Fusion-Extraction Network for Multimodal Sentiment Analysis

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Trend


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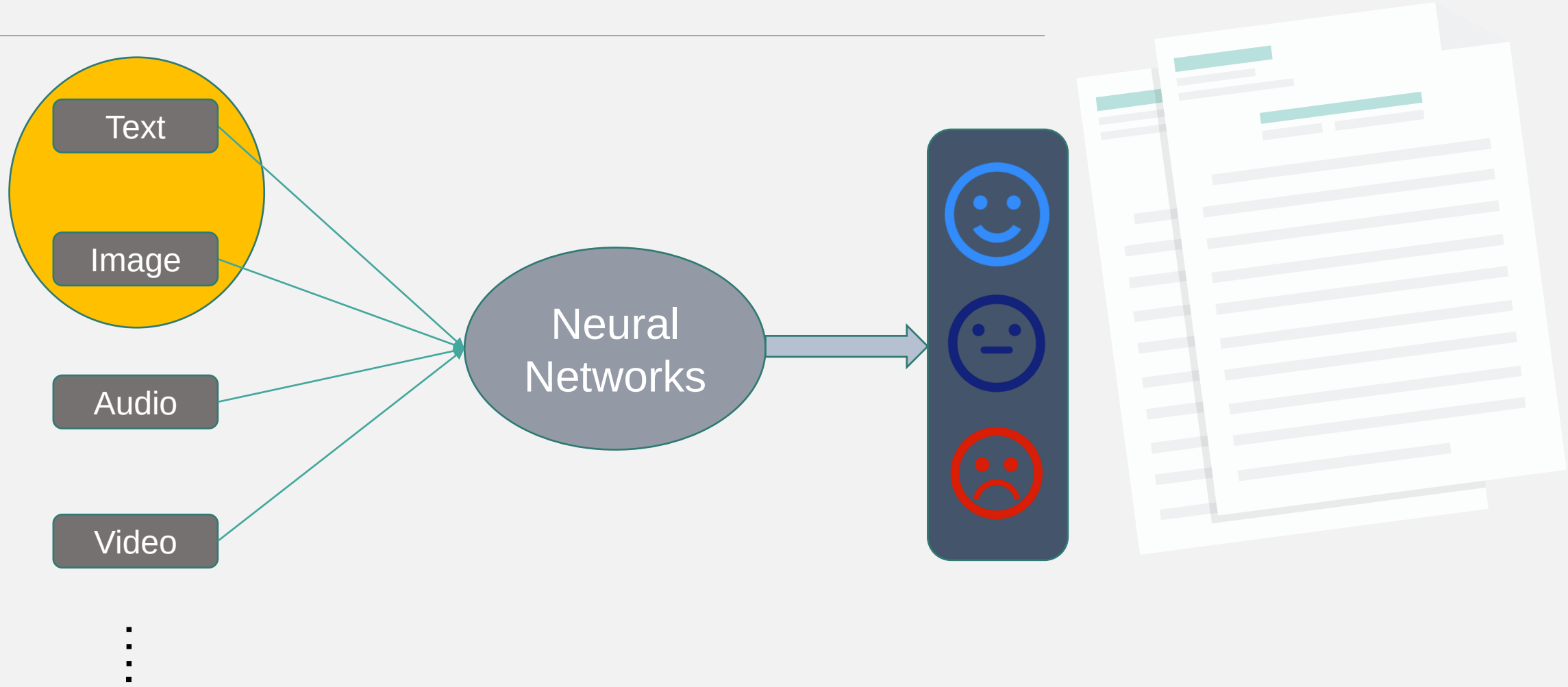
Introduce



