

## OVERVIEW

The supplementary material presents the following sections to strengthen the main manuscript:

- **Sec. A** shows the average quantitative results on various datasets under 100 epochs.
- **Sec. B** shows the average quantitative results on various datasets under 300 epochs.
- **Sec. C** shows the specific quantitative results for each class under 100 epochs on MVTec AD [Bergmann et al. \(2019\)](#) dataset.
- **Sec. D** shows the specific quantitative results for each class under 100 epochs on MVTec AD 3D [Bergmann et al. \(2022b\)](#) dataset.
- **Sec. E** shows the specific quantitative results for each class under 100 epochs on MVTec LOCO-AD [Bergmann et al. \(2022a\)](#) dataset.
- **Sec. F** shows the specific quantitative results for each class under 100 epochs on VisA [Zou et al. \(2022\)](#) dataset.
- **Sec. G** shows the specific quantitative results for each class under 100 epochs on BTAD [Mishra et al. \(2021\)](#) dataset.
- **Sec. H** shows the specific quantitative results for each class under 100 epochs on MPDD [Jezek et al. \(2021\)](#) dataset.
- **Sec. I** shows the specific quantitative results for each class under 100 epochs on MAD.Real [Zhou et al. \(2024\)](#) dataset.
- **Sec. J** shows the specific quantitative results for each class under 100 epochs on MAD.Sim [Zhou et al. \(2024\)](#) dataset.
- **Sec. K** shows the specific quantitative results for each class under 100 epochs on Uni-Medical [Zhang et al. \(2023a\)](#) dataset.
- **Sec. L** shows the specific quantitative results for each class under 100 epochs on Real-IAD [Wang et al. \(2024\)](#) dataset.
- **Sec. M** shows the specific quantitative results for each class under 100 epochs on COCO-AD [Zhang et al. \(2024a\)](#) dataset.
- **Sec. N** shows the specific quantitative results for each class under 300 epochs on MVTec AD [Bergmann et al. \(2019\)](#) dataset.
- **Sec. O** shows the specific quantitative results for each class under 300 epochs on MVTec AD 3D [Bergmann et al. \(2022b\)](#) dataset.
- **Sec. P** shows the specific quantitative results for each class under 300 epochs on MVTec LOCO-AD [Bergmann et al. \(2022a\)](#) dataset.
- **Sec. Q** shows the specific quantitative results for each class under 300 epochs on VisA [Zou et al. \(2022\)](#) dataset.
- **Sec. R** shows the specific quantitative results for each class under 300 epochs on BTAD [Mishra et al. \(2021\)](#) dataset.
- **Sec. S** shows the specific quantitative results for each class under 300 epochs on MPDD [Jezek et al. \(2021\)](#) dataset.
- **Sec. T** shows the specific quantitative results for each class under 300 epochs on MAD.Real [Zhou et al. \(2024\)](#) dataset.
- **Sec. U** shows the specific quantitative results for each class under 300 epochs on MAD.Sim [Zhou et al. \(2024\)](#) dataset.
- **Sec. V** shows the specific quantitative results for each class under 300 epochs on Uni-Medical [Zhang et al. \(2023a\)](#) dataset.

