Multiple Transformer Mining for VizWiz Image Caption

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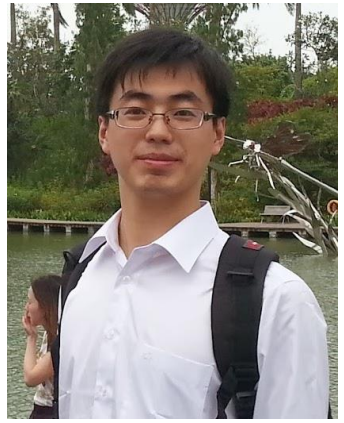

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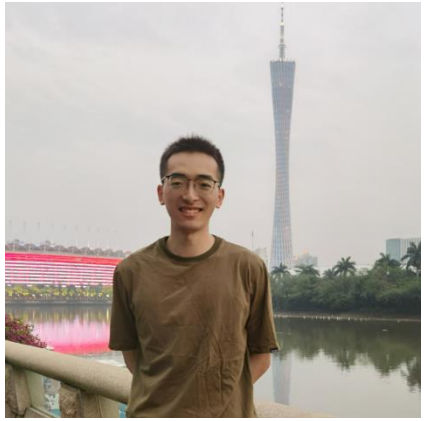
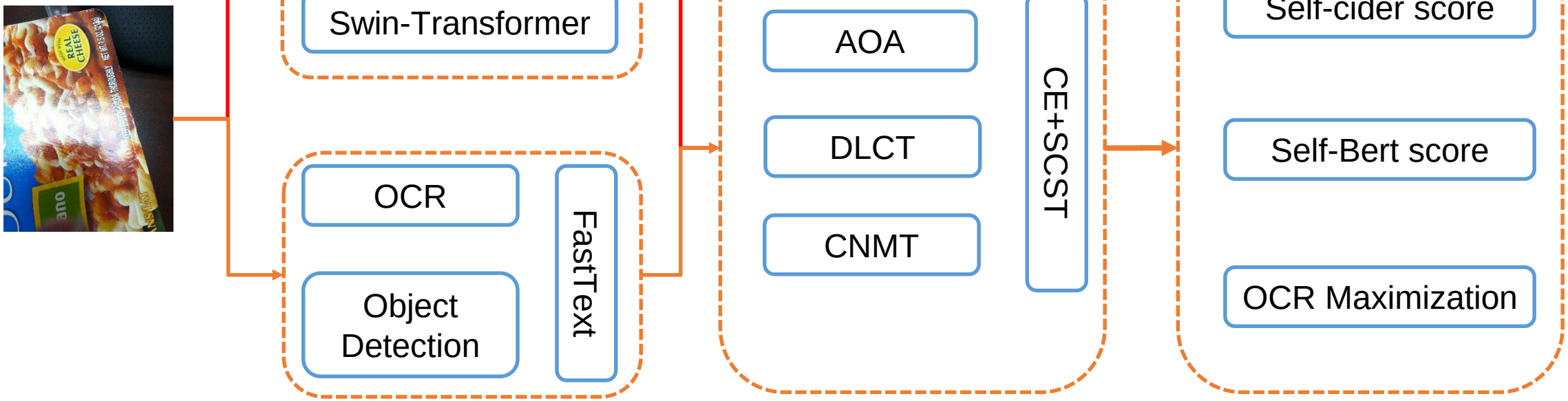


Si Liu


Feature
Multimodal Modeling
Post Processing
ResNext
Swin-Transformer
OCR
Object Detection
FastText
AOA
DLCT
CNMT
CE+SCST
Self-cider score
Self-Bert score
OCR Maximization

Feature

ResNext

Swin-Transformer

Object Detection

OCR

FastText

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S. Ren, K. He, R. Girshick, and J. Sun. Faster r-cnn: Towards real-time object detection with region proposal networks. *arXiv preprint arXiv:1506.01497*, 2015.

