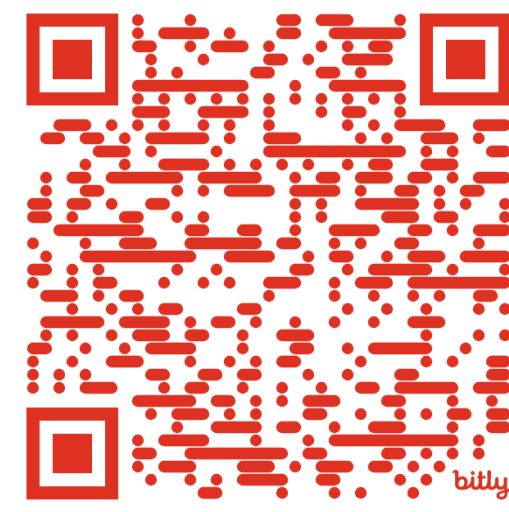




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Stanceformer: Target-Aware Transformer for Stance Detection

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STANCE DETECTION TASK

INPUTS: TWEET, TARGET
OUTPUT: FAVOR/ AGAINST/ NONE

Example

Tweet: a woman ?? wanting to be equal
to a man ???! what montrosity is this
Target: feminist movement
Stance: AGAINST

MOTIVATION

What if the targets are hidden from the model?
Stance outputs still do not change much →
Models tend to ignore the targets

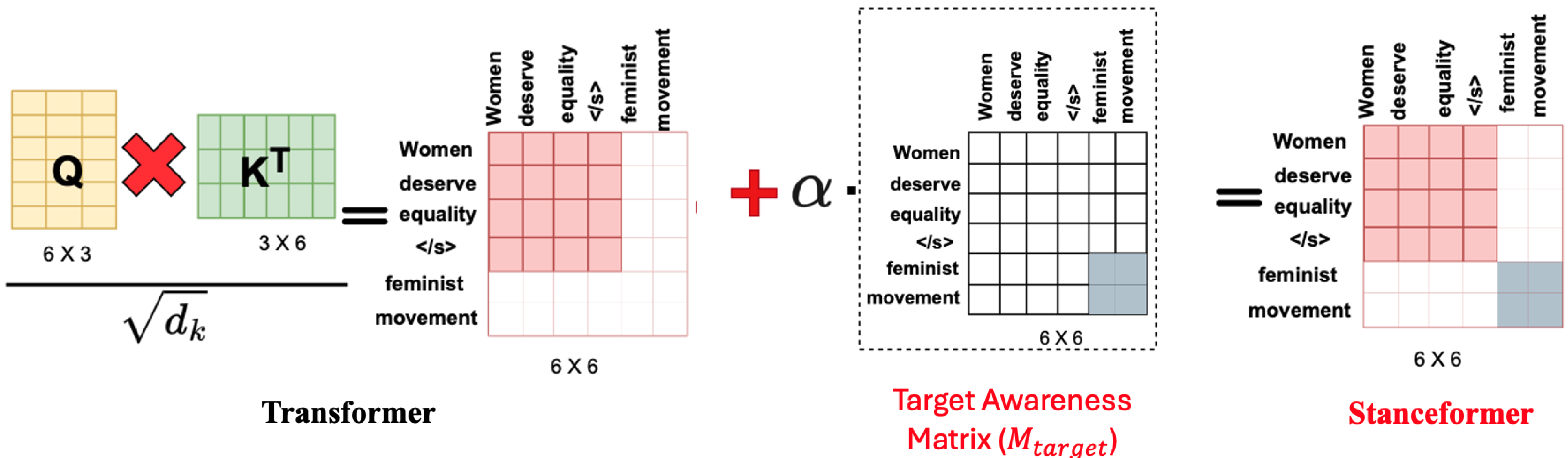
SemEval-2016	BERT	BERTweet
BERT	61.31	60.12
Targets Masked	64.23	62.63

Can the transformer-based models become
more target aware? If yes, how?
STANCEFORMER to the rescue

CONTRIBUTIONS

1. Propose novel **Stanceformer**, which uses **Target Awareness Matrix** for encouraging models to pay more attention to targets
2. Results on **four Stance Detection datasets** across various BERT-based models and LLMs
3. **First to finetune LLMs** for Stance Detection
4. Generalization to **Aspect-based Sentiment Analysis**

STANCEFORMER ARCHITECTURE



$$\text{Self-Attention}' = \text{softmax} \left(\frac{\mathbf{QK}^T}{\sqrt{d_k}} + \alpha \mathbf{M}_{target} \right) * \mathbf{V}$$

