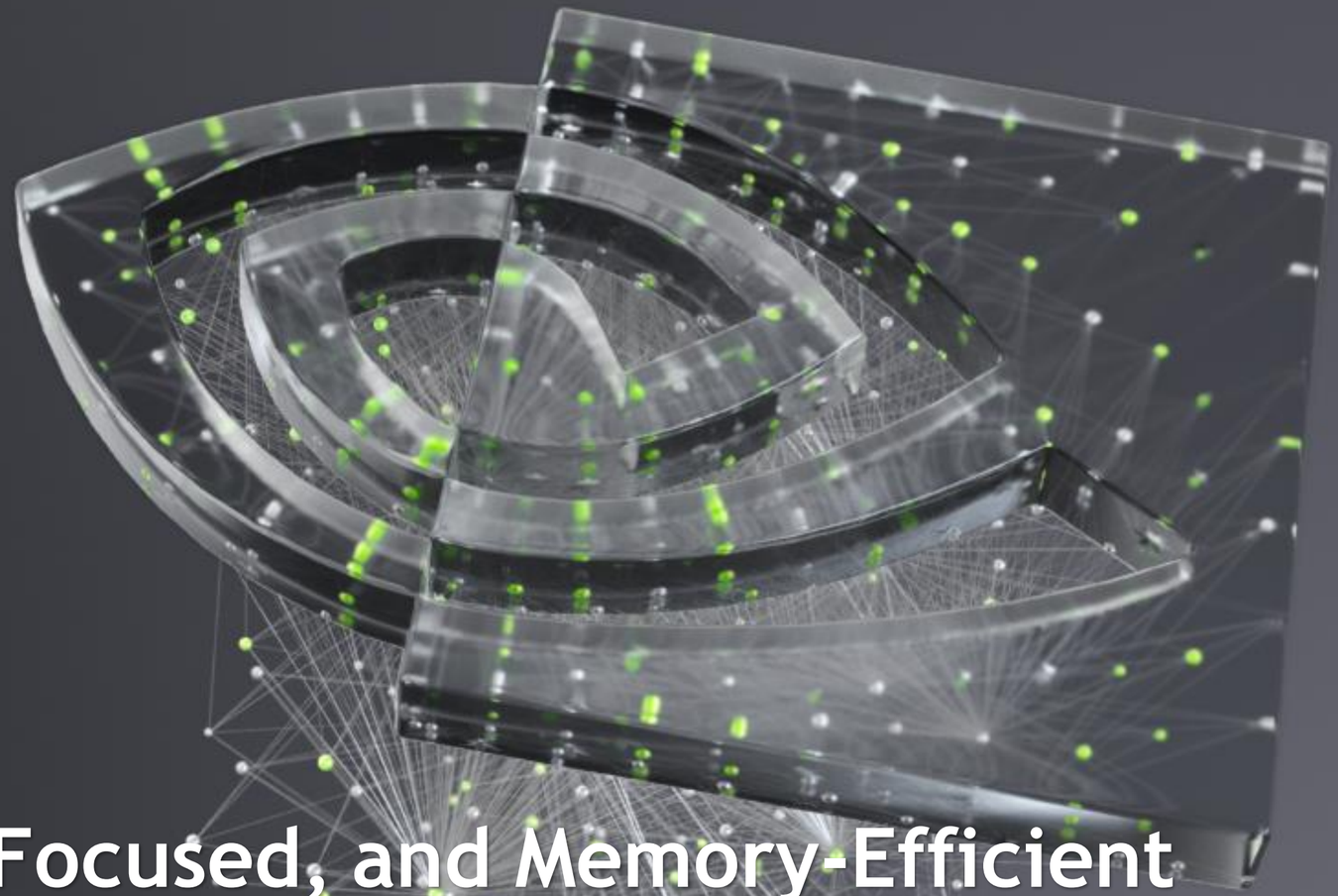
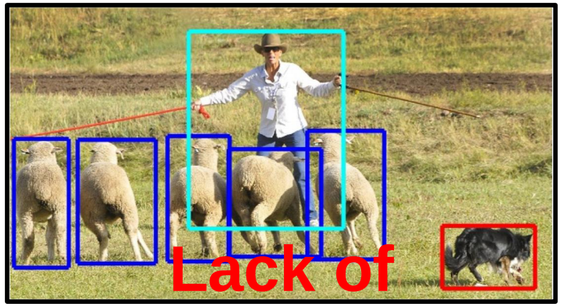