## A DETAILED QUANTITATIVE RESULTS ON ALL DATASET UNDER 100 EPOCHS

Table A1: Benchmarked results on MVTec AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.5	76.3	83.6	47.6	3.2	6.7	14.3	3.5	44.7
	SimpleNet <a href="#">Liu et al. (2023)</a>	95.4	98.3	95.7	96.8	48.8	51.9	86.9	36.4	83.8
	RealNet <a href="#">Zhang et al. (2024c)</a>	84.8	94.1	90.9	72.6	48.2	41.4	56.8	28.8	72.3
Emb.	CFA <a href="#">Lee et al. (2022)</a>	57.6	78.3	84.7	54.8	11.9	14.7	25.3	8.9	50.1
	PatchCore <a href="#">Roth et al. (2022)</a>	<b>98.8</b>	<b>99.5</b>	<b>98.4</b>	<b>98.3</b>	59.9	61.0	94.2	44.9	<b>88.6</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.6	96.7	93.4	95.7	45.9	48.6	88.3	33.2	81.8
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	70.2	85.5	85.5	80.0	22.3	22.0	47.5	12.8	61.7
	RD <a href="#">Deng &amp; Li (2022)</a>	93.6	97.2	95.6	95.8	48.2	53.6	91.2	37.0	83.8
Rec.	DiAD <a href="#">He et al. (2024b)</a>	88.9	95.8	93.5	89.3	27.0	32.5	63.9	21.1	70.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>	98.3	99.3	97.3	97.6	55.2	58.4	92.0	42.3	87.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	98.1	99.0	97.6	98.0	56.3	59.2	<b>94.4</b>	42.8	87.6
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.9	99.2	96.8	97.3	54.4	57.8	93.3	41.4	86.8
	MambaAD <a href="#">He et al. (2024a)</a>	97.8	99.3	97.3	97.4	55.1	57.6	93.4	41.2	87.0
Hybrid	UniAD <a href="#">You et al. (2022)</a>	92.5	97.3	95.4	95.8	42.7	48.0	89.3	32.5	82.0
	RD++ <a href="#">Tien et al. (2023)</a>	97.9	98.8	96.4	97.3	54.7	58.0	93.2	41.5	86.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	96.4	98.6	96.2	92.0	<b>71.1</b>	<b>68.2</b>	83.4	<b>52.8</b>	87.9

Table A2: Benchmarked results on MVTec 3D dataset [Bergmann et al. \(2022b\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	55.7	81.8	88.8	46.6	0.8	1.9	21.9	1.0	46.6
	SimpleNet <a href="#">Liu et al. (2023)</a>	75.8	92.3	90.4	94.7	17.3	23.4	81.0	13.9	70.1
	CFA <a href="#">Lee et al. (2022)</a>	67.1	89.3	89.6	71.6	9.7	16.1	43.2	9.3	58.6
Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	84.1	<u>95.1</u>	92.5	<u>98.6</u>	33.7	38.5	<u>94.4</u>	24.5	78.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	73.1	91.0	90.2	96.8	21.6	26.6	89.0	15.8	71.6
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.7	85.6	88.6	90.8	7.2	12.0	74.9	6.4	61.9
	RD <a href="#">Deng &amp; Li (2022)</a>	75.8	91.2	91.5	98.4	29.6	35.5	93.9	22.2	75.3
	DiAD <a href="#">He et al. (2024b)</a>	75.4	91.0	90.9	91.7	5.3	10.2	74.9	5.4	62.8
Rec.	ViTAD <a href="#">Zhang et al. (2023a)</a>	79.6	93.4	91.6	98.0	27.2	33.3	91.6	20.4	75.4
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>86.9</b>	<b>96.2</b>	<b>93.3</b>	<b>98.7</b>	<u>37.4</u>	<u>42.4</u>	<b>95.2</b>	<u>27.4</u>	<b>80.3</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<u>84.7</u>	95.6	92.6	98.6	<u>38.3</u>	41.9	94.2	26.9	79.6
	MambaAD <a href="#">He et al. (2024a)</a>	84.1	95.1	92.2	98.6	36.9	40.8	94.2	25.9	79.0
	UniAD <a href="#">You et al. (2022)</a>	75.3	92.1	90.3	96.6	21.2	27.9	88.9	16.7	72.3
Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	81.8	93.9	92.8	98.5	34.4	39.6	94.1	25.2	78.1
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	79.1	93.8	90.7	81.1	<b>41.3</b>	<b>42.7</b>	64.0	<b>28.4</b>	72.6

