

USING CONVOLUTION NEURON NETWORK WITH BERT FOR STANCE DETECTION IN VIETNAMESE

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INTRODUCTION

Stance detection: to detect expression of the speaker's attitude, standpoint, and judgement toward a target.

Messi có thể về Juventus Messi can join Juventus	
Comments	Stances
Không bao giờ đâu, chỉ là tin đồn thôi <i>Never, just a rumor</i>	<i>disagree</i>
Hãy để điều này xảy ra <i>Let it happen</i>	<i>agree</i>
Messi với ro mà đá với nhau thì ai mà đỡ được <i>If Messi and Ro play in the same team, who can be against them</i>	<i>discuss</i>
Xin lỗi đã làm phiền, ai quan tâm inbox nhé <i>Sorry to disturb, who interested in please inbox</i>	<i>Unrelated</i>

Some highlights of this paper:

- Present a systematic study on stance detection for a low-resource language.
- Perform extensive experiments and report the SOTA result for future research on this interesting direction.

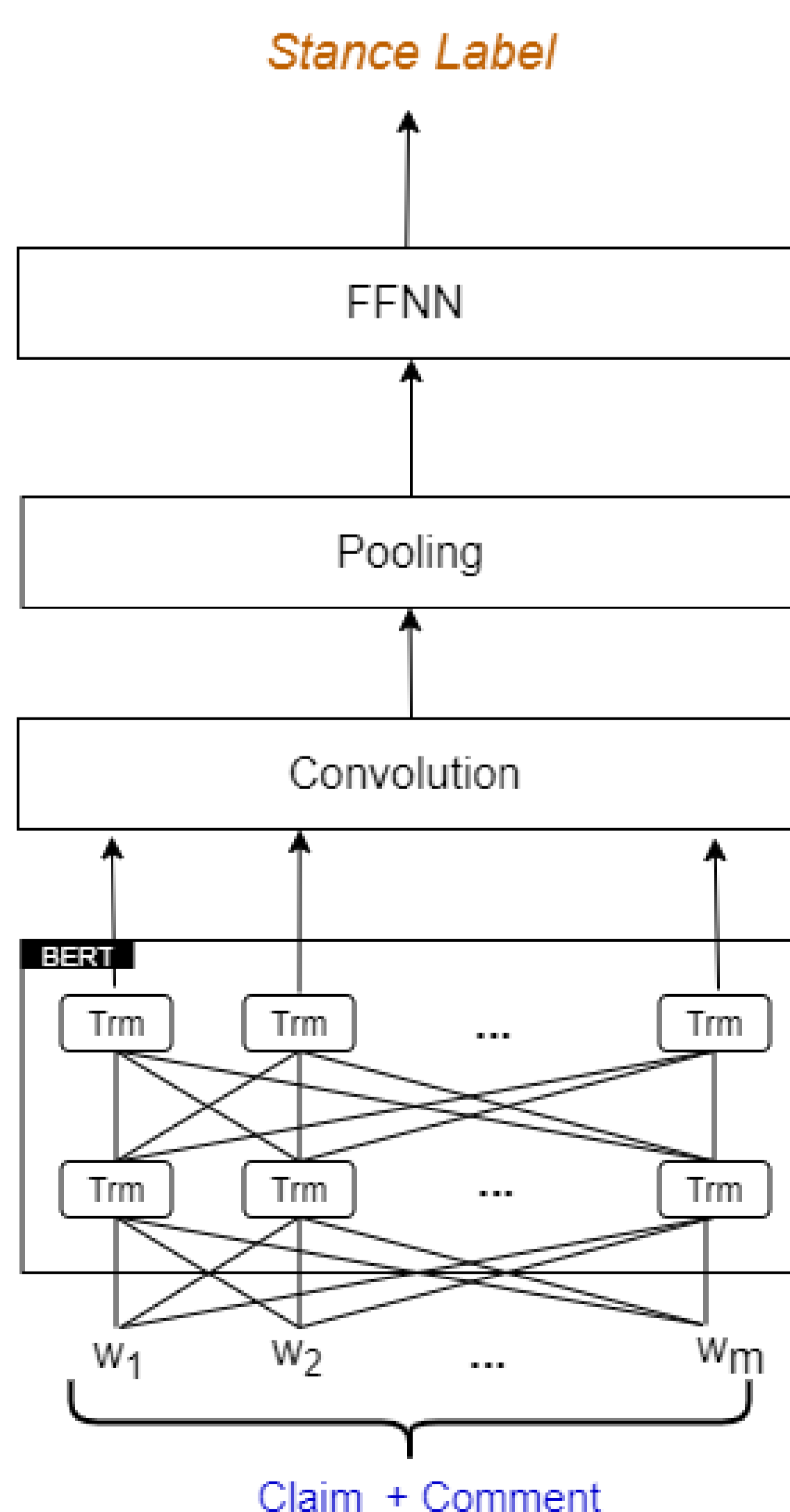
A MODEL USING CNN WITH BERT

The model

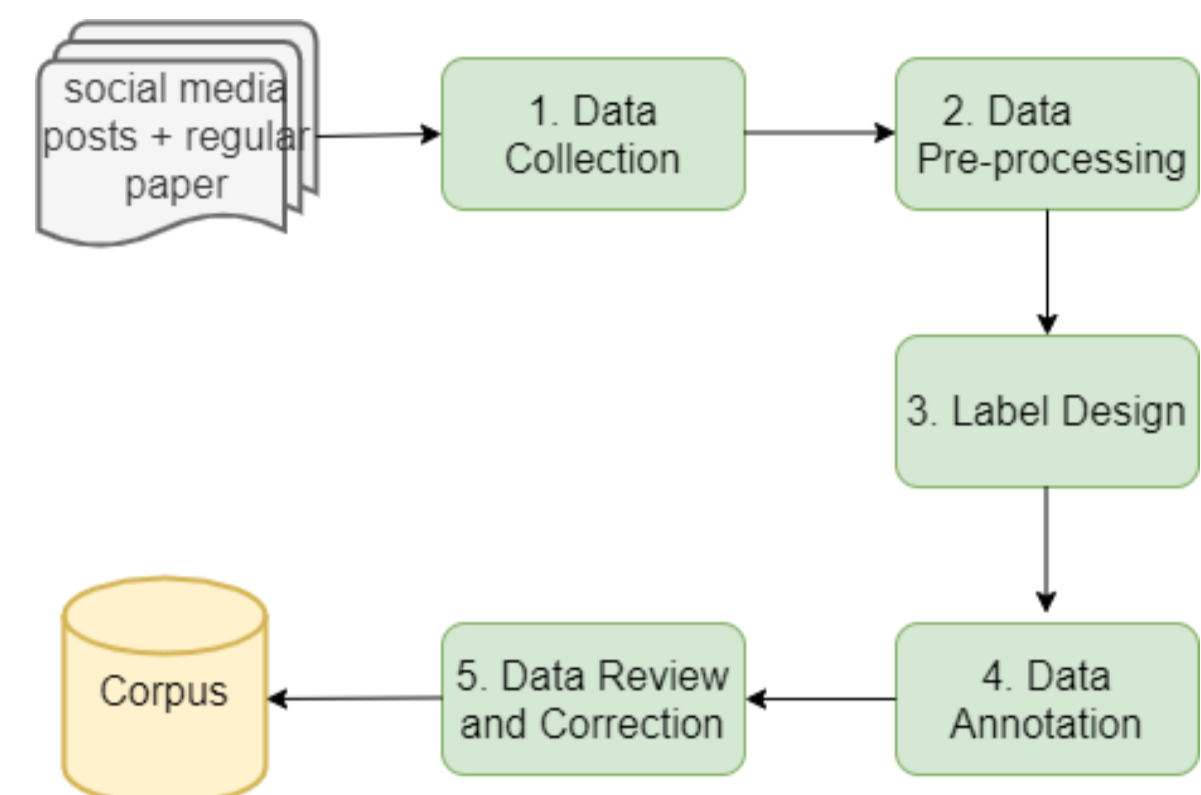
- utilizes knowledge embedded in pretrained BERT language models
- CNN is an ideal replacement for LSTM/GRUs (Hochreiter and Schmidhuber, 1997) for sequence modelling tasks.

Include the following layers:

1. Embedding layer
2. Text representation using CNN
3. FFNN



A VIETNAMESE CORPUS



• Introduced by Tran et al., 2021

Table 1: Number of comments pertaining to each stance.

No.	Stances	Comments