Case Analysis

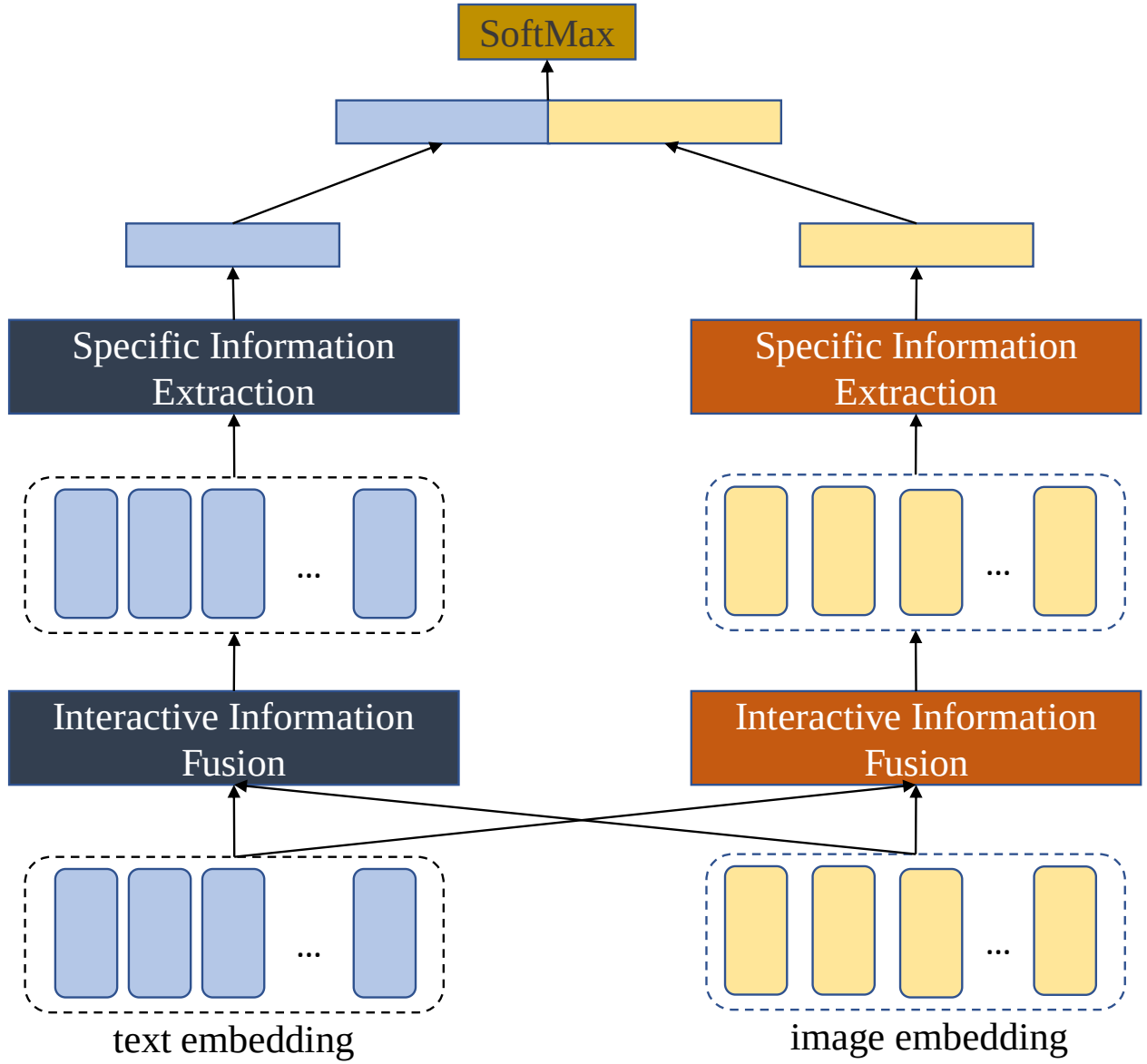
RT @OscarRomeo1268: Only 1 serious injury from #RTC on the #A64 with a few broken bones but talking. Other 3 walking wounded #incredible.

Difficulties

- Information fusion between multimodal data
- Information extraction of each modal data

The architecture of FENet

FENet is composed of interactive information fusion(IIF) layer and specific information extraction(SIE) layer.