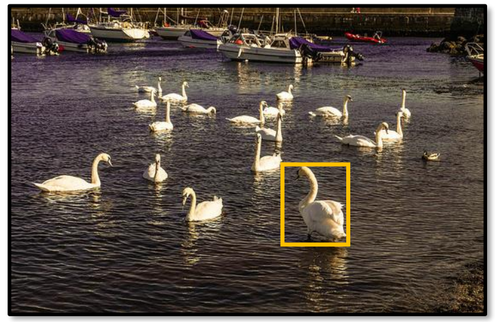
Instance-Aware, Context-Focused, and Memory-Efficient Weakly Supervised Object Detection

Zhiding Yu, May 12th, 2020

Weakly Supervised Object Detection

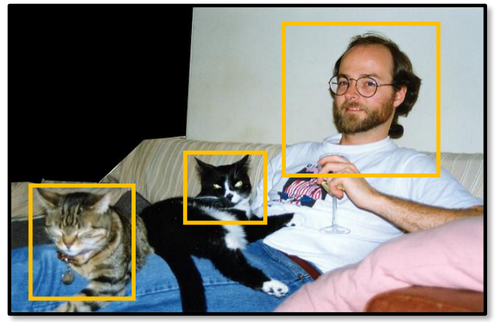


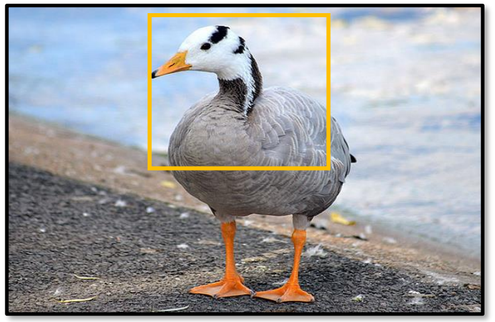
Missing Instance



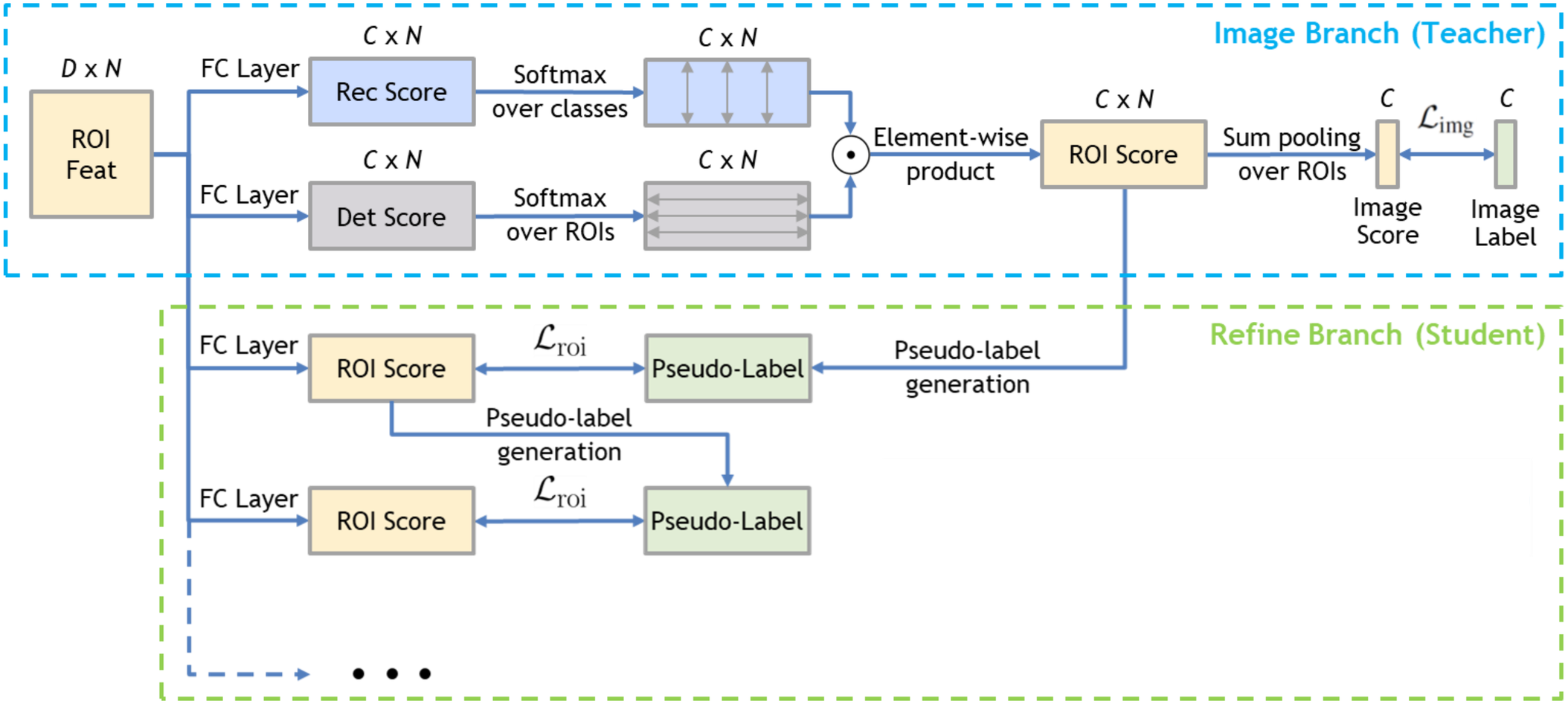
Grouped Instance

Part Domination



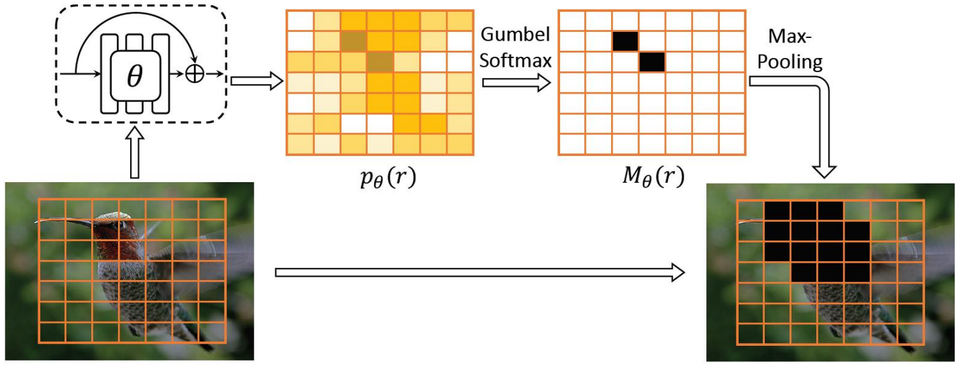


Multiple Instance Self-Training (MIST)



