MSeg: A Composite Dataset for Multi-domain Semantic Segmentation

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What's wrong with semantic segmentation?

- Community has tackled segmentation in a domain-specific way
- Want a general-purpose model that works out-of-the-box

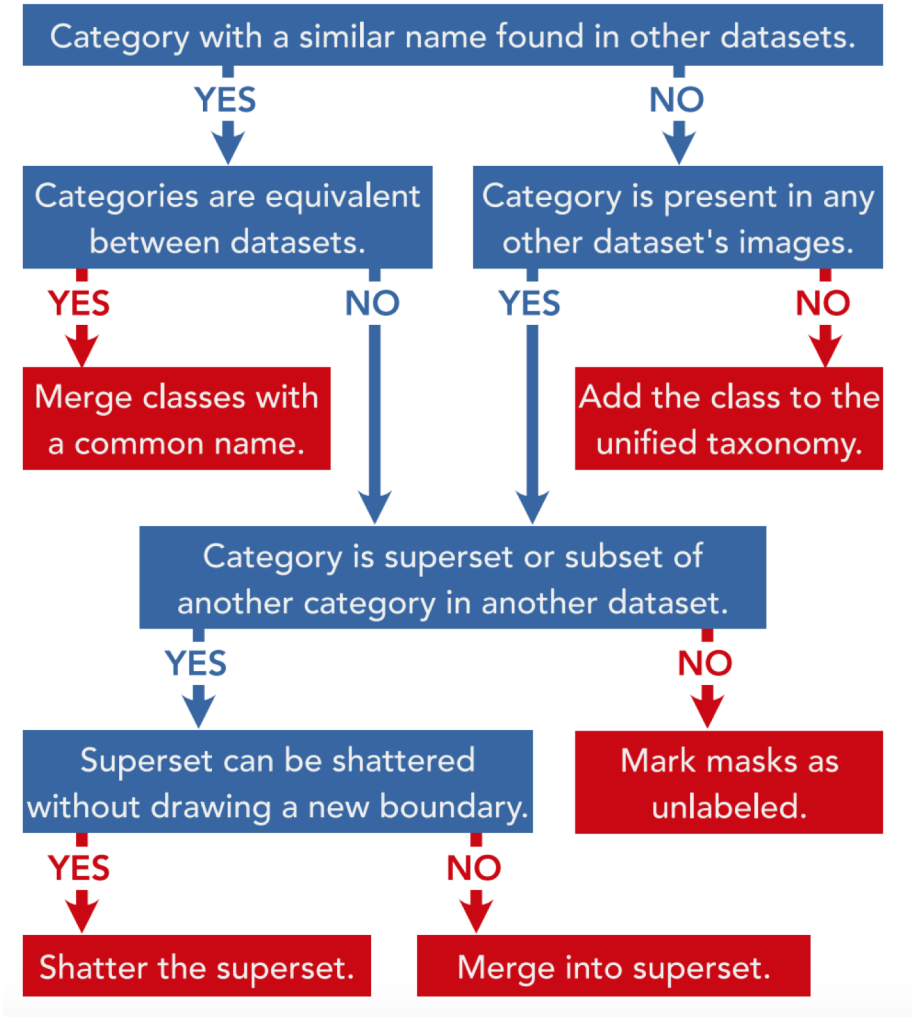
Cityscapes

ScanNet

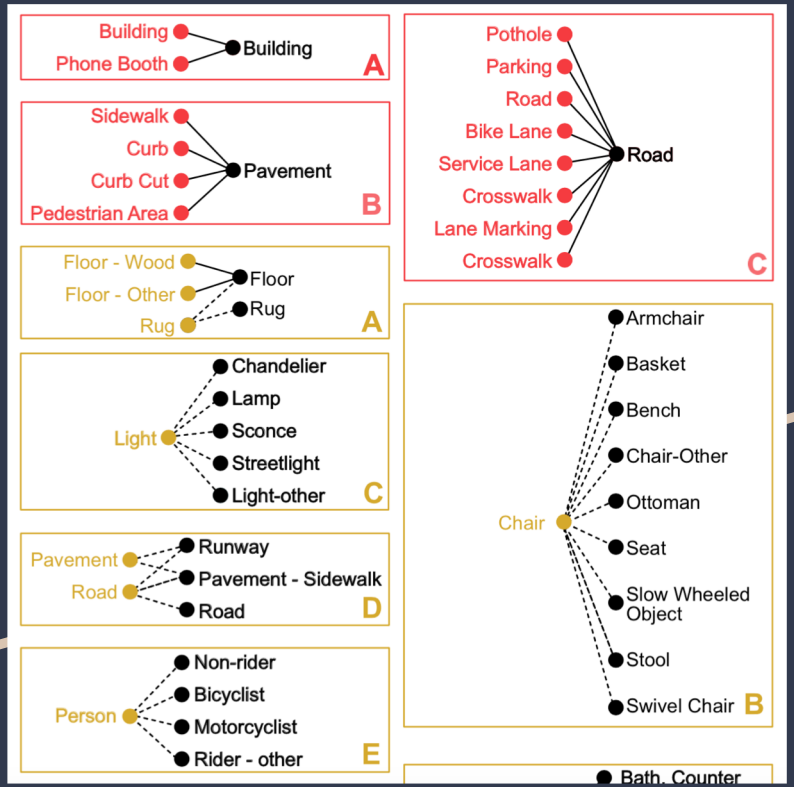
MSeg's component datasets of diverse scenes

