Bi-PointFlowNet

7차 보고

Experiment – WeightNet48(C_{mid} =4,8 , K=16)

0. Scratch Student

Epoch: 115 EPE3D=0.04283

Experiment – WeightNet4 (C_{mid}=4, K = 16)

	Baseline	Weightnet=4
FLOPs	13.3G	7.37G(45% ↓)
Param	7.98M	2.73M(66% ↓)

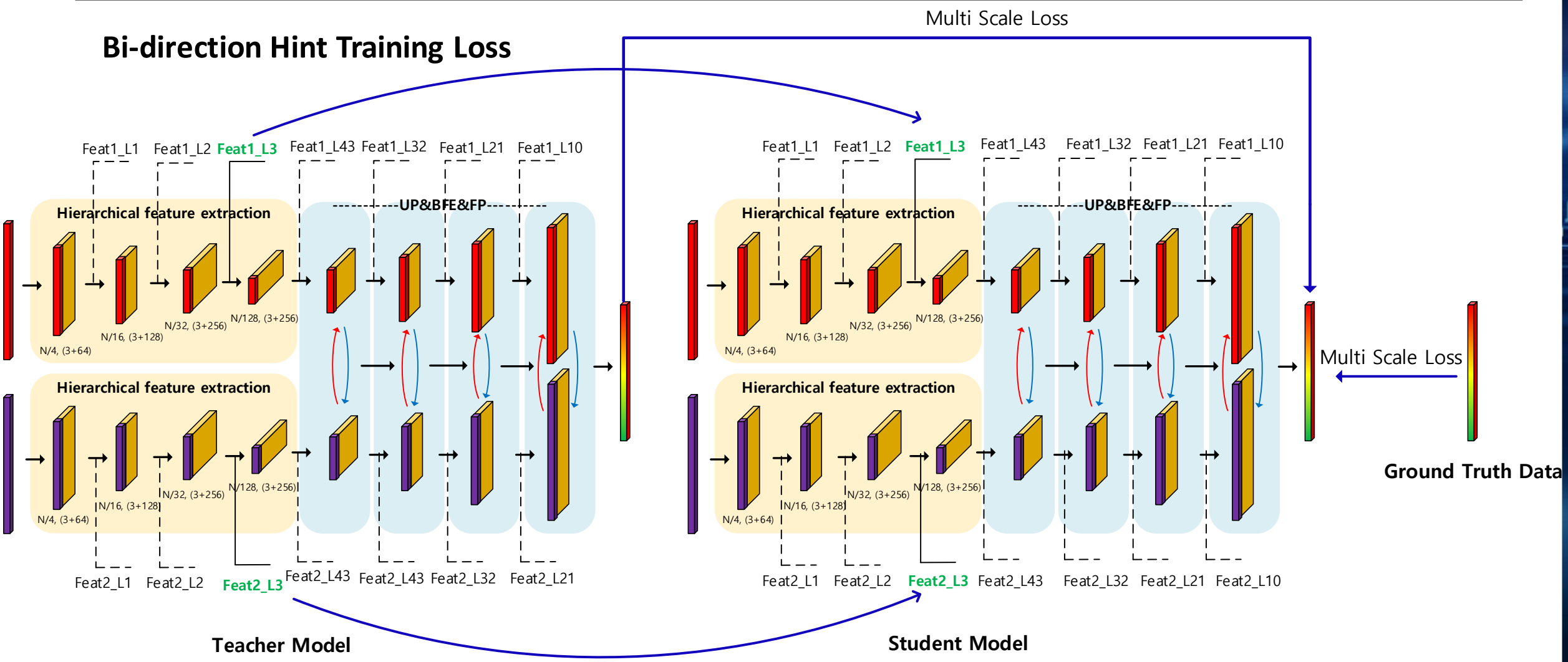
Baseline

Dataset	EPE3D(↓)	ACC3DS(↑)	ACC3DR(↑)	Outliers3D(↓)	EPE2D(↓)	ACC2D(↑)
FlyingThings	0.0288m	0.918	0.978	0.143	1.582	0.930
KITTI	0.0302m	0.920	0.962	0.136	1.061	0.948

WeightNet4(C_{mid}=4, K=16)

Loss Function	Dataset	EPE3D(↓)	ACC3DS(↑)	ACC3DR(↑)	Outliers3D(↓)	EPE2D(↓)	ACC2D(↑)
Scratch	FlyingThings	0.0325m	0.902	0.974	0.163	1.833	0.915
	KITTI	0.0319m	0.923	0.964	0.140	1.118	0.949
Hint Training Loss	FlyingThings	0.0317m	0.905	0.975	0.159	1.755	0.917
	KITTI	0.0325m	0.929	0.961	0.137	1.136	0.946
Bi-Directional Hint Training Loss	FlyingThings	**0.0305m**	**0.910**	**0.977**	**0.155**	**1.667**	**0.923**
	KITTI	0.0360m	0.906	0.951	0.151	1.219	0.935

