

Goal: Discover and segment objects from large-scale noisy Internet images



Object Co-segmentation



Top Down Priors	Interactive	Other Priors
[Alexe et al. 2010]	[Boykov & Jolly 2001]	[Lempitsky et al. 2009]
[Lee et al. 2010]	[Batra et al. 2010]	[Lee et al. 2010]
[Kuettel et al. 2012]	[Li et al. 2004]	[Faktor et al. 2012]
[Ma et al. 2013]	[Rother et al. 2004]	[Kim et al. 2011]
[Rubinstein et al. 2013]		

How can we get good top-down priors?

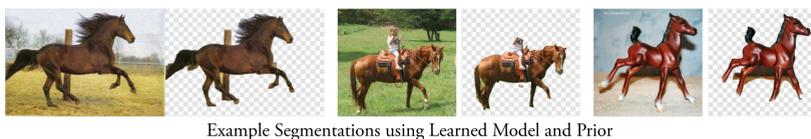
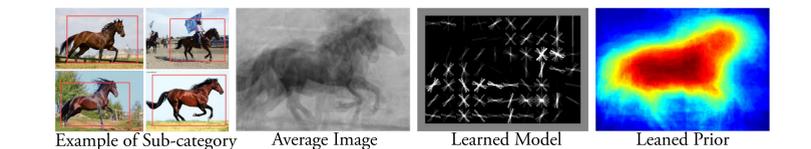
Discriminative Visual Sub-categories



Horse Internet Images [Divvala et al. 2012] Well-aligned Sub-categories [Chen et al. 2013]

Key Contribution

Top-down Priors from Sub-categories + Bottom-up Cues for Segmentation



Our Approach



(a) Car Internet Images (Noisy)



(b) Instance Detectors (Training & Detection)