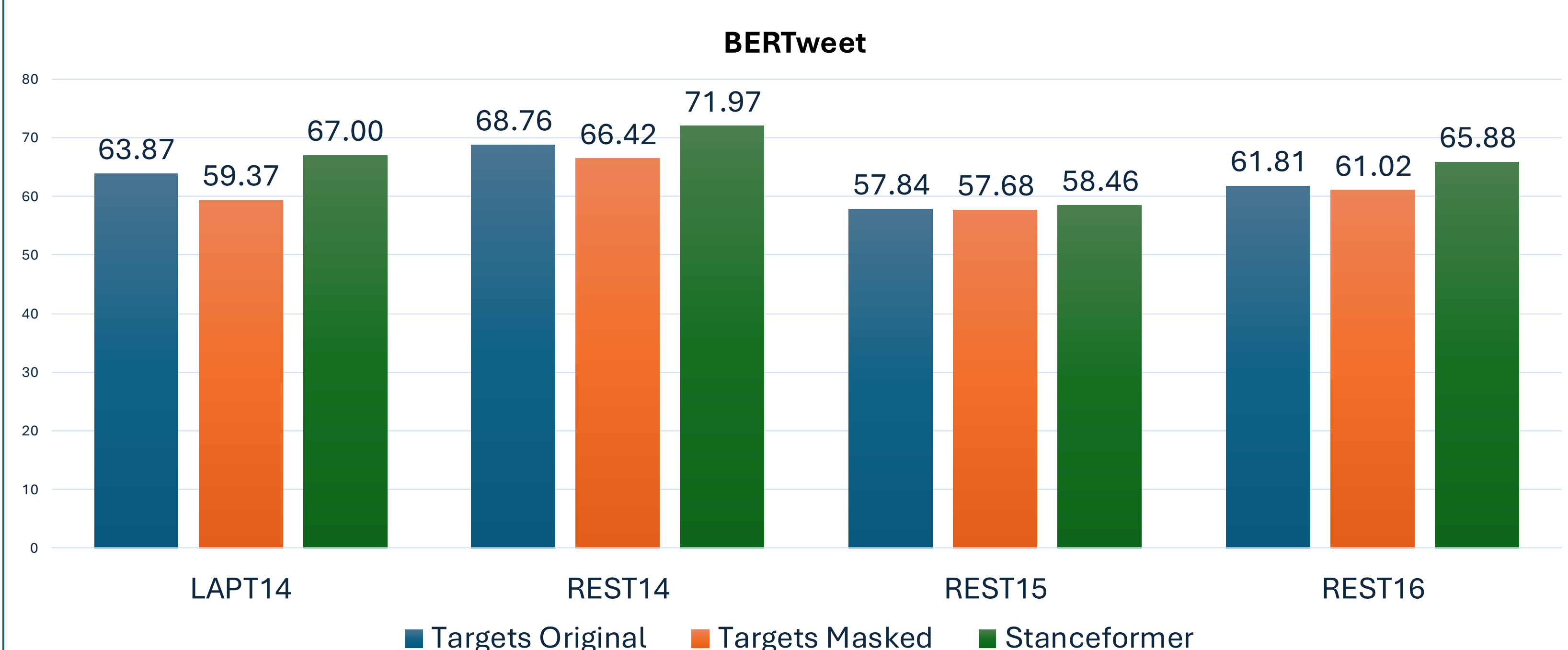
RESULTS

	SemEval-2016				
	AT	FM	HC	LA	Avg.
BiCE [†]	64.88	57.93	58.81	60.86	57.23
CNN-based [†]	66.76	58.83	57.12	65.45	58.31
TAN [‡]	59.33	55.77	65.38	63.72	59.56
CrossNet	-	-	-	-	-
BERT [‡]	68.67	61.66	62.34	58.60	59.09
TGA-Net	-	-	-	-	-
BERT	65.19	55.95	63.01	61.08	61.31
-» Stanceformer	64.86	57.49	64.70	62.48	62.38
BERT-variant	68.15	60.06	65.77	62.93	64.23
-» Stanceformer	69.99	61.84	66.65	65.56	66.01
WS-BERT	70.38	63.20	71.33	62.99	66.98
-» Stanceformer	72.01	64.41	73.39	63.96	68.44
Closed-source LLM					
GPT-3.5 [0-shot]	24.92	69.41	73.27	57.94	56.38
Open-source LLM					
Llama-2-7b-chat [0-shot]	17.34	48.37	53.09	36.67	38.87
Llama-2-7b-chat-finetune	44.49	44.56	56.79	45.42	47.81
-» Stanceformer	49.13	48.40	55.11	40.51	48.29
Llama-2-13b-chat [0-shot]	36.92	58.18	73.78	57.01	56.47
Llama-2-13b-chat-finetune	66.11	68.64	78.13	67.45	70.08
-» Stanceformer	67.16	71.43	74.76	73.98	71.83

STANCEFORMER IMPROVES TARGET AWARENESS

1. Stanceformer outperforms BERT-based models
2. Stanceformer outperforms Llama-based models
3. Llama-2-13b outperforms Llama-2-7b
4. Finetuned LLMs outperform zero-shot
5. LLM models often do not outperform BERT-based models

GENERALIZATION TO ABSA TASK



EXPOSING LLM RESEARCH GAPS

1. High variance across different seeds and prompts
2. Inconsistent Evaluation (accuracy depends upon seed, quality of prompt, quality of regex for parsing)
3. Uncontrollable LLM outputs (~15% *Abstain* cases, irrelevant strings)