Cross-Domain Label-Adaptive Stance Detection

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Summary

- Stance expressions can take **different forms**, e.g.
  - a tweet targeting a person
  - an article addressing a claim
  - a comment for a headline
- Datasets use **different labels** (*agree*, *support*, *argument for*, etc.)
- Data comes from **various domains** (rumours, news, politics, etc.)
- The above issues limit generalisation and cross-domain studies
- We introduce MoLE, which combines
  - Mixture of Experts
  - Domain-Adversarial Training
  - Label Embeddings
- MoLE can adapt to new domains and can work with unseen labels
- Strong performance in both in-domain and out-of-domain scenarios
- Exhaustive correlation analysis of performance vs. dataset characteristics

Contributions

- The largest study of stance detection datasets to date
- Novel framework (**MoLE**) combining **Mixture of Experts and Label Embeddings**
- MoLE can adapt to **out-of-domain data** and can work with **unseen labels**
- MoLE outperforms both **in-domain** and **out-of-domain** baselines
- **Correlation analysis** between performance and several dataset characteristics
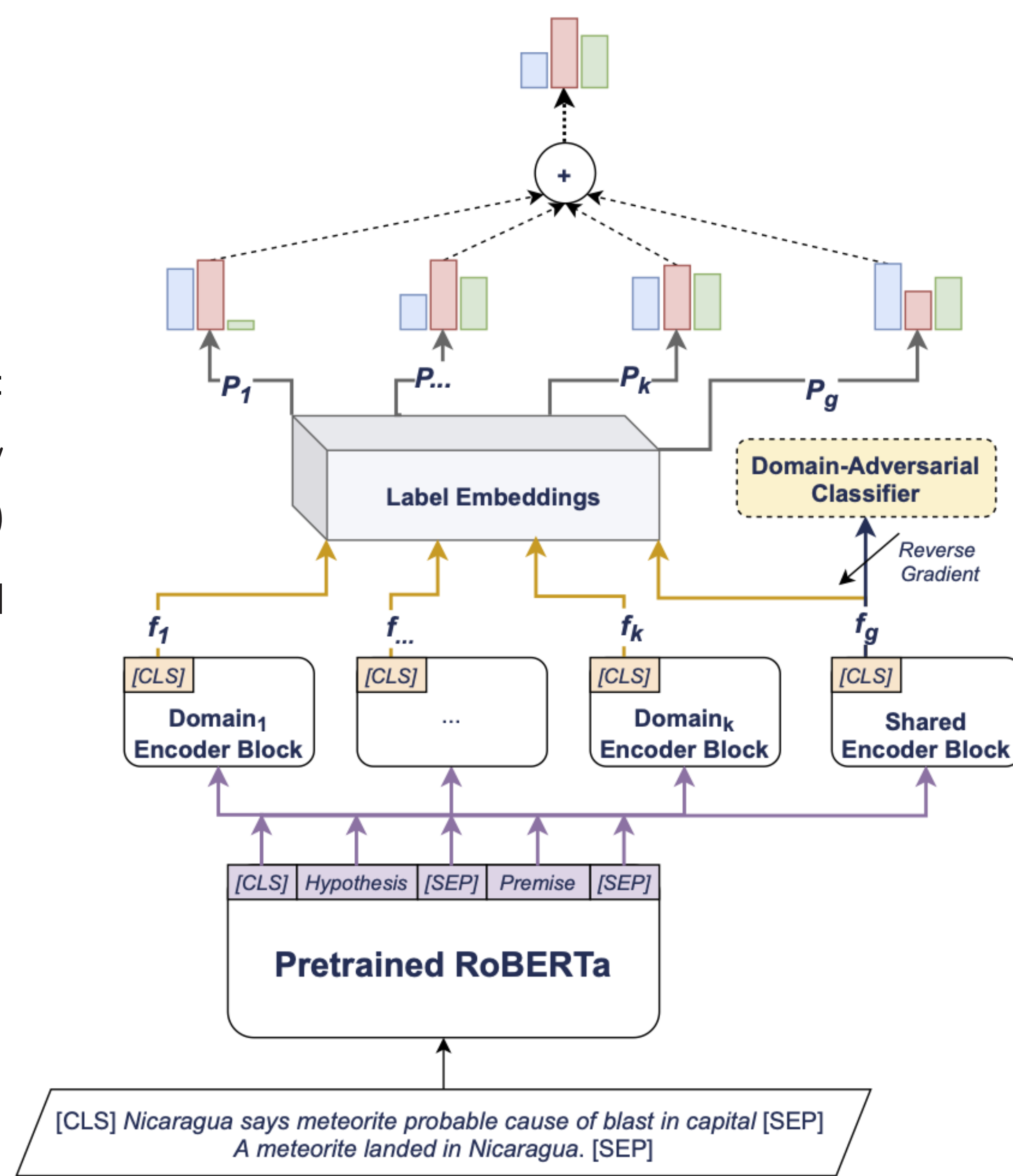
Datasets

