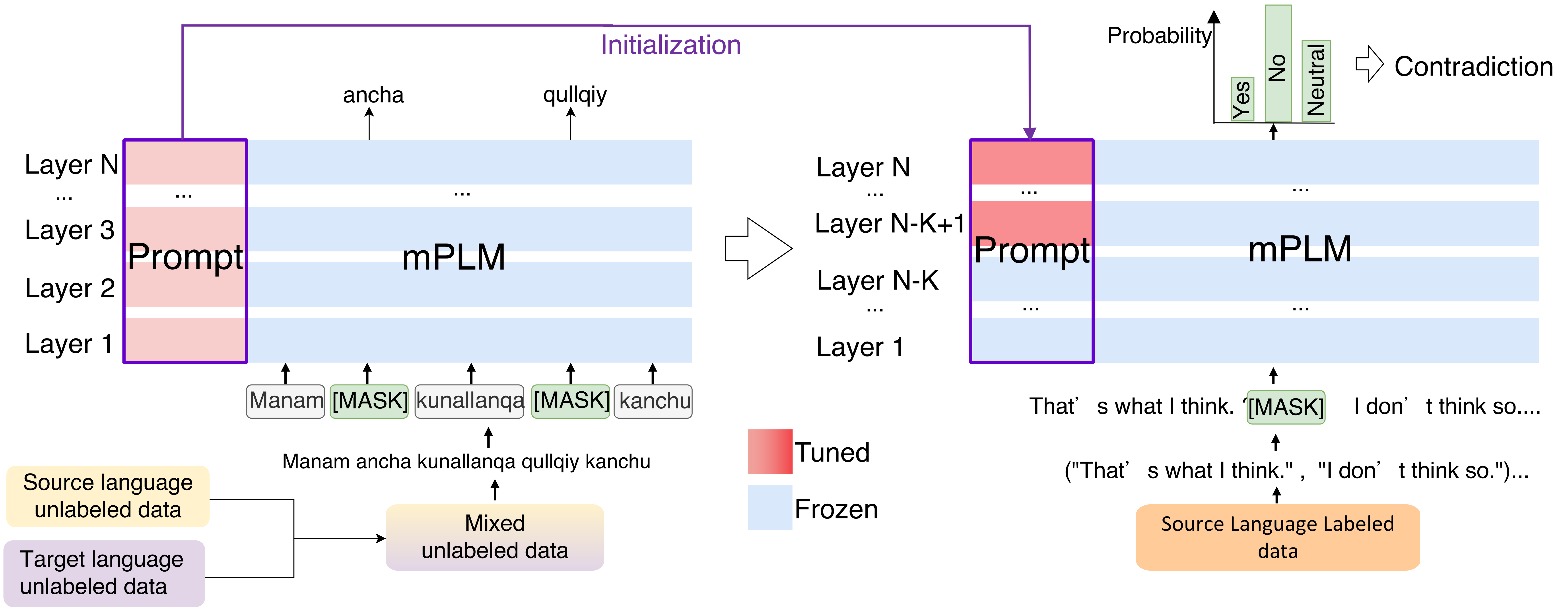
Design **parameter-efficient** and **data-efficient** framework to **adapt** mPLMs to **unseen** languages and achieve strong cross-lingual transfer performance