Concrete DropBlock and Sequential Batch BP

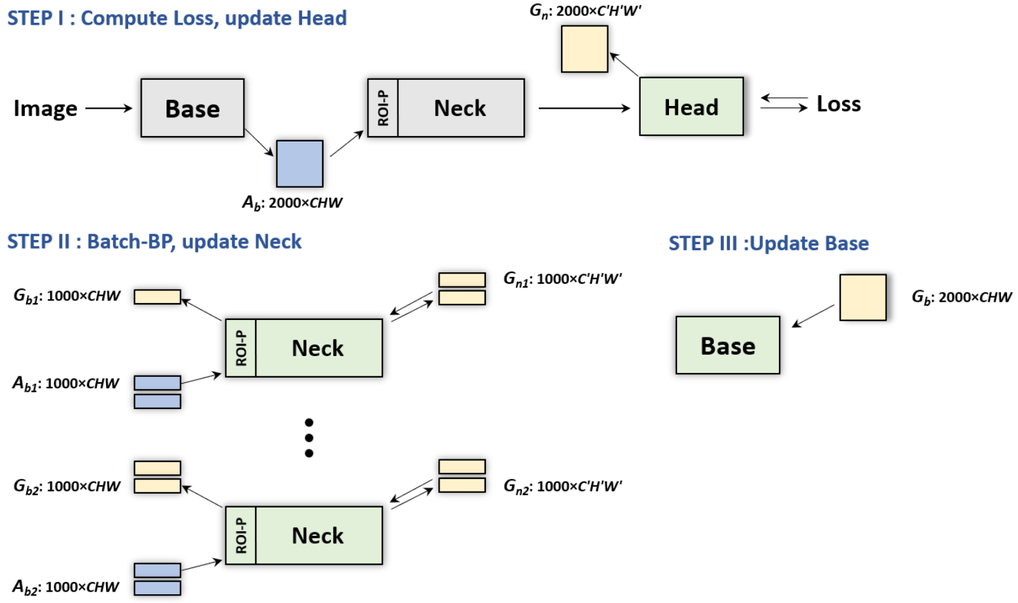
Concrete DropBlock

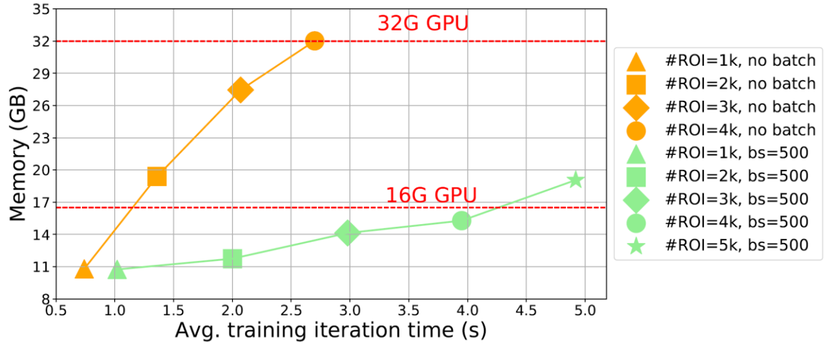


Data-Split Metrics	07 trainval CorLoc	07 test Det.	12 trainval CorLoc	12 test Det.
Baseline [45]*	60.8	42.5	-	-
+ PCL [44]	62.7	43.5	63.2	40.6
+ MIST w/o Reg.	62.9	48.3	65.1	-
+ MIST	**64.9**	**51.4**	**66.7**	-
+ Img Spa.-Dropout	64.3	51.1	65.9	-
+ ROI Spa.-Dropout	66.8	52.4	67.3	-
+ DropBlock [14]	67.1	52.9	68.4	-
+ Concrete DropBlock	**68.8**	**54.9**	**70.9**	**52.1**

Table 5: Ablation study. (*: our implementation)

Sequential Batch BP





Result Leaderboard (Papers with Code)