Table A3: Benchmarked results on MVTec LOCO dataset [Bergmann et al. \(2022a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.5	65.4	77.6	46.7	4.5	10.4	12.4	5.6	41.8
	SimpleNet <a href="#">Liu et al. (2023)</a>	81.6	88.5	<b>82.9</b>	<b>76.5</b>	29.0	32.7	63.8	21.2	67.4
	CFA <a href="#">Lee et al. (2022)</a>	66.5	78.6	77.9	58.5	14.2	16.3	31.1	9.1	52.2
Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	80.5	89.0	81.5	75.1	29.9	31.8	69.9	20.4	67.7
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	75.1	84.2	79.8	70.7	25.0	27.9	69.5	17.3	64.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	53.4	69.3	77.5	57.7	15.0	14.5	25.7	8.0	47.5
	RD <a href="#">Deng &amp; Li (2022)</a>	74.6	85.3	78.9	70.7	21.0	26.1	67.7	15.8	63.0
	DiAD <a href="#">He et al. (2024b)</a>	71.3	79.5	80.9	71.8	19.0	24.8	48.4	14.9	56.5
Rec.	ViTAD <a href="#">Zhang et al. (2023a)</a>	76.4	85.2	79.6	73.4	28.7	31.2	63.1	19.8	64.8
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>82.0</b>	<b>89.9</b>	82.0	76.4	<u>31.1</u>	<b>34.8</b>	<b>73.0</b>	<b>23.1</b>	<b>69.2</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	79.4	87.8	80.9	75.8	28.5	32.2	69.4	20.6	67.1
	MambaAD <a href="#">He et al. (2024a)</a>	75.8	85.5	81.0	<b>76.5</b>	28.8	32.5	<u>70.2</u>	20.6	66.4
	UniAD <a href="#">You et al. (2022)</a>	73.2	82.1	79.6	73.1	<u>30.7</u>	33.4	64.7	21.6	64.4
Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	76.4	86.8	79.2	71.5	24.3	28.3	68.8	17.6	64.5
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	77.9	86.7	81.3	64.1	<b>35.2</b>	30.5	53.4	20.3	63.9

Table A4: Benchmarked results on VisA dataset [Zou et al. \(2022\)](#) by the suggested metrics in Sec. 3.3.

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	55.1	62.4	72.9	37.5	0.6	1.7	10.0	0.9	38.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	86.4	89.1	82.8	96.6	34.0	37.8	79.2	25.7	74.0
		RealNet <a href="#">Zhang et al. (2024c)</a>	71.4	79.5	74.7	61.0	25.7	22.6	27.4	13.5	54.7
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	66.3	74.3	74.2	81.3	22.1	26.2	50.8	17.0	58.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	86.5	88.8	84.9	97.7	33.9	37.2	86.8	24.9	75.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.2	66.3	74.4	77.0	7.2	9.6	42.8	5.6	50.2
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	90.6	90.9	89.3	98.0	35.4	42.5	91.9	27.9	78.6
		DiAD <a href="#">He et al. (2024b)</a>	84.8	88.5	86.9	82.5	17.9	23.2	44.5	14.9	61.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	90.4	91.1	86.0	98.2	36.4	41.0	85.7	27.5	77.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>95.4</b>	<b>95.7</b>	<b>91.6</b>	<b>98.9</b>	<b>43.3</b>	<b>46.8</b>	<b>93.1</b>	<b>32.5</b>	<b>82.4</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	94.9	95.2	90.7	98.6	40.2	44.0	<b>93.1</b>	29.8	<b>81.3</b>
		MambaAD <a href="#">He et al. (2024a)</a>	94.5	94.9	90.2	98.4	39.3	43.7	92.1	29.5	80.8
Hybrid	UniAD <a href="#">You et al. (2022)</a>	89.0	91.0	85.8	98.3	34.5	39.6	86.5	26.4	76.7	
	RD++ <a href="#">Tien et al. (2023)</a>	93.9	94.7	90.2	98.4	42.3	46.3	91.9	31.2	81.3	
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	89.9	91.4	86.7	86.7	<b>46.6</b>	<b>47.2</b>	61.1	<b>32.7</b>	74.9	

Table A5: Benchmarked results on BTAD dataset [Mishra et al. \(2021\)](#) by the suggested metrics in Sec. 3.3.