- **Sixteen** diverse datasets
- Different **domains**
  - Fake News
  - Rumours
  - Politics
  - Company Acquisitions
- Over **fifty labels**
  - (well-known) Positive, Negative, etc.
  - (additional) Neutral, etc.
  - (unusual) Other, Question, etc.
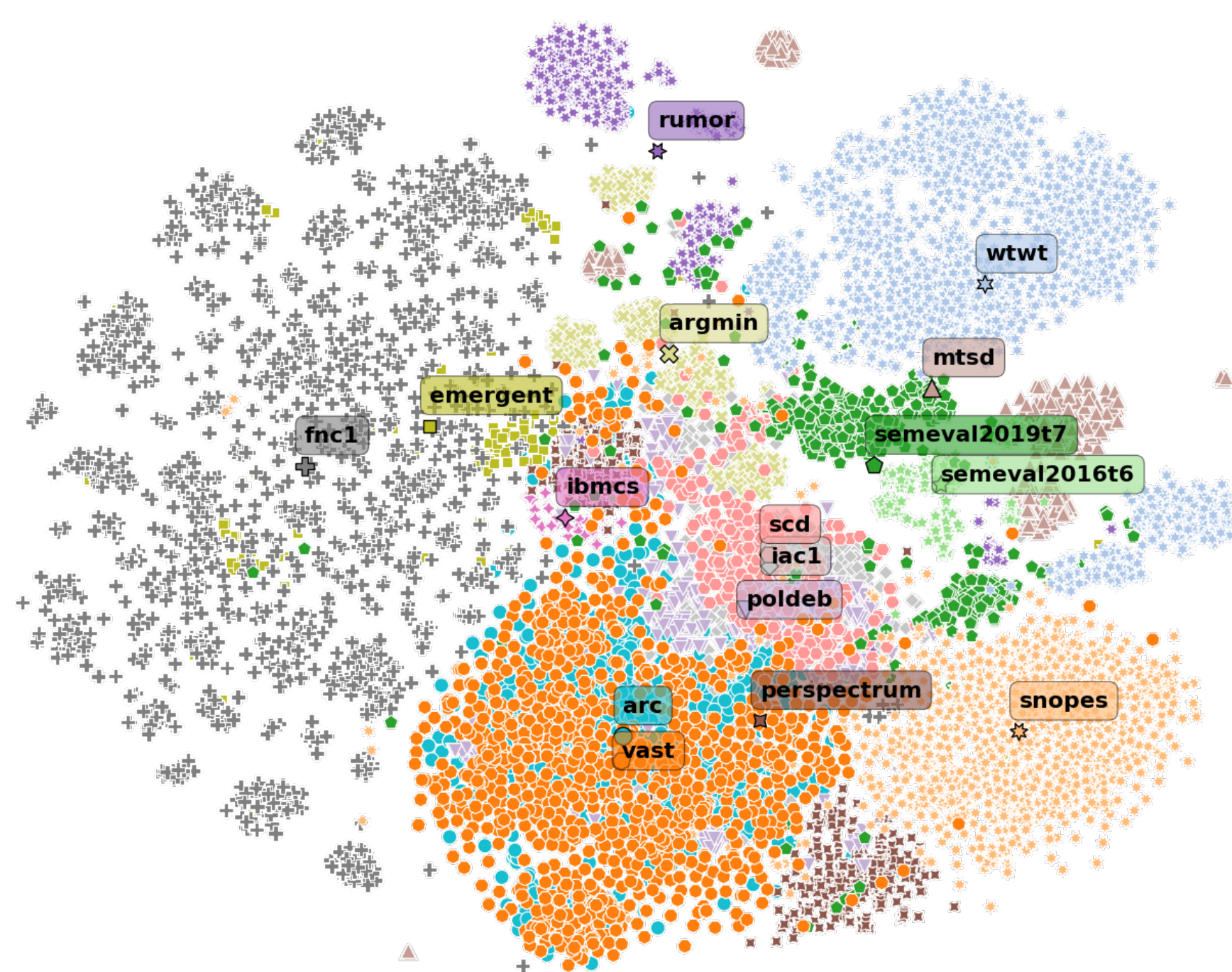
(MoLE) Mixture of Experts with Label Embeddings
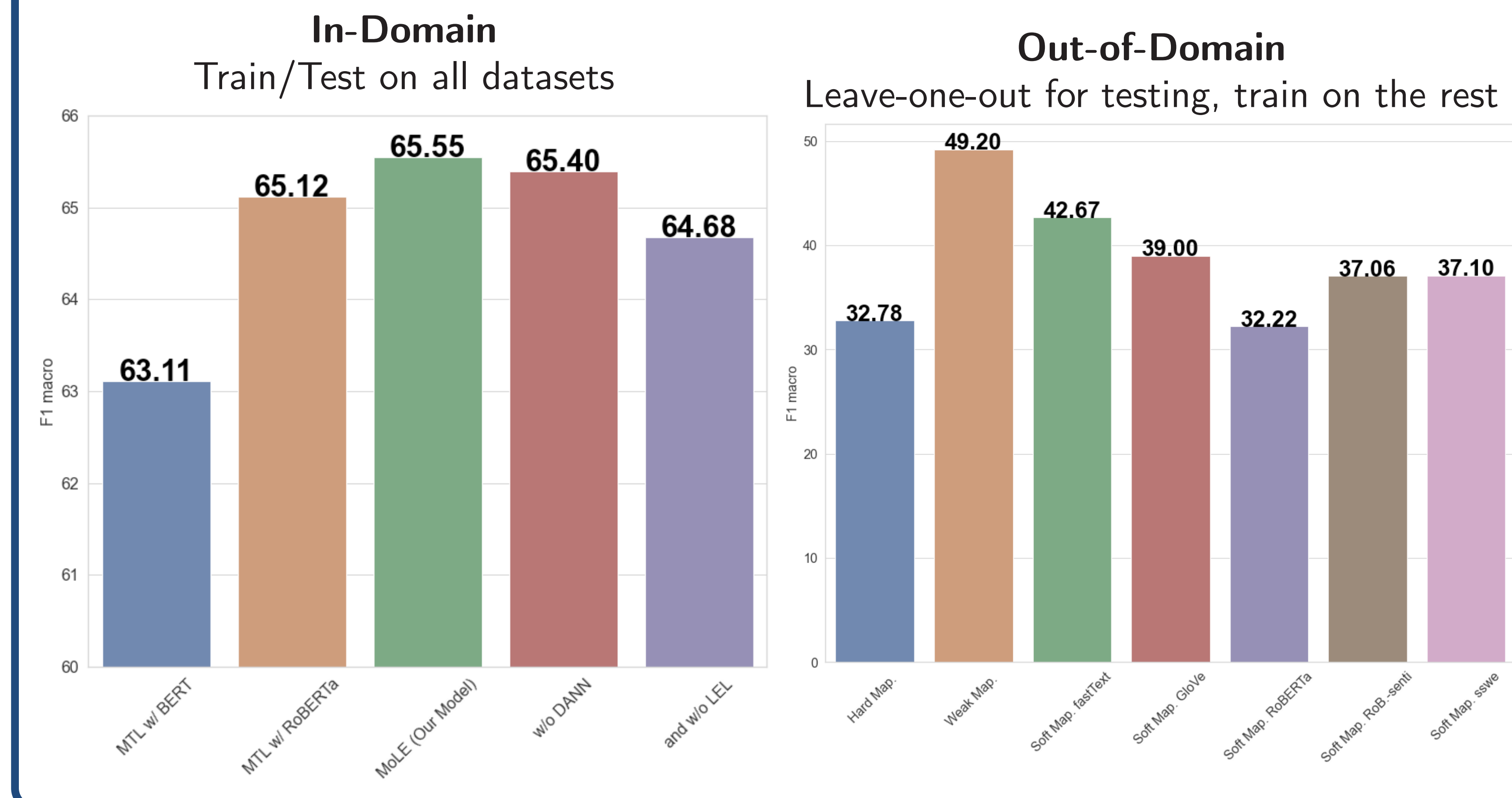
Key Characteristics (Our Model):

- Mixture-of-Experts (MoE) w/ Label Embeddings Layer (LEL)
- Domain-Adversarial Neural Network (DANN)
- Joint Label Space Voting
- Parameter-Efficient Model

Repository

Download the data, and try your own models!

Results

In-Domain — Train/Test on all datasets

MTL w/ BERT: 63.11; MTL w/ RoBERTa: 65.12; MoLE (Our Model): 65.55; w/o DANN: 65.40; and w/o LEL: 64.68

Out-of-Domain — Leave-one-out for testing, train on the rest

Hard Map: 32.78; Weak Map: 49.20; Soft Map fastText: 42.67; Soft Map GloVe: 39.00; Soft Map RoBERTa: 32.22; Soft Map RoB-sents: 37.06; Soft Map RoB-sent: 37.10

Correlation Analysis

(Pearson) Correlation Analysis:

- Dataset size (more training data – **better**)
- Vocabulary size (richer vocab – **harder** task)
- Social Media, Tweets are the **hardest**
- News, Article, Claim as Context are the **easiest**