Proposed Framework

MLM on Unlabeled Data

Tuning on Source-Language Labeled Data



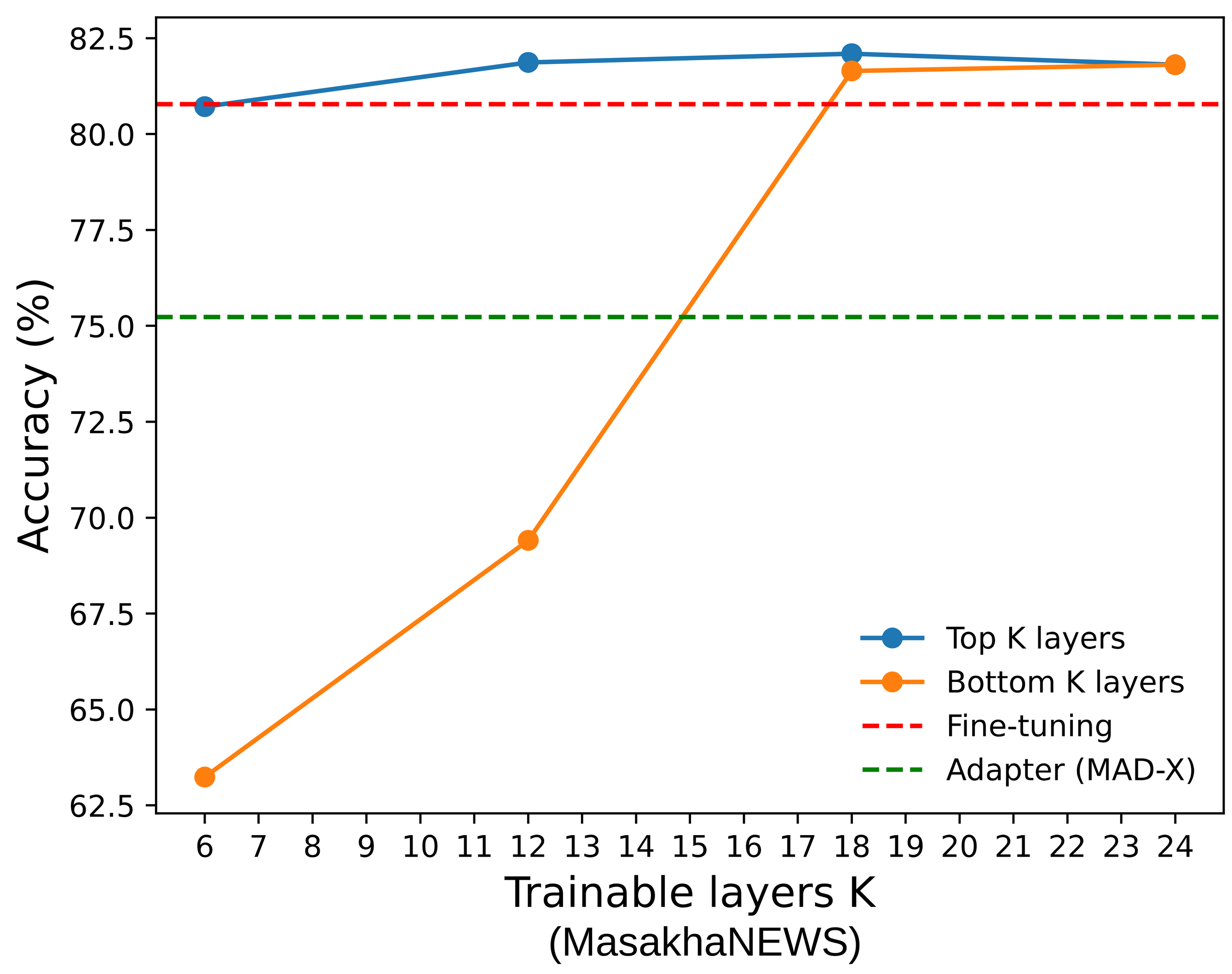
Experiments

MasakhaNEWS (Adelani+, 2023)

Model	Avg. accuracy
Zero-shot	
Fine-tuning	69.77
Prompt-tuning	62.54
Zero-shot with adaptation	
Fine-tuning	55.62
MAD-X (Pfeiffer+, 2020)	55.20
Ours	57.56

AmericasNLI (Ebrahimi+, 2022)

Model	Avg. accuracy
Zero-shot	
Fine-tuning	42.58
Prompt-tuning	43.35
Zero-shot with adaptation	
Fine-tuning	46.51
MAD-X (Pfeiffer+, 2020)	49.29
Ours	48.59



Conclusions

- First extend the generalization of mPLMs to unseen languages using only **soft-prompt tuning**
- We demonstrate the **efficiency** of soft-prompt language adaptation which
  - Outperforms fine-tuning with only **0.28%** of tunable parameter
  - Comparable to adapter-based method while utilizing **17 times** fewer parameters