

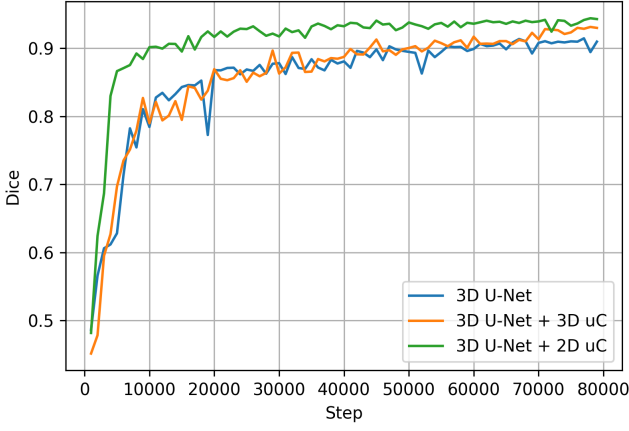


Figure 1: Validation Curve with Dice Score for OIMHS. The initial number of channels for these three model is set to 32.

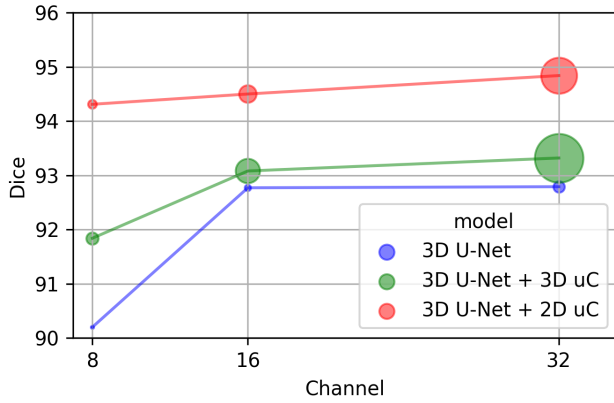


Figure 2: Comparison of the performance of 3D U-Net, 3D U-Net + 3D uC, and 3D U-Net + 2D uC across different initial channel numbers. The horizontal axis represents the initial channel number, the vertical axis represents the Dice coefficient, and the size of the circles corresponds to the number of parameters.

Datasets	Methods	mIoU	Dice	ASSD	HD95	AdjRand
FLARE2021	UNETR++	83.98 $\pm$ 4.45	89.92 $\pm$ 3.73	1.10 $\pm$ 0.51	4.14 $\pm$ 1.93	89.79 $\pm$ 3.75
	D.LKA_Former	88.80 $\pm$ 2.58	93.56 $\pm$ 1.82	0.71 $\pm$ 0.28	2.53 $\pm$ 1.05	93.46 $\pm$ 1.83
	uC 3DU-Net	89.36$\pm$2.26	93.98$\pm$1.46	0.68$\pm$0.30	2.35$\pm$0.99	93.88$\pm$1.49
FeTA2021	UNETR++	72.90 $\pm$ 2.60	84.04 $\pm$ 1.82	1.19 $\pm$ 0.11	3.37 $\pm$ 0.85	83.56 $\pm$ 1.75
	D.LKA_Former	73.35 $\pm$ 3.83	84.28 $\pm$ 2.64	1.19 $\pm$ 0.16	3.19 $\pm$ 0.65	83.82 $\pm$ 2.56
	uC 3DU-Net	78.66$\pm$3.05	87.88$\pm$1.98	0.91$\pm$0.09	2.34$\pm$0.27	87.48$\pm$1.91
OIMHS	UNETR++	79.27 $\pm$ 7.49	87.08 $\pm$ 6.54	0.99 $\pm$ 0.65	4.83 $\pm$ 2.49	86.26 $\pm$ 6.54
	D.LKA_Former	86.55 $\pm$ 4.11	92.39 $\pm$ 2.83	0.44 $\pm$ 0.27	2.28$\pm$1.12	91.84 $\pm$ 2.87
	uC 3DU-Net	90.67$\pm$2.95	94.91$\pm$1.84	0.34$\pm$0.46	2.35 $\pm$ 5.22	94.53$\pm$1.89
AbdomenCT-1K	UNETR++	81.11 $\pm$ 15.16	87.20 $\pm$ 15.19	2.69 $\pm$ 4.84	9.70 $\pm$ 12.43	87.04 $\pm$ 15.24
	D.LKA_Former	87.84 $\pm$ 3.35	93.08 $\pm$ 2.13	1.49 $\pm$ 0.94	7.16$\pm$9.08	92.95 $\pm$ 2.18
	uC 3DU-Net	88.29$\pm$4.04	93.35$\pm$2.60	1.48$\pm$1.09	8.53 $\pm$ 10.74	93.22$\pm$2.66

Table 1: Experimental results of the added baseline on the FLARE2021, FeTA2021, OIMHS, AbdomenCT-1K datasets.

Methods	mIoU	Dice	ASSD	HD95	AdjRand
3D U-Net (32)	87.08 $\pm$ 3.32	92.79 $\pm$ 2.09	1.31 $\pm$ 1.35	7.39 $\pm$ 14.69	92.22 $\pm$ 2.15
+2D uC (W)	88.01 $\pm$ 3.12	93.35 $\pm$ 1.96	0.86 $\pm$ 0.66	2.89 $\pm$ 5.53	92.84 $\pm$ 2.02
+2D uC (H)	87.74 $\pm$ 3.74	93.16 $\pm$ 2.46	0.48 $\pm$ 0.47	2.91 $\pm$ 5.03	92.63 $\pm$ 2.50
+2D uC (D)	90.67$\pm$2.95	94.91$\pm$1.84	0.34$\pm$0.46	2.35$\pm$5.22	94.53$\pm$1.89

Table 2: The results of applying 2D convolution on slices along the W, H, and D dimensions on the OIMHS dataset. The best values for each metric are highlighted in bold.