Interactive information fusion layer

$$G_i = tanh(W_g[S_i : F_i] + b_g)$$

$$G = IIF(S, A)$$

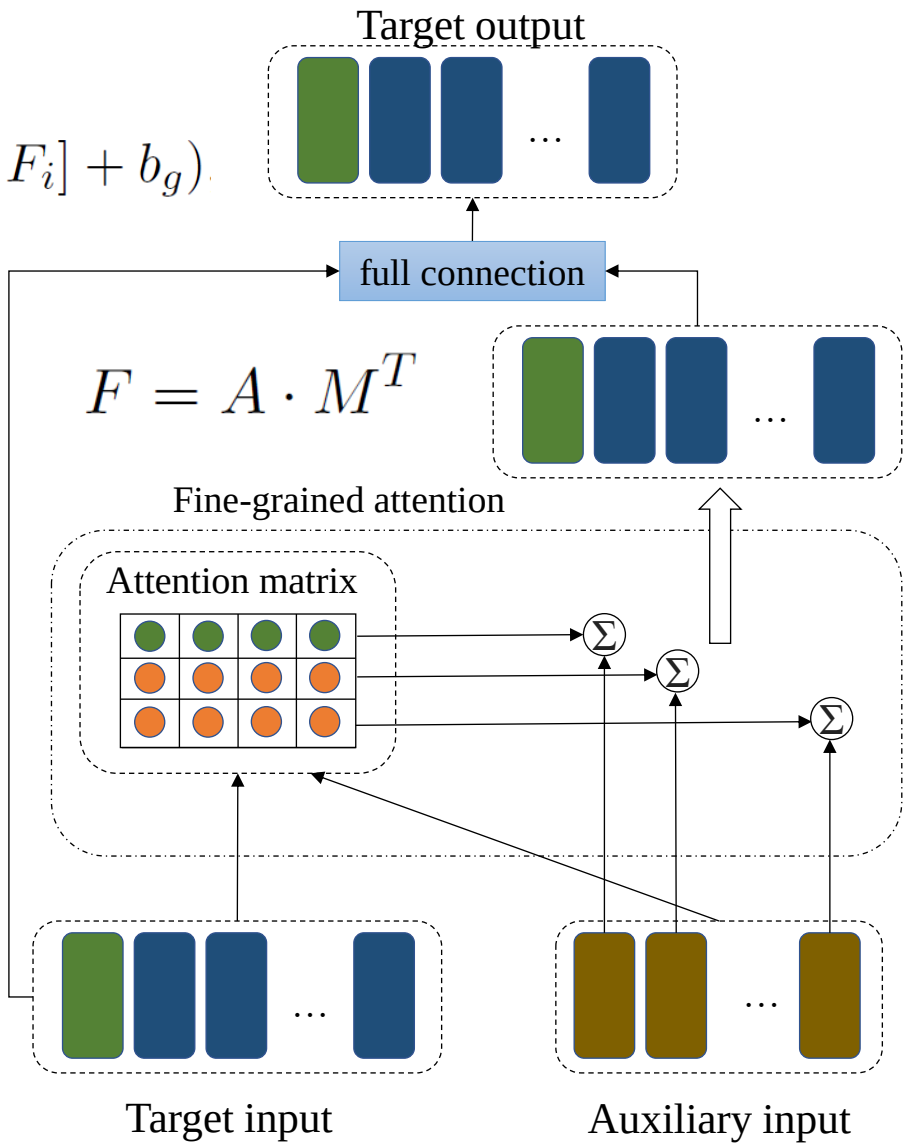
$$F = A \cdot M^T$$

$$M_{ij} = {S_{emb_i}}^T A_{emb_j}$$

$$M_{ij} = \frac{exp(M_{ij})}{\sum_{j=1}^{l} exp(M_{ij})}$$

$$S_{emb_i} = tanh(W_{S_{emb}} S_i + b_{S_{emb}})$$

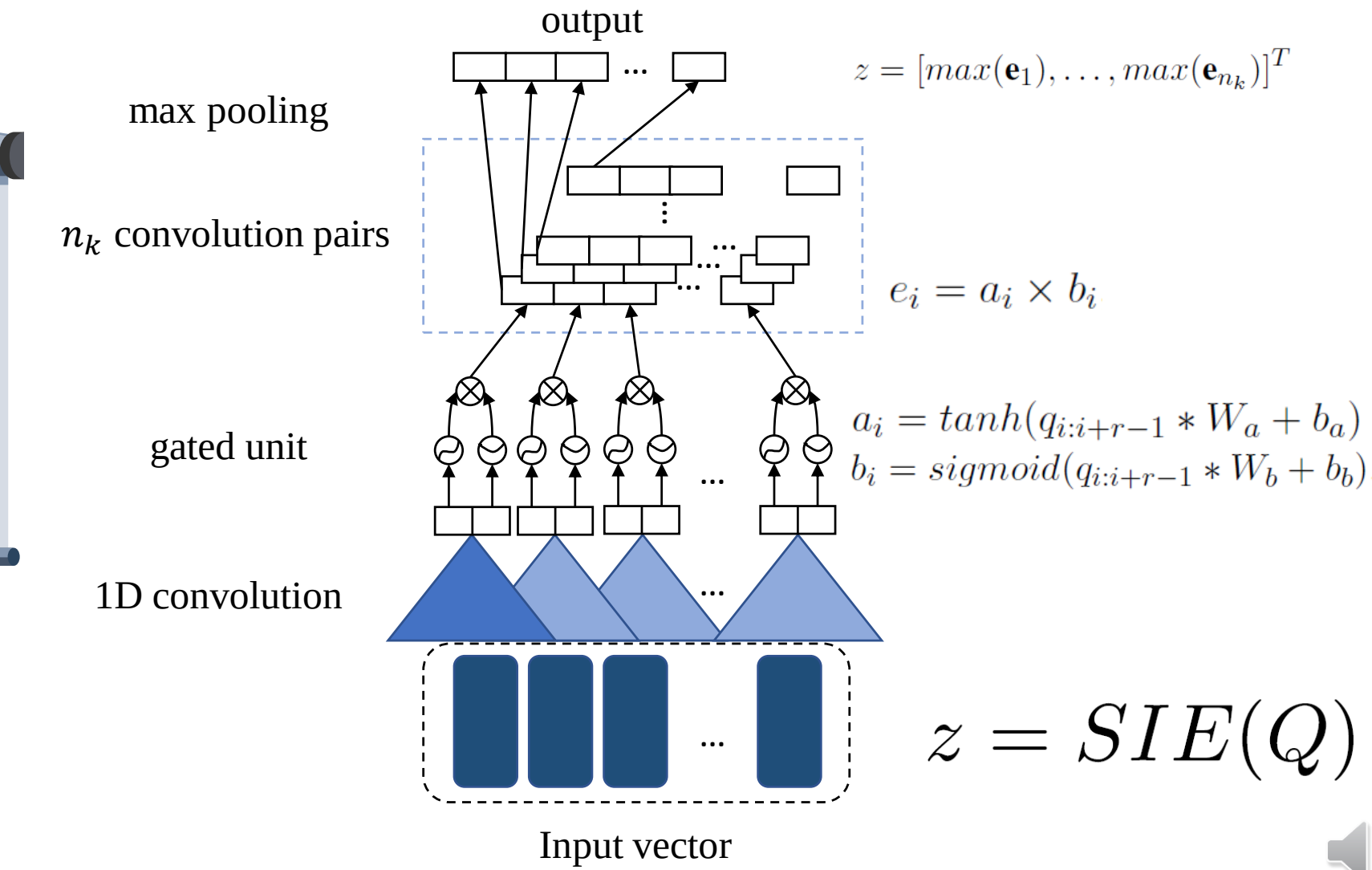
$$A_{emb_i} = tanh(W_{A_{emb}} A_i + b_{A_{emb}})$$



