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Weakly Supervised Coupled Networks for Visual Sentiment Analysis

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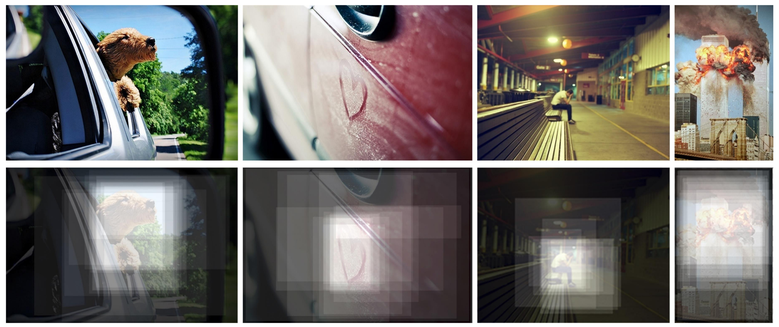
Introduction

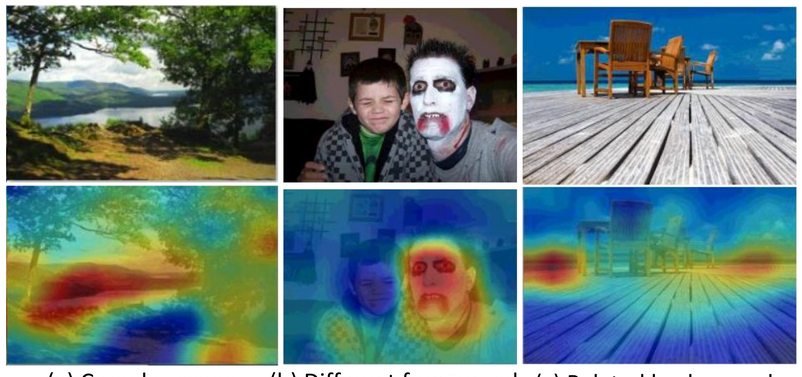


Emotion Stimuli Map (ESM)

Different image regions have different influence on the evoked sentiment. However, providing more ***precise annotations*** generally leads to better performance while labor-consuming.

Visualization

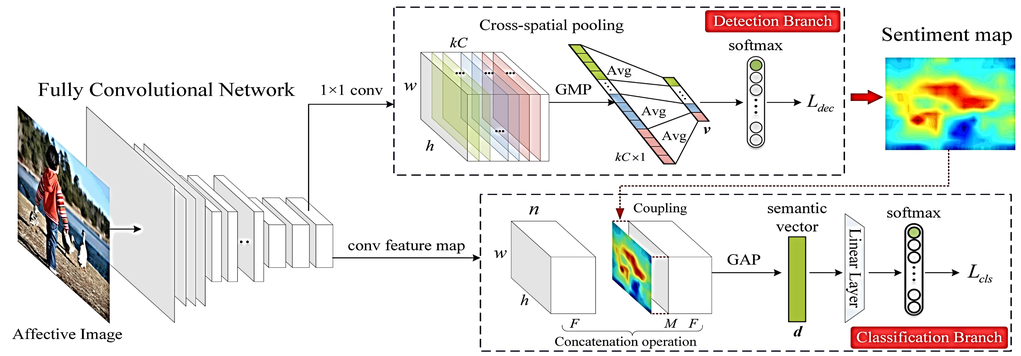
Weakly-Supervised Detected Sentiment Map

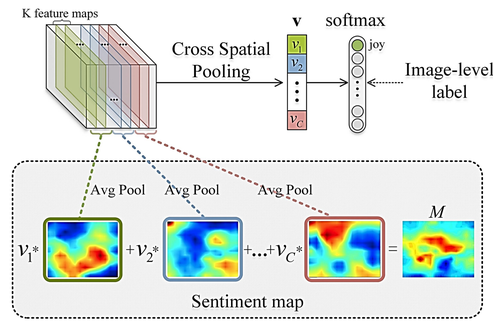


(a) Complex scene (b) Different foreground (c) Related background

Sentiment Map *v.s.* Salient Regions

Weakly Supervised Coupled Networks





➢ Detection Branch

- use 1x1 conv layer to capture multiple information
- summarize information to a single image-level score with cross-spatial pooling strategy

➢ Classification Branch

- produce local representation by coupling with feature response with sentiment map
- encode coupled feature maps and original feature maps

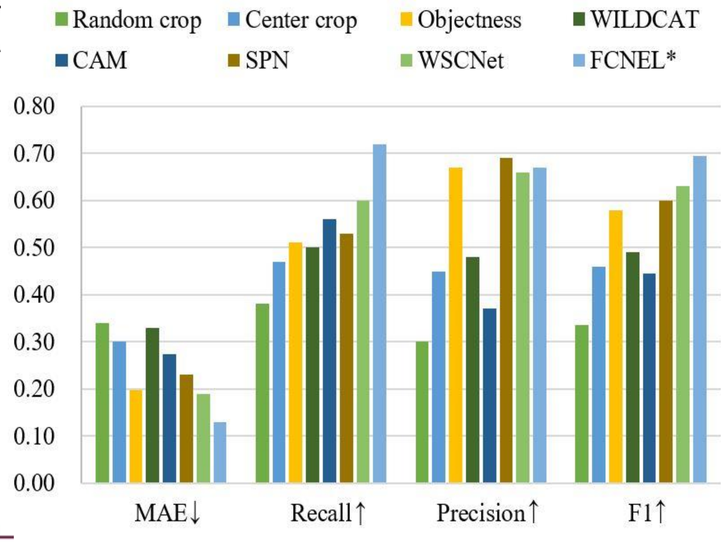
➢ Sentiment Map Generation

- use the fc units in the classification branch as the weights of the response map for each sentiment
- linear combine all the response maps with the corresponding weights

Experimental Results

Method	FI
Zhao *et al.* [34]	46.13
SentiBank [3]	49.23
DeepSentiBank [7]	51.54
ImageNet-AlexNet [15]	38.26
ImageNet-VGG16 [22]	41.22
ImageNet-Res101 [12]	50.01
Fine-tuned AlexNet	58.13
Fine-tuned VGG16	63.75
Fine-tuned Res101	66.16
Sun *et al.* [23]	–
Yang *et al.* [25]	66.79
WILDCAT [10]	67.03
SPN [38]	66.57
WSCNet	**70.07**

Classification accuracy of different baseline methods, including traditional and deep methods.



Sentiment detection performance on the EmotionROI by the baseline methods, objectness detection algorithm, weakly supervised frameworks and the supervised model.

Conclusion

- ✓ Sentiment maps are the regions causing the evoked emotion, which may contain not only salient objects but other areas related to emotion.
- ✓ The strength of the proposed method comes from the generated sentiment maps and combination of global and local representations in classification branch.

Any comments are welcome.

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