Methods	#Params	FLOPs	mIoU	Dice	ASSD	HD95	AdjRand
3D U-Net (8)	0.37M	16.50G	83.17 $\pm$ 4.51	90.20 $\pm$ 3.20	2.88 $\pm$ 2.16	16.92 $\pm$ 21.89	89.51 $\pm$ 3.23
+3D uC	5.56M	46.80G	85.58 $\pm$ 3.60	91.84 $\pm$ 2.35	2.25 $\pm$ 1.35	8.64 $\pm$ 14.07	91.19 $\pm$ 2.40
+2D uC	2.85M	42.54G	89.59$\pm$2.61	94.31$\pm$1.62	0.52$\pm$0.48	2.57$\pm$4.74	93.84$\pm$1.65
3D U-Net (16)	1.47M	65.09G	87.08 $\pm$ 3.43	92.77 $\pm$ 2.24	0.92 $\pm$ 0.92	4.57 $\pm$ 8.92	92.20 $\pm$ 2.29
+3D uC	22.21M	186.27G	87.50 $\pm$ 3.34	93.08 $\pm$ 2.11	4.61 $\pm$ 1.25	43.45 $\pm$ 19.56	92.41 $\pm$ 2.15
+2D uC	11.38M	169.20G	89.98$\pm$3.43	94.50$\pm$2.23	0.39$\pm$0.42	2.56$\pm$4.96	94.06$\pm$2.26
3D U-Net (32)	4.81M	135.90G	87.08 $\pm$ 3.32	92.79 $\pm$ 2.09	1.31 $\pm$ 1.35	7.39 $\pm$ 14.69	92.22 $\pm$ 2.15
+3D uC	88.67M	596.06G	87.93 $\pm$ 3.33	93.32 $\pm$ 2.09	3.09 $\pm$ 1.31	14.13 $\pm$ 16.99	92.73 $\pm$ 2.12
+2D uC	45.33M	527.75G	90.52$\pm$2.77	94.84$\pm$1.68	0.35$\pm$0.33	2.20$\pm$4.07	94.43$\pm$1.76

Table 3: Results of 3D U-Net, 3D U-Net + 3D uC, and 3D U-Net + 2D uC across different initial channel numbers on the OIMHS dataset. The best values for each metric are highlighted in bold.

	3D U-Net(32)	+3D uC	+2D uC
PSNR	28.98db	34.93db	36.29db

Table 4: PSNR results of the reconstruction experiments on the OIMHS dataset, including three methods: 3D U-Net, 3D U-Net + 3D uC, and 3D U-Net + 2D uC.

Methods	mIoU	Dice	ASSD	HD95	AdjRand
TransBTS	67.85 $\pm$ 3.55	78.38 $\pm$ 3.50	2.01 $\pm$ 1.03	8.70 $\pm$ 4.60	78.31 $\pm$ 3.51
UNETR	68.99 $\pm$ 2.52	79.82 $\pm$ 2.51	1.39 $\pm$ 0.54	7.38 $\pm$ 4.90	79.76 $\pm$ 2.51
3D UX-Net	72.27 $\pm$ 3.26	82.31 $\pm$ 3.06	1.37 $\pm$ 0.45	4.70 $\pm$ 1.49	82.25 $\pm$ 3.06
3D U-Net	72.25 $\pm$ 3.30	82.24 $\pm$ 2.99	1.06 $\pm$ 0.40	4.22 $\pm$ 1.35	82.19 $\pm$ 3.00
uC 3DU-Net	72.99$\pm$3.40	82.74$\pm$3.18	0.97$\pm$0.21	3.63$\pm$0.80	82.69$\pm$3.19

Table 5: Comparative experimental results of uC 3DU-Net and 4 previous methods on the BTCV Standard dataset. The best values for each metric are highlighted in bold.

Methods	#Params	FLOPs	mIoU	Dice	ASSD	HD95	AdjRand
stage1	30.38M	439.87G	90.06 $\pm$ 3.41	94.55 $\pm$ 2.16	0.96 $\pm$ 1.85	7.93 $\pm$ 19.51	94.14 $\pm$ 2.20
+DFi	23.58M	377.19G	90.42$\pm$2.59	94.79$\pm$1.56	0.68$\pm$1.19	4.45$\pm$11.03	94.38$\pm$1.62
stage2	30.28M	330.01G	89.73 $\pm$ 3.12	94.37 $\pm$ 1.92	0.35$\pm$0.38	2.36$\pm$4.69	93.94 $\pm$ 1.99
+DFi	23.49M	267.34G	90.03$\pm$3.09	94.53$\pm$1.93	0.49 $\pm$ 0.50	2.50 $\pm$ 5.19	94.11$\pm$1.99
stage3	29.92M	286.09G	88.71 $\pm$ 3.31	93.75 $\pm$ 2.12	0.43$\pm$0.42	2.70 $\pm$ 5.17	93.26 $\pm$ 2.18
+DFi	23.12M	223.39G	89.33$\pm$3.30	94.13$\pm$2.07	0.55 $\pm$ 0.64	2.67$\pm$5.30	93.68$\pm$2.13
stage1,2,3	45.33M	527.75G	90.52 $\pm$ 2.77	94.84 $\pm$ 1.68	0.35 $\pm$ 0.33	2.20$\pm$4.07	94.43 $\pm$ 1.76
+DFi	38.53M	465.07G	90.86$\pm$2.75	95.03$\pm$1.68	0.34$\pm$0.45	2.34 $\pm$ 5.23	94.63$\pm$1.73

Table 6: Further ablation experiments on DFI. The best values for each metric are highlighted in bold.