1. Calculate the attention matrix of the target input to the auxiliary input.
2. Multiply the auxiliary input with the obtained attention matrix to obtain the auxiliary output.
3. Auxiliary output and target input are fused through full connection.

Specific information extraction layer

1. Feed the fused representation into n convolutions and corresponding gated units.
2. Use max pooling to get the most expressive n-dimensional representation.



$$z = SIE(Q)$$

Experiment Results

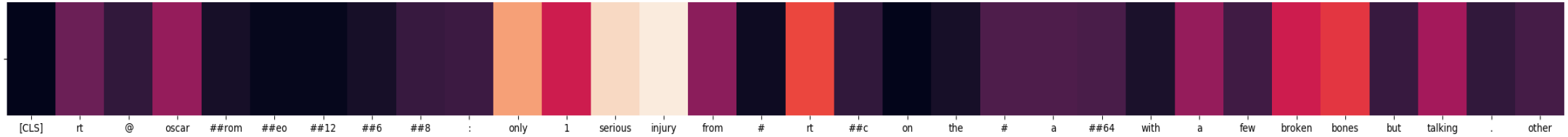
	Model	MVSA-Single		MVSA-Multiple	
		ACC	F1	ACC	F1
Baselines	SentiBank & SentiStrength	0.5205	0.5008	0.6562	0.5536
	CNN-Multi	0.6120	0.5837	0.6630	0.6419
	DNN-LR	0.6142	0.6103	0.6786	0.6633
	MultiSentiNet	0.6984	0.6963	0.6886	0.6811
	CoMN(6)	0.7051	0.7001	0.6892	0.6883
Ablated FENet	FENet w/o IIF	0.6920	0.6882	0.6837	0.6795
	FENet w/o SIE	0.7120	0.7102	0.6989	0.6964
FENet variants	FENet-Glove	**0.7254**	**0.7232**	**0.7057**	**0.7038**
	FENet-BERT	**0.7421**	**0.7406**	**0.7146**	**0.7121**

visual and textual attention visualizations.

Visual attention

RT @OscarRomeo1268: Only 1 serious injury from #RTC on the #A64 with a few broken bones but talking. Other 3 walking wounded #incredible

Textual attention



Main contributions

1. We introduce an Interactive Information Fusion (IIF) mechanism to learn fine-grained fusion features. IIF is based on cross-modality attention mechanisms, aiming to generate the visual-specific textual representation and the textual-specific visual representation for both two modality contents.

2. We propose a specific Information Extraction (SIE) mechanism to extract the informative features for textual and visual information, and leverage the extracted visual and textual information for sentiment prediction. To the best of our knowledge, no CNN-gated extraction mechanism for both textual and visual information has been proposed in the field of multimodal sentiment analysis so far.

thanks