Weakly Supervised Object Detec

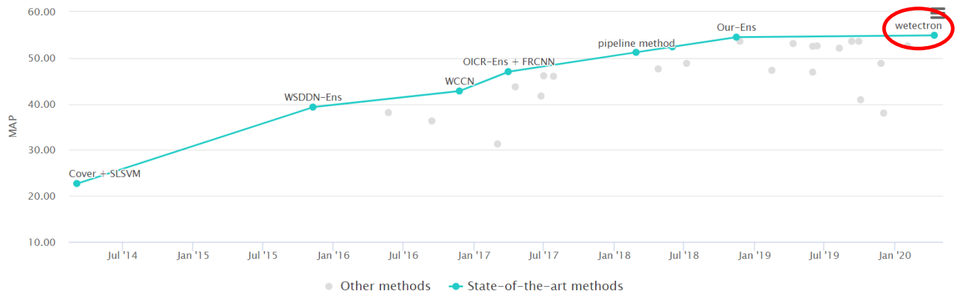
paperswithcode.com/task/weakly-supervised-object-detection

Leaderboards

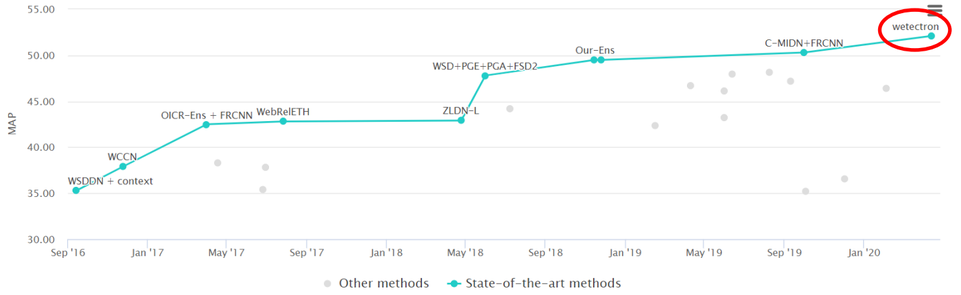
Add a Result

TREND	DATASET	BEST METHOD	PAPER TITLE	PAPER	CODE	COMPARE
	PASCAL VOC 2007	wetectron(single-model)	Instance-aware, Context-focused, and Memory-efficient Weakly Supervised Object Detection			See all
	PASCAL VOC 2012 test	wetectron(single-model)	Instance-aware, Context-focused, and Memory-efficient Weakly Supervised Object Detection			See all
	Charades	Spatial Prior	Activity Driven Weakly Supervised Object Detection			See all
	ImageNet	PCL-OB-G-Ens + FRCNN	PCL: Proposal Cluster Learning for Weakly Supervised Object Detection			See all
	COCO	MSLPD	Few-Example Object Detection with Model Communication			See all
	HICO-DET	Spatial Prior	Activity Driven Weakly Supervised Object Detection			See all
	COCO test-dev	wetectron(single-model, VGG16)	Instance-aware, Context-focused, and Memory-efficient Weakly Supervised Object Detection			See all
	Watercolor2k	WSDDN	Weakly Supervised Deep Detection Networks			See all
	Comic2k	DT+PL	Cross-Domain Weakly-Supervised Object Detection through Progressive Domain Adaptation			See all
	Clipart1k	DT+PL	Cross-Domain Weakly-Supervised Object Detection through Progressive Domain Adaptation			See all
	PeopleArt	MI-max	Weakly Supervised Object Detection in Artworks			See all

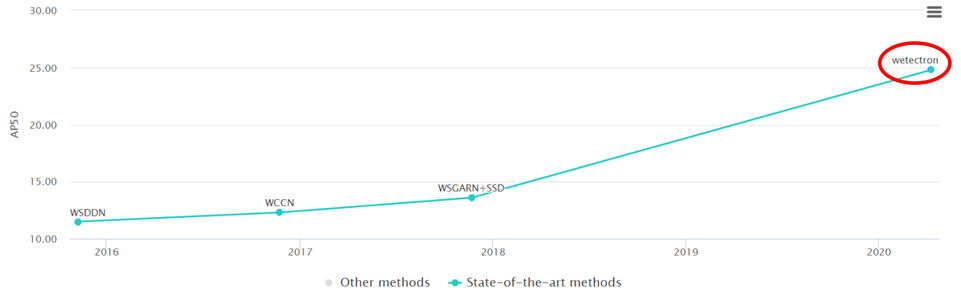
Weakly Supervised Object Detection on PASCAL VOC 2007