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	71.3	78.5	78.0	49.0	3.7	6.5	16.2	3.4	47.4
		SimpleNet <a href="#">Liu et al. (2023)</a>	93.2	97.3	93.3	96.3	41.5	44.3	69.8	28.6	78.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	89.7	95.3	92.8	84.0	48.1	52.7	53.4	36.6	76.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	92.7	97.5	93.5	96.3	47.4	50.2	69.5	33.6	80.2
		PatchCore <a href="#">Roth et al. (2022)</a>	94.4	98.2	94.6	97.5	55.0	54.9	76.0	38.0	83.3
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.2	94.8	88.3	96.8	45.6	50.1	72.7	33.8	78.9
	Rec.	PyramidalFlow <a href="#">Lei et al. (2023)</a>	87.0	83.1	81.0	90.9	29.6	26.9	64.1	18.3	68.3
		RD <a href="#">Deng &amp; Li (2022)</a>	94.4	96.6	94.0	98.1	59.6	59.2	80.7	42.1	84.7
		DiAD <a href="#">He et al. (2024b)</a>	90.1	88.4	92.6	91.7	19.6	26.7	70.4	15.7	68.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	93.6	96.8	93.3	97.6	59.2	56.7	73.2	40.1	83.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	96.1	97.8	94.3	98.1	62.6	61.4	80.9	44.3	85.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.1	97.4	94.6	97.9	59.2	59.7	78.6	42.6	84.4
Hybrid	MambaAD <a href="#">He et al. (2024a)</a>	93.1	96.1	92.5	97.7	52.5	56.0	78.2	39.0	82.5	
	UniAD <a href="#">You et al. (2022)</a>	94.8	98.3	94.2	97.2	50.3	53.8	78.8	36.9	82.9	
	RD++ <a href="#">Tien et al. (2023)</a>	94.6	97.8	94.1	98.0	59.6	59.8	79.0	42.8	84.8	
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.8	95.9	92.3	92.2	34.8	44.3	70.0	29.0	77.0	

Table A6: Benchmarked results on MPDD dataset [Jezek et al. \(2021\)](#) by the suggested metrics in Sec. 3.3.

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	35.6	53.3	72.5	42.1	2.2	4.6	19.0	2.5	35.4
	SimpleNet <a href="#">Liu et al. (2023)</a>	88.4	92.0	87.9	96.5	32.0	34.6	89.0	24.5	76.2
	RealNet <a href="#">Zhang et al. (2024c)</a>	85.1	90.2	88.3	83.3	36.1	39.6	68.1	28.2	72.3
Emb.	CFA <a href="#">Lee et al. (2022)</a>	81.6	87.7	85.7	84.9	19.6	22.9	53.5	16.6	65.1
	PatchCore <a href="#">Roth et al. (2022)</a>	<b>94.6</b>	<b>96.9</b>	<b>93.4</b>	<b>98.9</b>	<b>46.1</b>	<b>47.6</b>	<b>95.7</b>	<b>35.0</b>	<b>83.5</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	75.7	80.1	81.7	96.8	26.3	28.0	89.5	20.1	69.7
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	73.6	77.0	79.4	94.1	21.1	17.8	77.2	10.4	64.6
Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	91.3	93.6	91.8	98.3	40.4	41.8	95.5	31.4	80.6
	DiAD <a href="#">He et al. (2024b)</a>	68.3	77.9	80.1	90.4	10.9	13.1	66.1	8.2	58.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>	87.8	90.5	88.0	97.7	35.2	37.4	92.8	27.7	77.3
	InvAD <a href="#">Zhang et al. (2024a)</a>	93.7	93.9	93.0	98.2	42.4	45.7	94.8	34.0	81.9
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	90.9	92.9	89.5	98.0	39.7	42.6	94.0	30.9	79.8
	MambaAD <a href="#">He et al. (2024a)</a>	88.7	93.2	90.8	97.5	33.6	38.1	92.3	26.8	78.1
	UniAD <a href="#">You et al. (2022)</a>	70.5	76.0	78.0	93.9	13.7	19.9	79.7	12.5	63.3
	RD++ <a href="#">Tien et al. (2023)</a>	90.2	93.3	90.5	98.5	43.0	44.1	95.5	33.6	80.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	91.3	90.8	90.2	82.0	32.6	34.6	63.3	25.6	71.9

