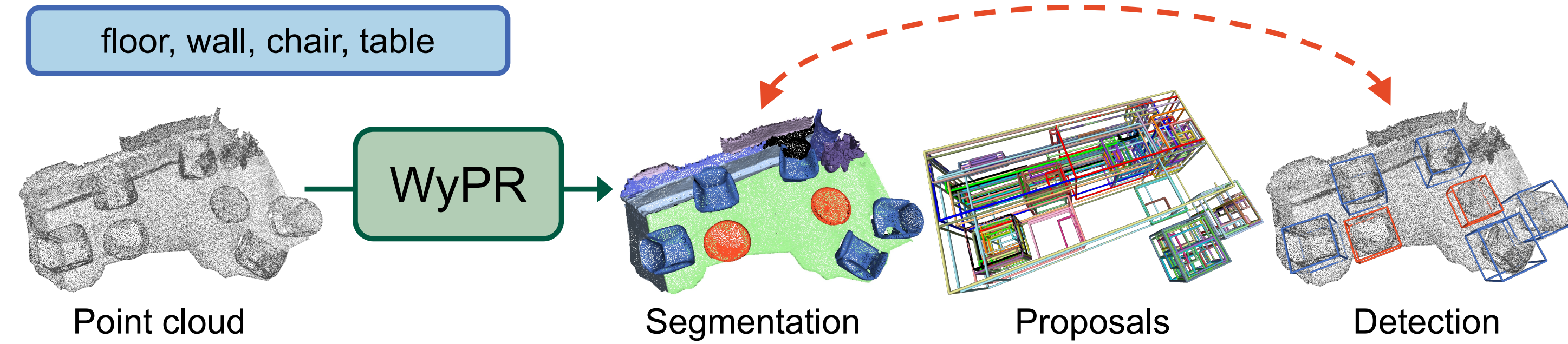


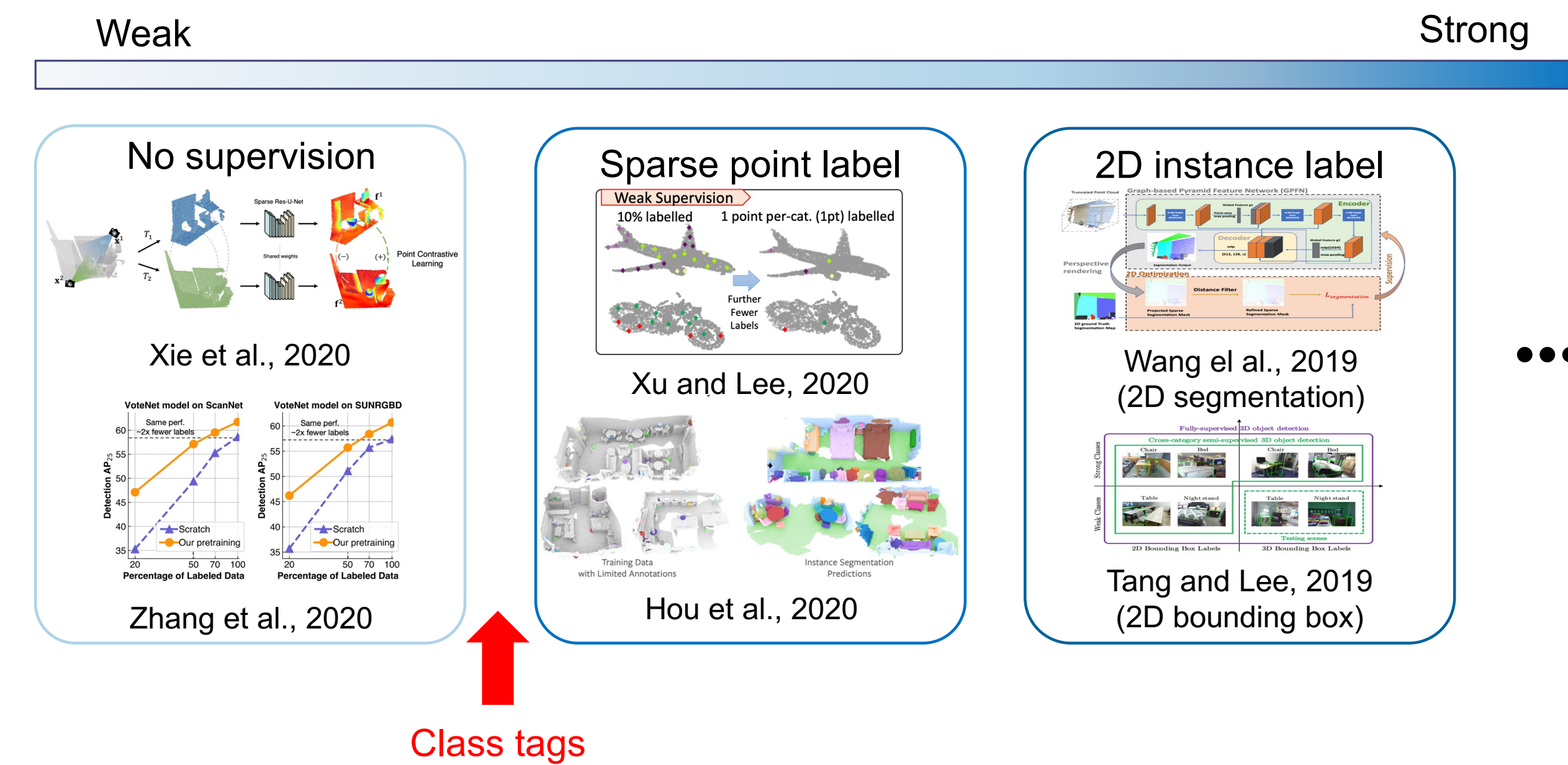
Overview

Goal: train 3D recognition framework with class tags

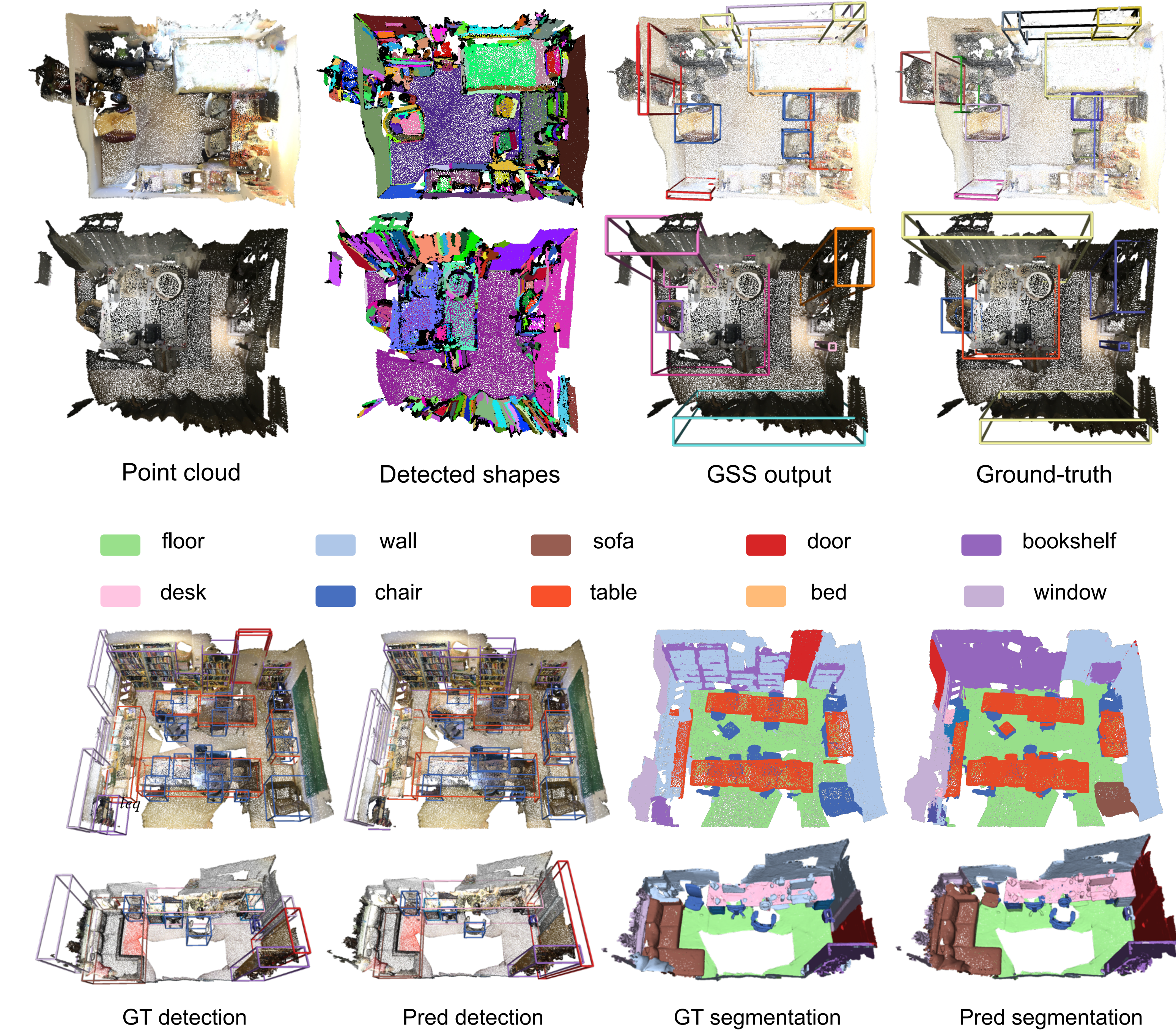


Novelties: 1) multi-task joint learning
2) unsupervised proposal generation

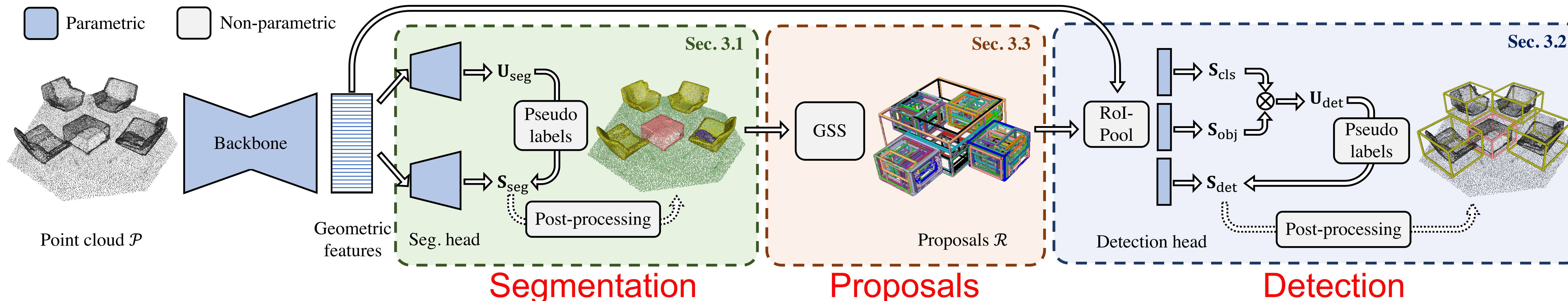
Prior work



Results

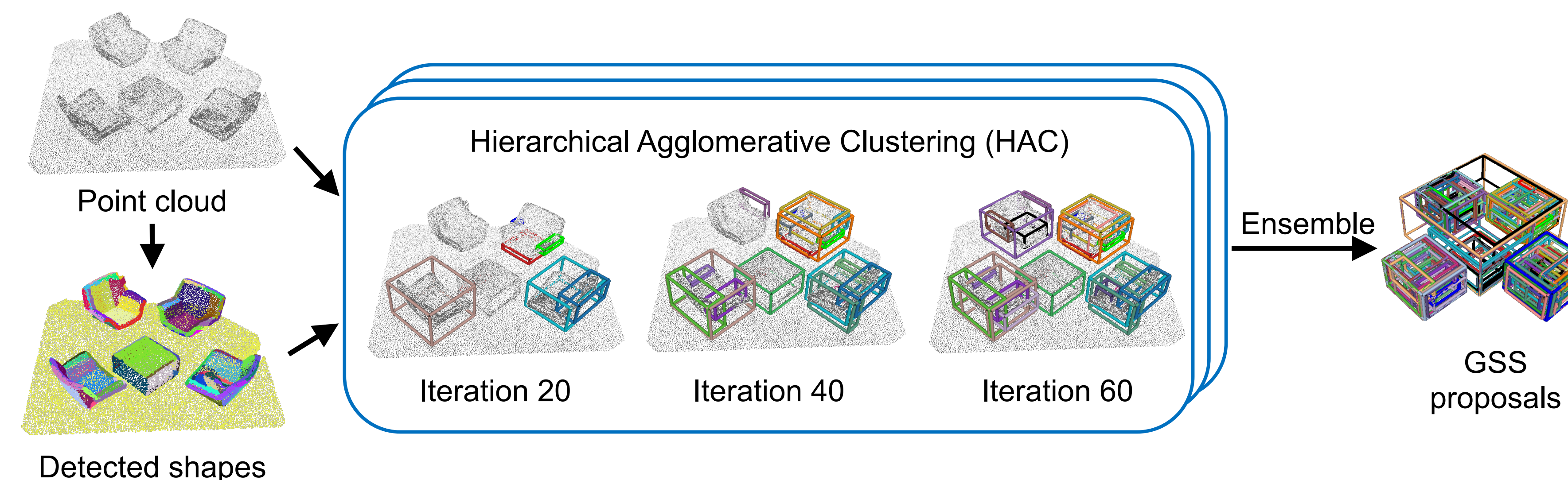


WyPR: Weakly-supervised Point Cloud Recognition



Training objectives:

- Multiple instance learning (MIL)
- Self-training
- Cross-task consistency
- Cross-transformation consistency
- Local smoothness



Geometric Selective Search (GSS)

Segmentation

Methods	Split	mIoU
PCAM (Wei 2020)	train	22.1
MPRM (Wei 2020)	train	24.4
WyPR	train	30.7
MIL-Seg	val	20.7
WyPR	val	29.6
WyPR+prior	val	31.1
PointNet++ (Qi 2017)	val	55.7
SparseConv (Choy 2019)	val	73.6

Proposal & Detection

Methods	#boxes	MABO	AR	mAP
Qin 2020	1k	0.092	23.6	N/A
GSS	256	0.321	73.4	N/A
GSS	1k	0.378	86.2	N/A
MIL-det	1k	0.378	86.2	9.6
WyPR	1k	0.409	89.3	18.3
WyPR+prior	1k	0.427	90.5	19.7
VoteNet (Qi 2021)	256	0.436	84.7	58.6
VoteNet (Qi 2021)	1k	0.450	88.1	55.3