Experiment


Bi-direction Hint Training Loss
Multi Scale Loss
Feat1_L1
Feat1_L2
Feat1_L3
Feat1_L43
Feat1_L32
Feat1_L21
Feat1_L10
Hierarchical feature extraction
UP&BFE&FP
N/4, (3+64)
N/16, (3+128)
N/32, (3+256)
N/128, (3+256)
Feat2_L1
Feat2_L2
Feat2_L3
Feat2_L43
Feat2_L32
Feat2_L21
Feat2_L10
Multi Scale Loss
Ground Truth Data
Teacher Model
Student Model

Experiment – WeightNet8 (C_{mid} =8, K=16)

	Baseline	Weightnet=8
FLOPs	13.3G	9.36G(30% ↓)
Param	7.98M	4.47M(43% ↓)

Baseline

Dataset	EPE3D(↓)	ACC3DS(↑)	ACC3DR(↑)	Outliers3D(↓)	EPE2D(↓)	ACC2D(↑)
FlyingThings	0.0288m	0.918	0.978	0.143	1.582	0.930
KITTI	0.0302m	0.920	0.962	0.136	1.061	0.948

WeightNet8(C_{mid}=8, K=16)

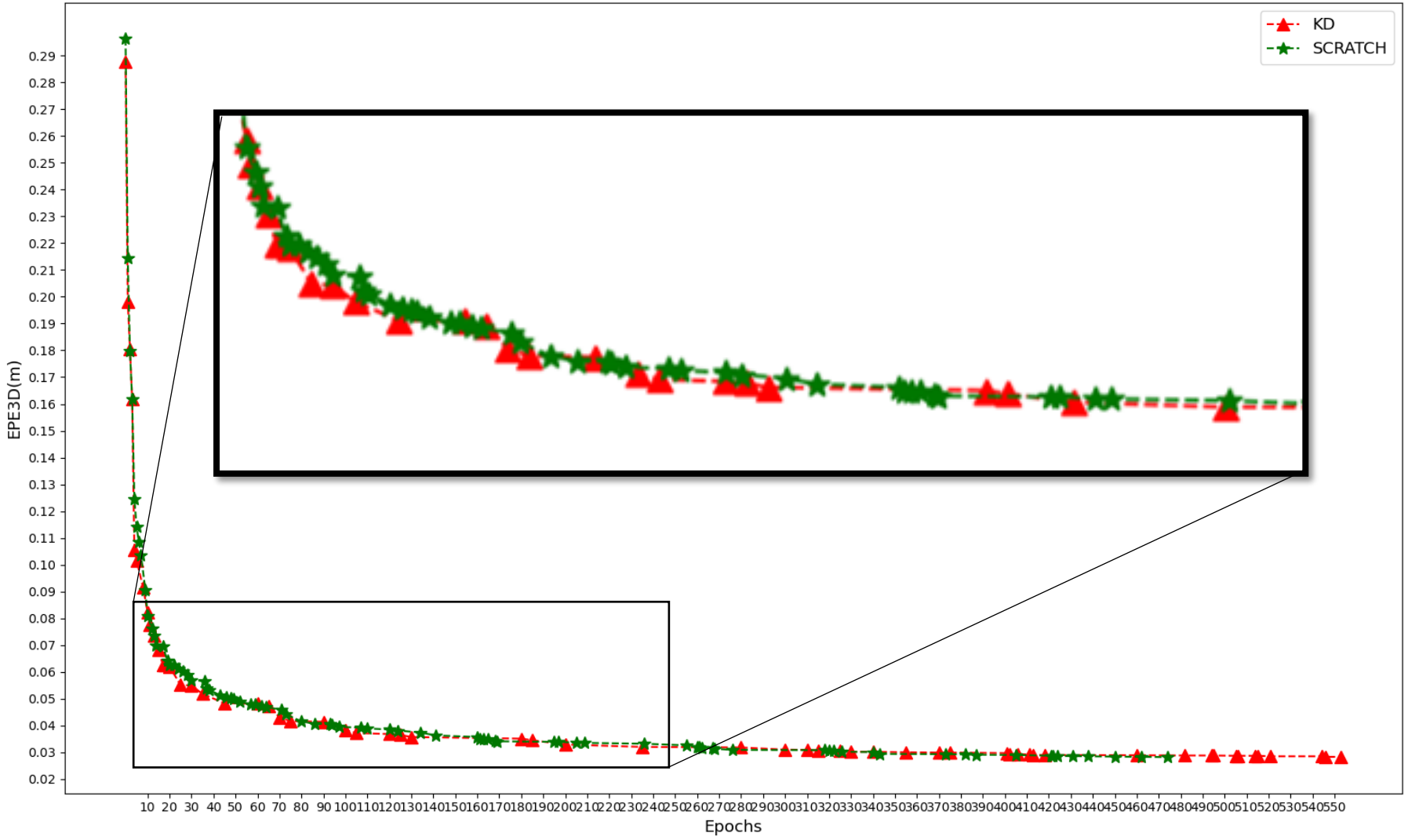
Loss Function	Dataset	EPE3D(↓)	ACC3DS(↑)	ACC3DR(↑)	Outliers3D(↓)	EPE2D(↓)	ACC2D(↑)
Scratch	FlyingThings	0.0280m	0.923	0.979	0.137	-	-
	KITTI	0.0294m	0.927	0.962	0.136	-	-
Bi-Directional Hint Training Loss	FlyingThings	0.0282m	0.924	0.980	0.136	1.642	0.934
	KITTI	0.0292m	0.923	0.961	0.138	0.972	0.953
Bi-Directional Hint Training Loss + Scratch	FlyingThings	**0.0266m**	**0.932**	**0.982**	**0.129**	**1.492**	**0.941**
	KITTI	0.0286m	0.930	0.965	0.134	1.002	0.954

