One-shot Logo Detection in the Wild

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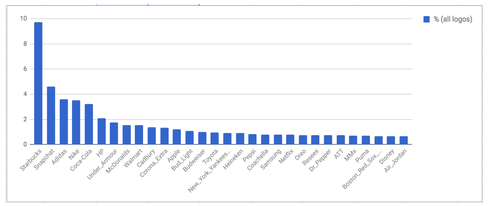
Motivation

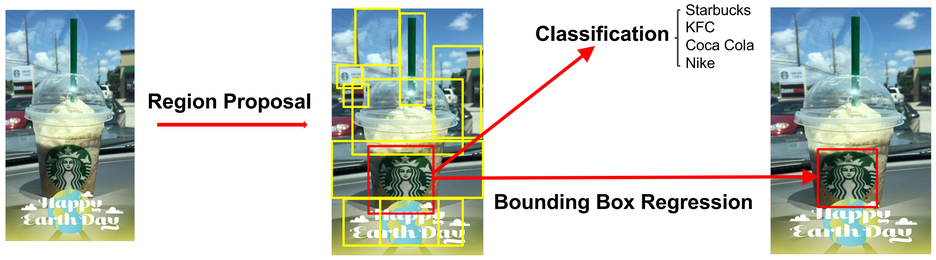
- **Logo Detection:** Given a set of standard logo images, identify and localize their instances in real-world images.

- **Long-tailed Data:** Annotate images with logos from common brands, work for any unseen brand.

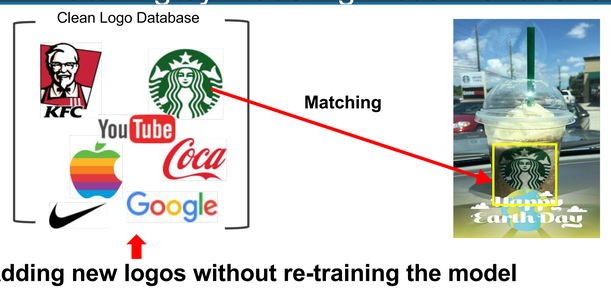


- **One-shot Detection:** The detector trained on a set of logo categories should be capable of detecting logos from unseen categories without too much performance drop.

Standard Detection Paradigm

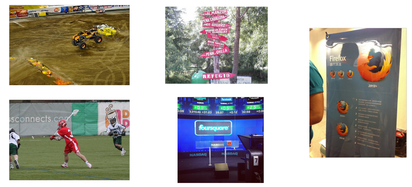


Detect Unseen Logos: Matching by Modeling Visual Variations



Our Dataset

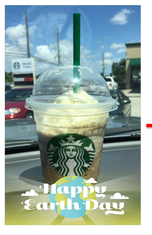
- Our Dataset: 461 logo classes, 130,153 annotated images.
- FlickrLogos-32: 32 logo classes, 2,240 annotated images.

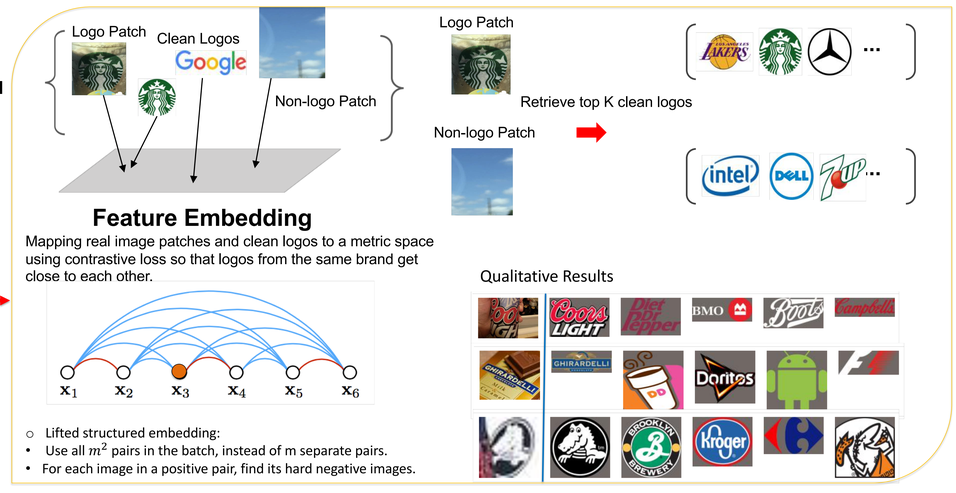


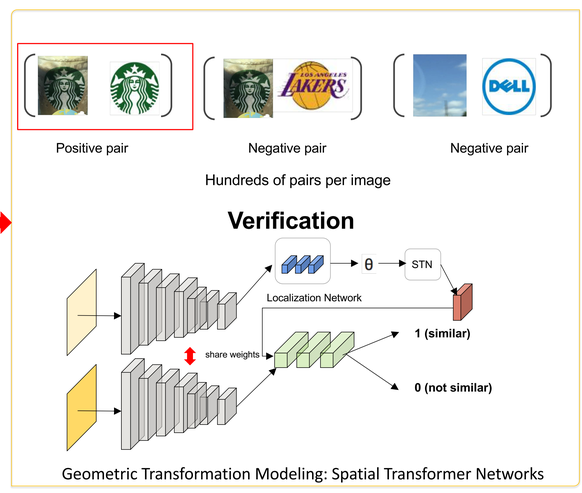
	Train	Test unseen with Flickr32 logos	Test unseen without Flickr32 logos	Test seen
Classes	237	31	143	237
Image detection instances	89166	3664	12754	9858
Patches (logo)	89166	3664	12754	9858
Patches (no logo)	228636	10323	32265	29022
Pairs (balanced)	178332 (positive: 89166 negative: 44609 logo 44557 no-logo)	7328 (positive: 3664 negative: 1833 logo 1831 no-logo)	25508 (positive: 12754 negative: 6397 logo 6357 no-logo)	19716 (positive: 9858 negative: 4985 logo 4873 no-logo)

Our New Framework

Region Proposal







Conclusion

- A new logo detection framework which can detect unseen logos without re-training the model.
- Each module in the framework can be improved individually.
- A new large-scale logo dataset with annotations for the task of logo detection.

Experimental Results

1. Region Proposal

IoU Threshold	Models	Test unseen with Flickr32	Test unseen without Flickr32	Test seen
0.3	**Selective Search + EAST**	**98.74%**	**98.02%**	**98.31%**
0.5		**88.46%**	**87.41%**	**88.43%**
0.7		**57.89%**	**58.78%**	**60.17%**
0.3	Selective Search	97.68%	96.38%	96.55%
0.5		81.77%	79.28%	79.53%
0.7		50.22%	48.93%	49.04%

2. Feature Embedding

K	Test unseen with Flickr32		Test unseen without Flickr32		Test seen	
	Baseline	Lifted structured	Baseline	Lifted structured	Baseline	Lifted structured
1	50.52%	81.99%	32.44%	73.12%	32.64%	91.15%
3	72.79%	94.08%	50.10%	85.75%	48.74%	96.25%
5	**81.20%**	**96.48%**	**58.69%**	**89.54%**	**56.71%**	**97.45%**
10	88.56%	98.44%	70.97%	93.74%	67.07%	98.67%

3. Verification

	Test unseen with Flickr32	Test unseen without Flickr32	Test seen
Siamese	96.206%	96.052%	98.61%
Siamese+STN	**96.92%**	**96.32%**	**98.68%**