TABLE 4: Comparative semantic segmentation results on the S3DIS (including both Area5 and 6-fold cross validation) [176], Semantic3D (including both *semantic-8* and *reduced-8* subsets) [9] , ScanNet [8], and SemanticKITTI [177] datasets. Overall Accuracy (OA), Mean Intersection-over-Union (mIoU) are the main evaluation metric. For simplicity, we omit the '%' after the value. The symbol '-' means the results are unavailable.

Method			S3DIS				Semantic3D				ScanNet(v2)		Sem. KITTI
			Area5 (OA)	Area5 (mIoU)	6-fold (mIoU)	6-fold (mIoU)	sem. (OA)	sem. (mIoU)	red. (OA)	red. (mIoU)	OA	mIoU	(mIoU)
Projection -based Methods	Multi-view	DeePr3SS [148]	-	-	-	-	-	-	88.9	58.5	-	-	-
		SnapNet [149]	-	-	-	-	91.0	67.4	88.6	59.1	-	-	-
		TangentConv [161]	82.5	52.8	-	-	-	-	-	-	80.1	40.9	40.9
	Spherical	SqueezeSeg [150]	-	-	-	-	-	-	-	-	-	-	29.5
		SqueezeSegV2 [151]	-	-	-	-	-	-	-	-	-	-	39.7
		RangeNet++ [152]	-	-	-	-	-	-	-	-	-	-	52.2
	Volumetric	SegCloud [164]	-	48.9	-	-	-	-	88.1	61.3	-	-	-
		SparseConvNet [155]	-	-	-	-	-	-	-	-	-	72.5	-
		MinkowskiNet [167]	-	-	-	-	-	-	-	-	-	73.6	-
		VV-Net [153]	-	-	87.8	78.2	-	-	-	-	-	-	-
	Permutohedral lattice	SPLATNet [156]	-	-	-	-	-	-	-	-	-	39.3	18.4
		LatticeNet [157]	-	-	-	-	-	-	-	-	-	64.0	52.2
	Hybrid	3DMV [158]	-	-	-	-	-	-	-	-	-	48.4	-
		UPB [168]	-	-	-	-	-	-	-	-	-	63.4	-
		MVPNet [159]	-	-	-	-	-		-	-	-	64.1	-
Point -based Methods	Point-wise MLP	PointNet [5]	-	41.1	78.6	47.6	-	-	-	-	-	-	14.6
		PointNet++ [27]	-	-	81.0	54.5	85.7	63.1	-	-	84.5	33.9	20.1
		PointSIFT [114]	-	-	88.7	70.2	-	-	-	-	86.2	41.5	-
		Engelmann [178]	84.2	52.2	84.0	58.3	-	-	-	-	-	-	-
		3DContextNet [79]	-	-	84.9	55.6	-	-	-	-	-	-	-
		A-SCN [81]	-	-	81.6	52.7	-	-	-	-	-	-	-
		PointWeb [31]	87.0	60.3	87.3	66.7	-	-	-	-	85.9	-	-
		PAT [29]		60.1		64.3	-	-	-	-	-	-	-
		LSANet [171]	-	-	86.8	62.2	-	-	-	-	85.1	-	-
		ShellNet [170]	-	-	87.1	66.8	-	-	93.2	69.3	85.2	-	-
		RandLA-Net [95]	-	-	87.2	68.5	-	-	94.4	76.0	-	-	50.3
	Point convolution	PointCNN [52]	85.9	57.3	88.1	65.4	-	-	-	-	85.1	45.8	-
		PCCN [174]	-	58.3	-	-	-	-	-	-	-	-	-
		A-CNN [55]	-	-	87.3	-	-	-	-	-	85.4	-	-
		ConvPoint [47]	-	-	88.8	68.2	93.4	76.5	-	-	-	-	-
		KPConv [42]	-	67.1	-	70.6	-	-	92.9	74.6	-	68.4	-
		DPC [175]	86.8	61.3	-	-	-	-	-	-	-	59.2	-
		InterpCNN [53]	-	-	88.7	66.7	-	-	-	-	-	-	-
	RNN -based	RSNet [179]	-	51.9	-	56.5	-	-	-	-	84.9	39.4	-
		G+RCU [180]	-	45.1	81.1	49.7	-	-	-	-	-	-	-
		3P-RNN [181]	85.7	53.4	86.9	56.3	-	-	-	-	-	-	-
	Graph -based	DGCNN [60]	-	-	84.1	56.1	-	-	-	-	-	-	-
		SPG [182]	86.4	58.0	85.5	62.1	92.9	76.2	94.0	73.2	-	-	17.4
		SSP+SPG [183]	87.9	61.7	87.9	68.4	-	-	-	-	-	-	-
		GACNet [184]	87.8	62.9	-	-	-	-	91.9	70.8	-	-	-
		PAG [185]	86.8	59.3	88.1	65.9	-	-	-	-	-	-	
		HDGCN [186]	-	59.3	-	66.9	-	-	-	-	-	-	-
		HPEIN [187]	87.2	61.9	88.2	67.8	-	-	-	-	-	61.8	-
		SPH3D-GCN [188]	87.7	59.5	88.6	68.9	-	-	-	-	-	61.0	-
		DPAM [65]	86.1	60.0	87.6	64.5	-	-	-	-	-	-	-