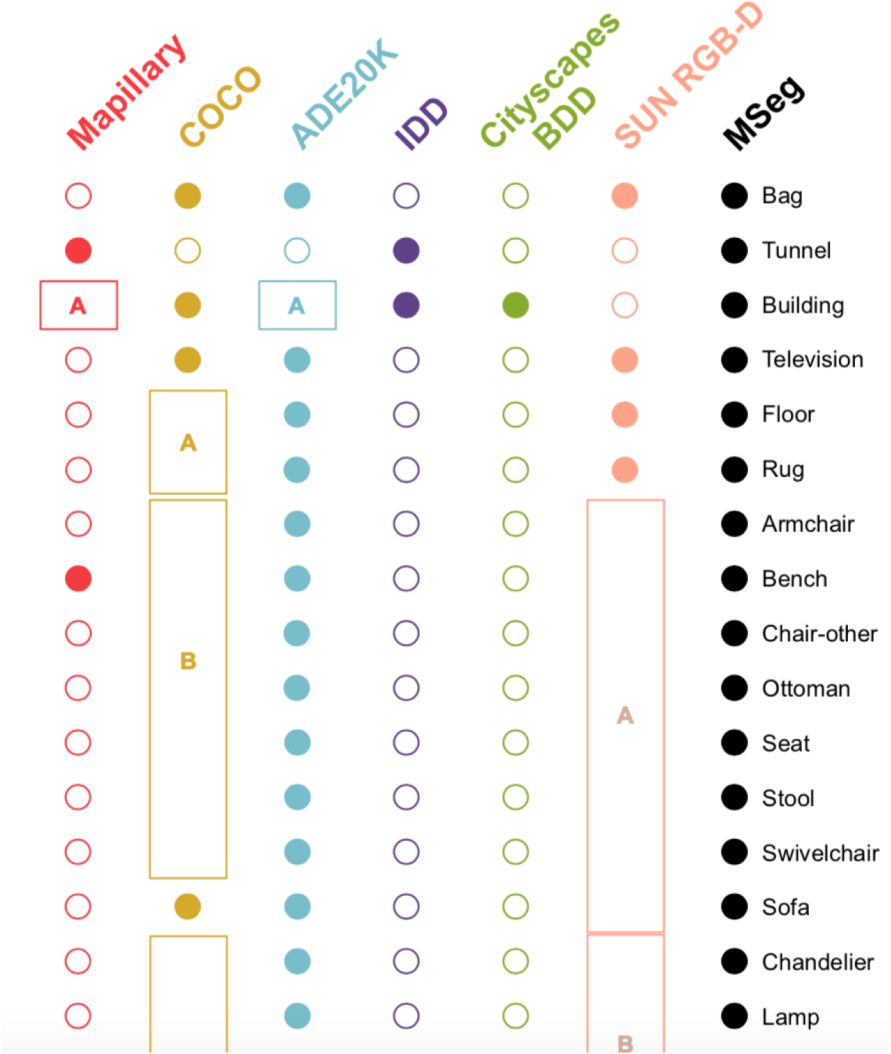
Dataset name	Origin domain	# Images
Training & Validation		
COCO [19] + COCO STUFF [4]	Everyday objects	123,287
ADE20K [46]	Everyday objects	22,210
MAPILLARY [25]	Driving (Worldwide)	20,000
IDD [40]	Driving (India)	7,974
BDD [43]	Driving (United States)	8,000
CITYSCAPES [7]	Driving (Germany)	3,475
SUN RGBD [36]	Indoor	5,285
Test		
PASCAL VOC [10]	Everyday objects	1,449
PASCAL CONTEXT [24]	Everyday objects	5,105
CAMVID [3]	Driving (U.K.)	101
WILDDASH [44]	Driving (Worldwide)	70
KITTI [11]	Driving (Germany)	400
SCANNET-20 [8]	Indoor	5,436

Towards a unified taxonomy



Mapping classes to a unified taxonomy





Our MSeg model:

- performs consistently across novel test datasets

- leads the WildDash robust segmentation challenge

Train/Test	VOC	Context	CamVid	WildDash	KITTI	ScanNet	*h. mean*
COCO	**73.7**	**43.1**	56.6	38.9	48.2	33.9	46.0
ADE20K	34.6	24.0	53.5	37.0	44.3	43.8	37.1
Mapillary	22.0	13.5	**82.5**	55.2	**68.5**	2.1	9.2
IDD	14.5	6.3	70.5	40.6	50.7	1.6	6.5
BDD	13.5	6.9	71.0	52.1	55.0	1.4	6.1
Cityscapes	12.1	6.5	65.3	30.1	58.1	1.7	6.7
SUN RGBD	10.2	4.3	0.1	1.4	0.7	42.2	0.3
MSeg	70.8	**42.9**	**83.1**	**63.1**	63.7	**48.4**	**59.0**
Oracle	77.0	46.0	79.1	–	57.5	62.2	–

	Meta AVG mIoU	Seen WildDash data?
MSeg-1080 (Ours)	**48.3**	✗
LDN BIN-768 [1]	46.9	✓
LDN OE [1]	42.7	✓
DN169-CAT-DUAL	41.0	✓
AHiSS [22]	39.0	✗

Thank you!

Please visit https://github.com/mseg-dataset/ for API & Model Release (including semantic, instance & panoptic segmentation)!