1	Agree	2,941
2	Disagree	2,574
3	Discuss	3,334
4	Unrelated	2,404
Total:		11,253

- Data statistics

RESULTS

Setting-up experiments: Word2vec with 300 dimensions, Dropout rate 0.2, Hidden units: 200, Adam optimizer, CNN kernel sizes: 2,3, Exploit PhoBERT

Table 2: Experimental results of the proposed methods averaged on four stance labels.

Number	Methods	Accuracy
Best previous work (Tran et al., 2021)		
0	biLSTM+Att+rich-features	66.32
word2vec embeddings		
1	word2vec-GRU	64.57
2	word2vec-LSTM	67.24
3	word2vec-CNN	69.79
BERT embeddings		
4	BERT-fine-tuning	73.82
5	BERT-GRU	74.05
6	BERT-LSTM	74.59
7	BERT-CNN	75.57

Table 3: Experimental results of the best BERT-CNN model on four stance labels.

Stance Labels	Precision	Recall	F ₁ score
Agree	76.77	79.67	78.19
Disagree	72.73	59.74	65.62
Discuss	64.87	72.71	68.57
Unrelated	91.62	89.37	90.48

Gold stance	wrongly-predicted stances		
discuss	agree	disagree	unrelated
	30.56	56.42	12.89
agree	disagree	discuss	unrelated
	25.43	53.11	21.42
disagree	agree	discuss	unrelated
	30.11	51.36	18.4
unrelated	agree	disagree	discuss
	35.16	15.89	48.91

Table 4: The most wrongly-predicted stance labels by the best stance detection model.

CONCLUSION

Proposed a robust and effective model to detect stances in Vietnamese using CNN with BERT. The experimental results showed that the model exploiting BERT with CNN outperformed other strong baseline methods by a large margin. It yielded 75.57% accuracy score on the test set.