Weakly Supervised Object Detection on PASCAL VOC 2012 test

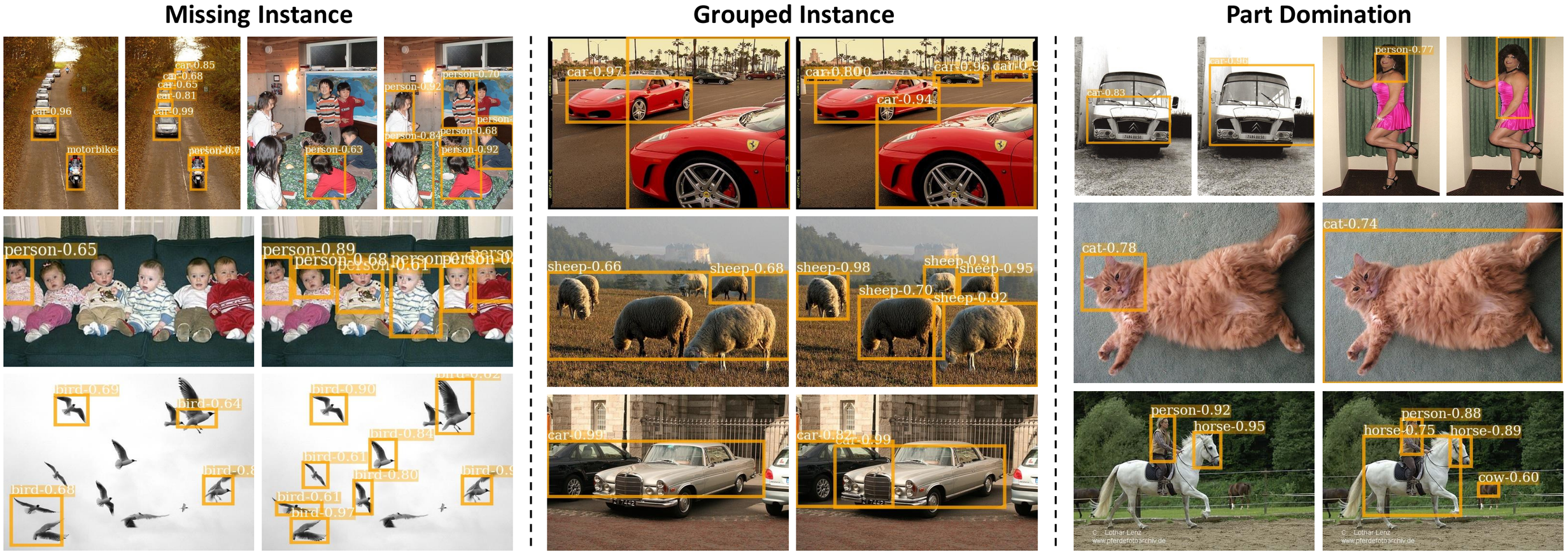


Weakly Supervised Object Detection on COCO test-dev



NVIDIA

Experiment: Qualitative Results



Comparison between our final WSOD model (right in pairs) and OICR [1] (left in pairs)

[1] Tang et al., Multiple Instance Detection Network with Online Instance Classifier Refinement, CVPR17

Summary

- A unified framework towards the problem of weakly supervised object detection with state-of-the-art results.
- Addressed challenges due to lack of supervision with MIST (instance ambiguity) and Concrete DropBlock (part domination).
- Addressed heavy memory issues with sequential batch BP
- Potential applications to NVIDIA products, such as IVA/AI City, DriveAV, Robotics and Medical AI, etc.