Table A7: Benchmarked results on MAD Real dataset [Zhou et al. \(2024\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	59.1	<b>88.1</b>	90.4	49.4	0.6	1.7	22.3	0.8	48.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	47.8	81.9	90.7	83.1	5.4	11.6	59.8	6.3	56.7
		CFA <a href="#">Lee et al. (2022)</a>	49.3	81.7	91.4	83.3	10.5	15.2	64.2	8.7	58.7
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	59.7	84.8	93.5	<b>95.4</b>	<b>20.2</b>	<b>27.3</b>	<b>85.5</b>	<b>16.6</b>	<b>68.2</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	59.8	86.0	91.2	90.9	<u>10.7</u>	<u>15.4</u>	74.4	8.8	63.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.1	83.6	90.3	88.4	5.0	9.4	68.2	5.1	59.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	55.5	85.8	90.6	87.0	8.2	12.8	67.8	7.2	60.6
		DiAD <a href="#">He et al. (2024b)</a>	49.9	85.1	90.8	87.7	2.9	6.8	67.4	3.6	55.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	47.0	81.3	90.2	87.3	4.5	9.3	66.6	5.0	57.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>66.5</b>	<u>87.7</u>	<b>93.8</b>	88.3	<b>22.1</b>	<u>26.2</u>	73.2	<b>16.8</b>	67.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	60.4	84.3	92.2	88.2	9.0	14.3	72.9	8.1	62.5
		MambaAD <a href="#">He et al. (2024a)</a>	56.2	84.3	90.3	87.8	7.5	12.8	68.5	7.2	60.5
Hybrid	UniAD <a href="#">You et al. (2022)</a>	47.6	81.3	90.4	88.2	5.8	10.6	68.6	5.8	58.2	
	RD++ <a href="#">Tien et al. (2023)</a>	54.7	83.9	<u>92.3</u>	88.5	9.4	14.9	70.4	8.5	61.4	
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	45.4	80.3	<u>90.7</u>	72.7	5.0	8.2	48.3	4.5	52.8	

Table A8: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	49.5	88.3	93.8	48.4	0.8	1.5	24.5	0.7	48.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	58.9	91.7	93.8	85.5	4.2	8.0	63.9	4.2	60.9
		CFA <a href="#">Lee et al. (2022)</a>	56.4	91.1	93.8	76.6	4.2	8.7	54.7	4.6	58.2
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	55.8	90.6	93.8	86.9	3.4	5.2	63.9	2.7	60.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.8	88.9	93.8	82.0	2.3	4.8	58.8	2.5	57.4
		RD <a href="#">Deng &amp; Li (2022)</a>	58.6	91.7	93.8	88.3	4.7	8.5	74.2	4.5	62.6
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	65.7	93.3	94.1	87.2	3.9	7.9	60.1	4.2	58.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	58.5	91.5	93.8	89.0	5.0	9.5	73.5	5.0	62.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	70.4	94.6	93.9	90.5	8.8	15.7	79.3	8.6	67.4
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	64.7	93.3	93.8	89.4	6.4	11.2	76.1	6.0	64.9
		MambaAD <a href="#">He et al. (2024a)</a>	63.0	92.9	93.8	88.3	5.2	9.4	73.3	5.0	63.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	54.2	90.0	93.8	88.1	3.5	6.8	71.8	3.5	60.9
		RD++ <a href="#">Tien et al. (2023)</a>	59.3	91.7	93.8	88.3	4.6	8.5	73.8	4.4	62.7
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	57.9	91.8	93.8	54.5	6.2	7.7	35.8	4.1	53.6