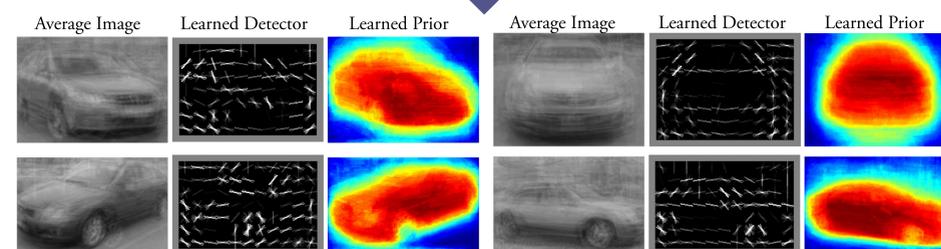


(c) Aligned Homogeneous Clusters

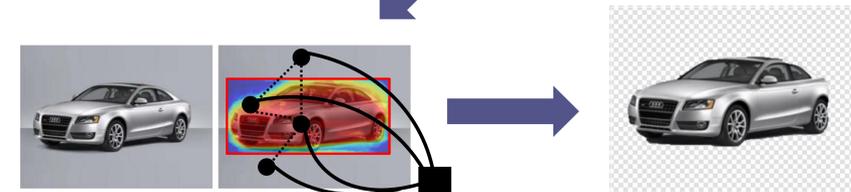


(d1) Graph Clustering

(d2) Joint Seed Segmentation



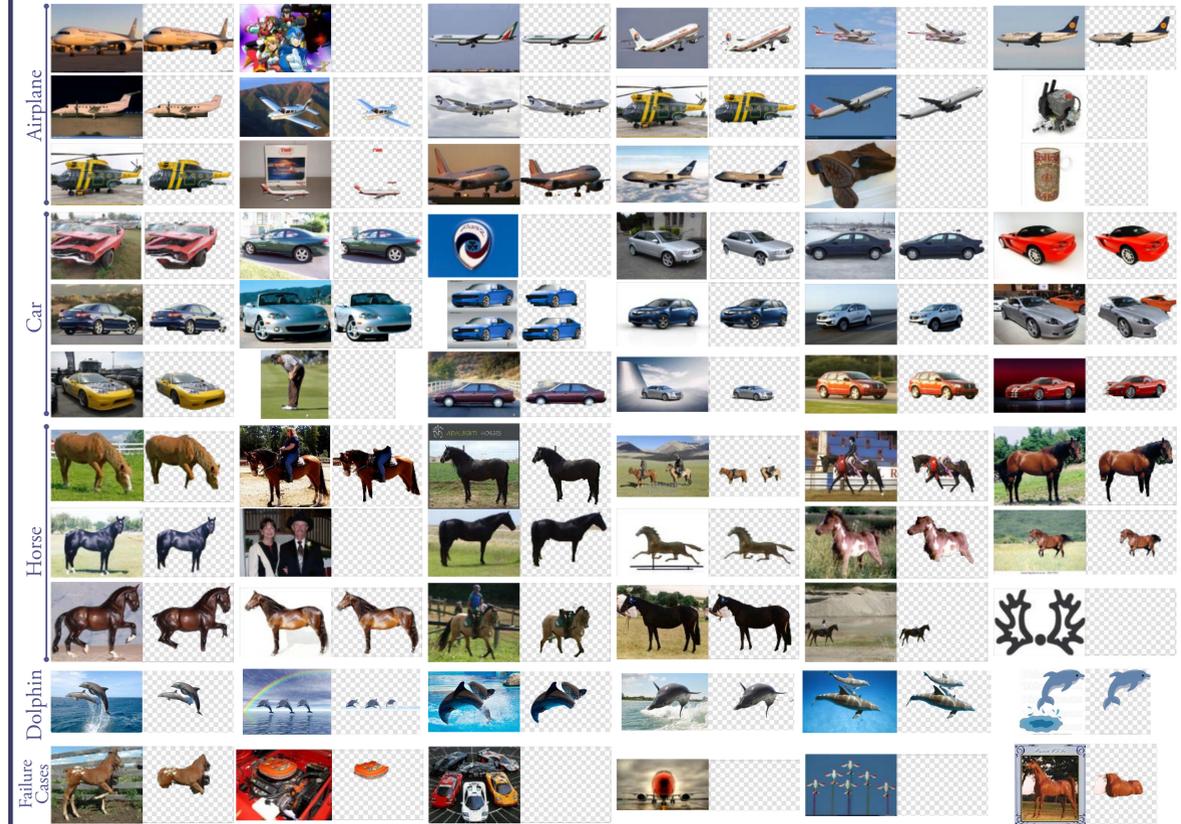
(e) Visual Subcategories



(f) Graph Cut on Detection

(g) Final Segmentation

Results: Internet Image Dataset [Rubinstein et al. 2013]



	Car		Horse		Airplane	
	P	J	P	J	P	J
[1]	83.38	63.36	83.69	53.89	86.14	55.62
eLDA	85.56	70.61	85.86	56.98	85.25	55.31
K-Means	82.11	54.35	87.02	52.99	86.08	51.18
[NEIL]	85.49	63.09	82.98	51.49	85.23	50.02
Our Approach	87.09	64.67	89	57.58	90.24	59.97

	Car		Horse		Airplane	
	P	J	P	J	P	J
[2]	58.70	37.15	63.84	30.16	49.25	15.36
[3]	59.20	35.15	64.22	29.53	47.48	11.72
[4]	68.85	0.04	75.12	6.43	80.20	7.90
[1]	85.38	64.42	82.81	51.65	88.04	55.81
Our Approach	87.65	64.86	86.16	33.39	90.25	40.33

[1]. Rubinstein et al., CVPR 2013; [2]. Joulin et al., CVPR 2010; [3]. Joulin et al., CVPR 2012; [4]. Kim et al., ICCV 2011; [NEIL]. Chen et al., ICCV 2013; P: Precision; J: Jaccard Similarity.

Results: NEIL Dataset [Chen et al. 2013]

>500k Segmentations on www.neil-kb.com