Experiment – WeightNet8(C_{mid} =8 , K=16)

Bi-Directional Hint Training Loss

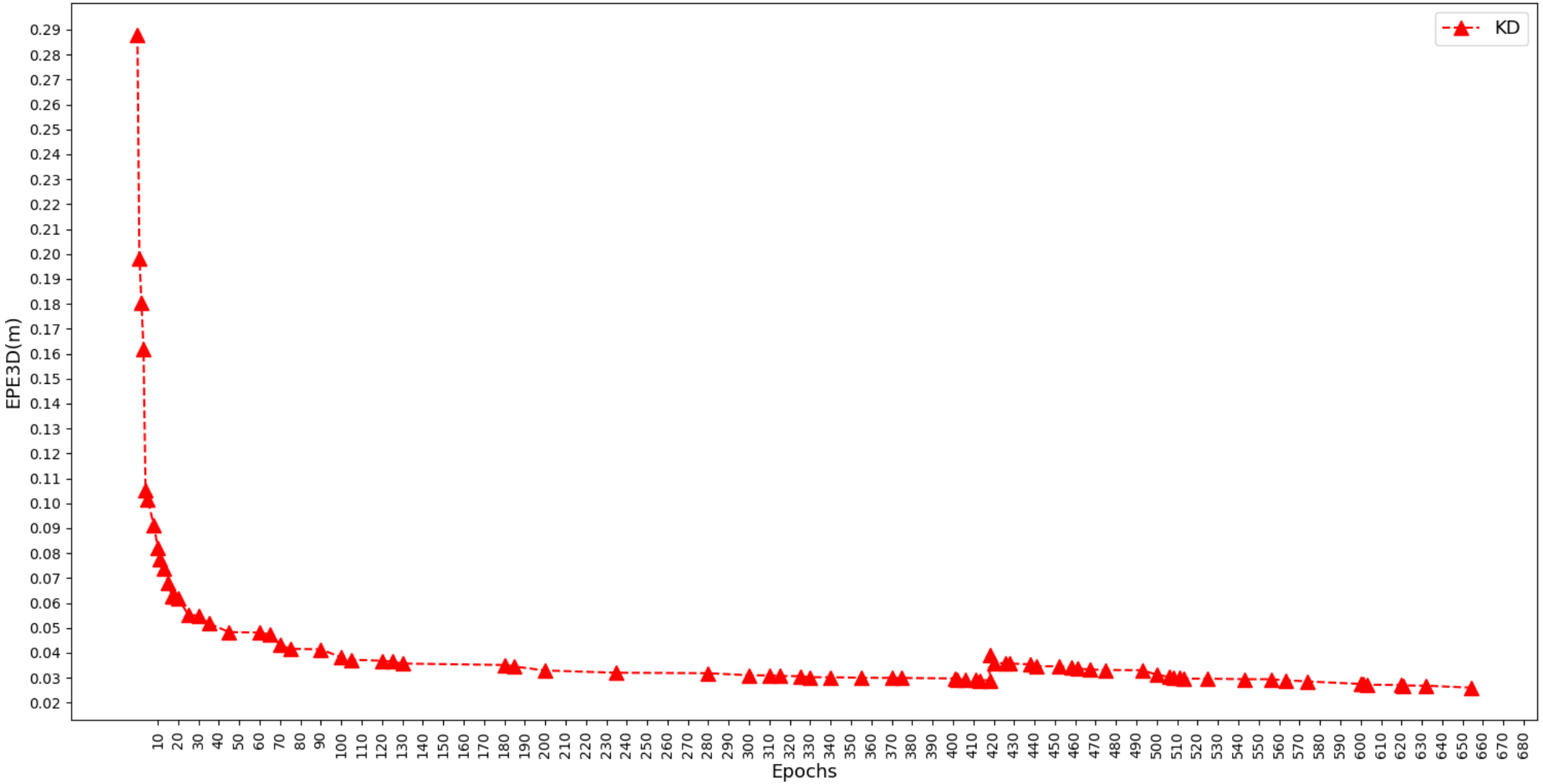
Knowledge Distillation이 기존 **Scratch** 학습 방법**보다** EPE 0.03m 까지는 **빠르게 수렴**

50 Epoch 정도 이득



Experiment – WeightNet8(C_{mid} =8 , K=16)

Bi-Directional Hint Training Loss + Scratch



Experiment – WeightNet4 (C_{mid}=4, K=16)