https://github.com/facebookresearch/fastText#text-classification

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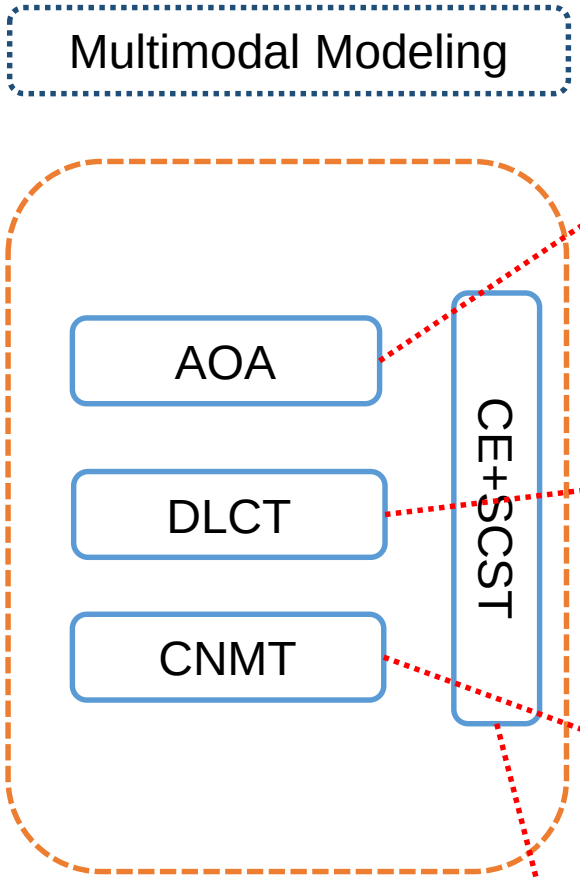

L. Huang, W. Wang, J. Chen, and X.-Y. Wei. Attention on attention for image captioning. In *Proceedings of the IEEE/CVF International Conference on Computer Vision*, pages 4634–4643, 2019.

Y. Luo, J. Ji, X. Sun, L. Cao, Y. Wu, F. Huang, C.-W. Lin, and R. Ji. Dual-level collaborative transformer for image captioning. *arXiv preprint arXiv:2101.06462*, 2021.

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S. J. Rennie, E. Marcheret, Y. Mroueh, J. Ross, and V. Goel. Self-critical sequence training for image captioning. InPro-ceedings of CVPR, pages 7008–7024

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Post Processing

Self-cider score

Qingzhong Wang and Antoni Chan. Describing like humans: on diversity in image captioning. CVPR, 2019

Self-Bert score

T. Zhang, V. Kishore, F. Wu, K. Q. Weinberger, and Y. Artzi.Bertscore: Evaluating text generation with bert. *arXiv preprint arXiv:1904.09675*, 2019.

OCR Maximization

We find that selecting a caption whose tokens has most overlap with the OCR tokens helps increase the CIDEr score.

Experimental Results

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Method	Object Feature	Grid Feature	OCR	SCST	B@1	B@4	M	R	CIDEr	SPICE
AoANet	FRCNN101	-		✓	66.3	23.0	20.1	47.0	61.1	15.4
AoANet†	-	Swin-L		✓	70.3	27.2	22.1	49.6	**77.1**	18.6
DLCT	FRCNN101	ResNeXt101		✓	68.3	24.3	20.4	46.9	63.6	15.7
DLCT†	FRCNN101	Swin-L		✓	70.6	27.1	22.2	49.7	**78.3**	18.6
CNMT	FRCNN101	-	✓		63.7	19.3	18.7	43.7	52.7	13.3
CNMT†	-	ResNeXt101	✓		66.0	21.0	19.6	45.3	60.4	14.9
CNMT†	-	Swin-L	✓		67.9	23.6	21.1	47.1	**71.0**	16.8

Table 1. Comparison of different features. All the results are evaluated on the test-dev. Method names with † are our implement using other feature.

Eval	Model Set	Ensamble	Scorer	B@1	B@4	M	R	CIDEr	SPICE
test-dev	CNMT†	30	bert	71.5	25.6	21.8	49.1	75.8	17.7
	DLCT†	30	bert	72.9	29.3	23.1	51.3	84.1	19.4
	AoANet†	20	bert	74.1	29.0	23.1	51.3	84.5	19.3
	CNMT†+DLCT†+AoANet†	80	bert	75.0	29.6	23.4	51.9	85.7	19.6
	CNMT†+DLCT†+AoANet†	80	cider	74.9	30.7	23.6	51.8	93.7	19.9
	CNMT†+DLCT†+AoANet†	150	cider	74.8	**30.8**	**23.7**	**51.9**	**94.9**	19.9
test-challenge	CNMT†+DLCT†+AoANet†	150	cider	**75.0**	30.7	23.6	51.6	94.1	**19.9**

Table 2. Ensemble results of different models with two type of scorers, bert indicates BERT-score and cider indicates self-CIDEr.

Summary

- Swin-transformer is used to extract the grid features of the image
- we extract OCR and object detection information as feature supplement
- we integrate the results by self cider, and OCR maximization

Thanks!