Label-Guided Auxiliary Training Improves 3D Object Detector

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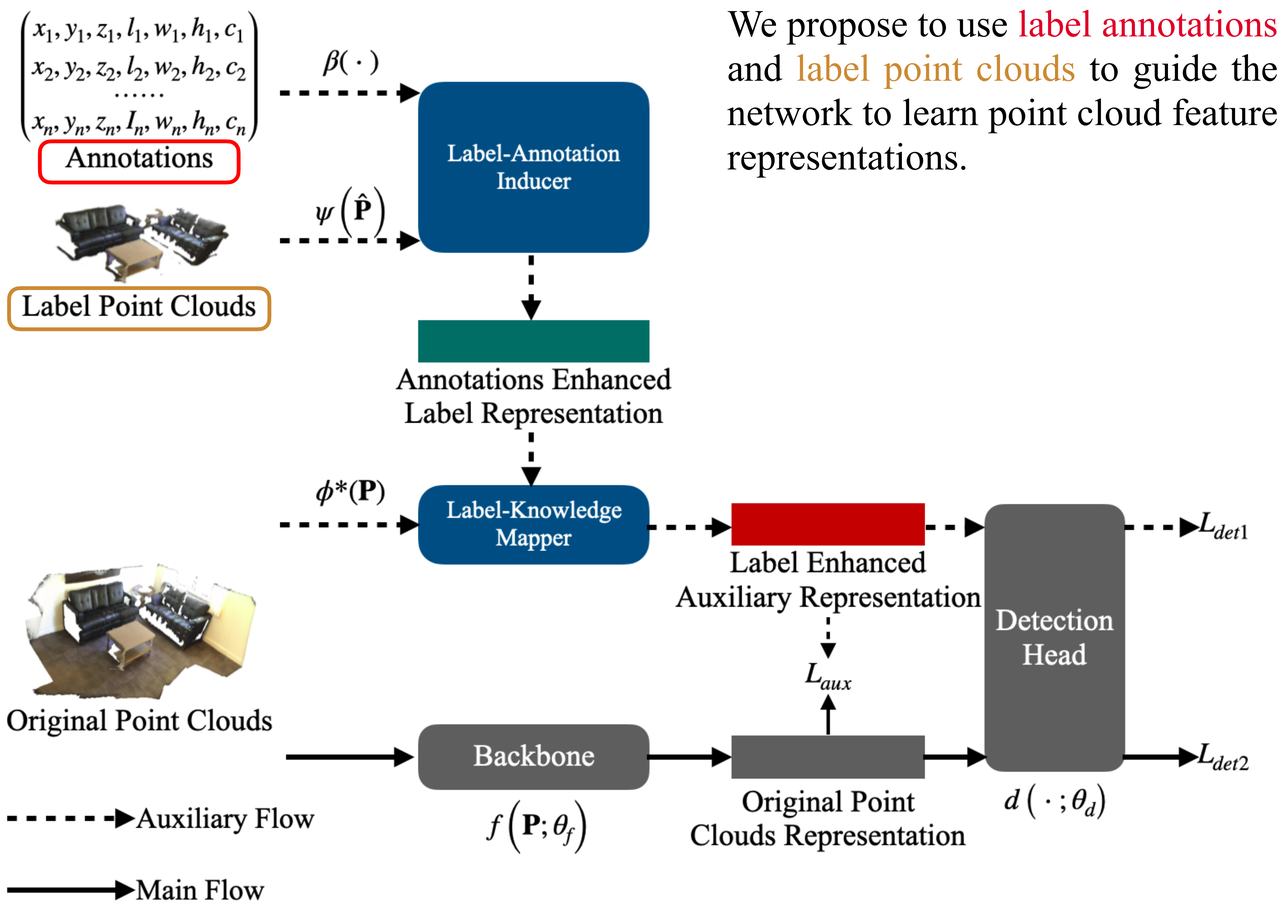
1. Contributions

- We demonstrate that point cloud label itself contains useful feature that can help the learning of 3d object detecor
- We propose two novel modules to fuse such label features with vanilla model without extra cost

2. Proposed Method

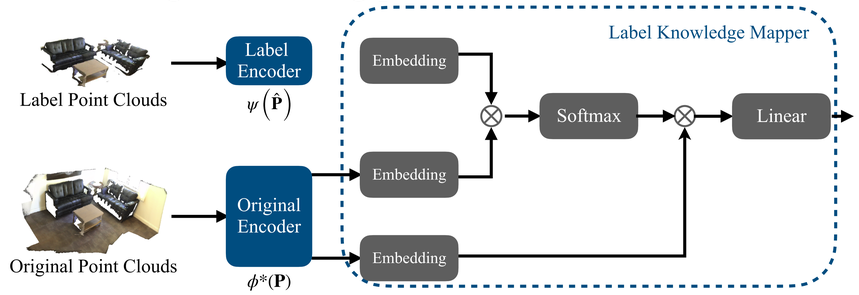
LG3D—Overview



We propose to use label annotations and label point clouds to guide the network to learn point cloud feature representations.

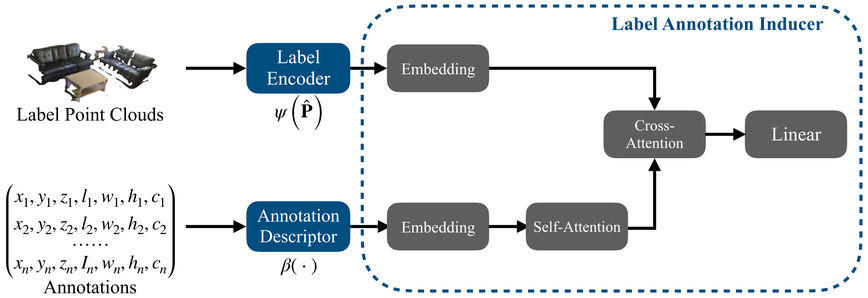
LG3D—LAI

The LAI module establishes a cross-attention mechanism between the label point clouds and the label annotations to recover more key information during the training phase.



LG3D—LKM

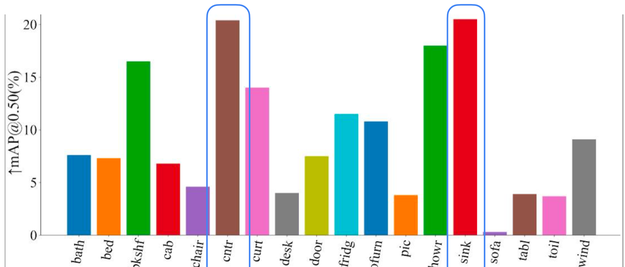
The LKM module establishes an attention fusion mechanism between the original point clouds and the label point clouds to guide the original network to extract features more effectively.



3. Experiments

mAP@0.5	SUN RGBD	ScanNetV2
VoteNet	35.8	39.9
+LG3D	38.3(+2.7)	43.0(+3.1)
GP3D	45.2	52.8
+Ours	47.5(+2.3)	54.1(+1.3)

mAP@0.5	KITTI(Car)		
	Easy	Mod.	Hard
PointPillars	82.6	74.3	69.0
+LG3D	84.4(+1.8)	76.4(+2.1)	69.9(+0.9)
3DSSD	88.4	79.6	74.6
+Ours	89.0(+0.6)	81.5(+1.9)	76.7(+2.1)



Our method improves well on indoor and outdoor datasets and different models. This is especially for the detection of small objects.