Table A9: Benchmarked results on Uni-Medical dataset [Zhang et al. \(2023a\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.6	60.6	70.6	33.8	2.0	5.7	10.5	3.0	37.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	77.5	77.7	76.7	94.3	34.4	36.0	77.0	23.3	68.9
		CFA <a href="#">Lee et al. (2022)</a>	71.0	73.3	73.1	78.3	19.5	24.9	44.7	14.7	57.2
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.2	79.6	77.2	95.4	40.4	26.9	81.8	17.7	69.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	53.9	57.3	70.5	78.8	8.4	17.1	34.2	9.4	47.6
		RD <a href="#">Deng &amp; Li (2022)</a>	76.1	75.7	78.2	96.5	38.8	39.8	86.8	26.9	71.1
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	78.8	77.2	77.7	95.8	34.2	35.5	84.3	23.2	69.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	81.8	80.7	80.0	97.1	<b>48.3</b>	<b>48.2</b>	86.7	<b>33.7</b>	<b>75.5</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	82.4	80.5	80.5	<b>97.3</b>	46.2	46.1	<b>89.3</b>	32.6	<u>75.4</u>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	77.9	77.3	79.1	96.2	39.0	39.3	85.8	26.5	71.6
		MambaAD <a href="#">He et al. (2024a)</a>	<b>83.9</b>	<b>80.8</b>	<b>81.9</b>	96.8	45.8	47.5	88.2	33.5	<b>75.9</b>
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	79.0	76.1	77.1	96.6	39.3	41.1	86.0	27.6	71.6
		RD++ <a href="#">Tien et al. (2023)</a>	77.2	76.5	79.2	96.7	41.5	42.2	87.8	29.4	72.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	78.5	77.0	78.2	65.7	41.7	34.0	35.3	21.2	61.0

Table A10: Benchmarked results on Real-IAD dataset [Wang et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.9	45.9	61.3	44.0	0.2	0.4	13.6	0.2	33.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	54.9	50.6	61.5	76.1	1.9	4.9	42.4	2.5	43.5
		CFA <a href="#">Lee et al. (2022)</a>	55.7	50.5	61.9	81.3	1.6	3.8	48.8	2.0	45.0
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	77.0	75.8	69.9	94.8	17.6	21.7	80.4	12.4	63.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	54.4	48.0	62.0	71.1	1.2	1.1	34.9	0.5	40.9
		RD <a href="#">Deng &amp; Li (2022)</a>	82.7	79.3	74.1	97.2	25.2	32.8	90.0	20.0	70.0
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	75.6	66.4	69.9	88.0	2.9	7.1	58.1	3.7	52.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	82.7	80.2	73.7	97.2	24.3	32.3	84.8	19.6	69.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>89.4</b>	<b>87.0</b>	<b>80.2</b>	98.4	32.6	38.9	<b>92.7</b>	24.6	<b>75.6</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	87.2	85.2	77.8	98.0	31.7	37.9	92.0	23.8	74.2
		MambaAD <a href="#">He et al. (2024a)</a>	87.0	85.3	77.6	<b>98.6</b>	32.4	38.1	91.2	23.9	74.2
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	83.1	81.2	74.5	97.4	23.3	30.9	87.1	18.6	69.6
		RD++ <a href="#">Tien et al. (2023)</a>	83.6	80.6	74.8	97.7	25.9	33.6	90.7	20.5	<u>70.8</u>
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	79.3	76.7	70.7	80.3	<b>36.9</b>	<b>40.3</b>	56.1	<b>26.2</b>	64.5

Table A11: Benchmarked results on COCO-AD dataset [Zhang et al. \(2024a\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Avg	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.5	48.5	62.5	49.9	7.6	14.4	15.3	8.0	38.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	55.6	49.4	62.3	60.2	14.5	19.2	26.1	11.5	42.9
	CFA <a href="#">Lee et al. (2022)</a>	56.7	51.2	62.6	56.2	10.3	16.0	17.9	8.9	41.0
	Emb. CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	<b>67.7</b>	<b>57.9</b>	<b>64.5</b>	<b>76.0</b>	<b>20.3</b>	<b>26.4</b>	<b>47.7</b>	<b>16.0</b>	<b>53.0</b>
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	51.6	47.4	61.6	50.0	13.4	14.4	15.0	8.0	38.4
	RD <a href="#">Deng &amp; Li (2022)</a>	57.6	49.9	62.0	66.5	13.9	20.0	39.8	11.5	45.8
	DiAD <a href="#">He et al. (2024b)</a>	59.0	53.0	63.2	68.1	20.5	14.2	30.8	11.6	44.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>	66.9	<b>59.3</b>	63.7	<b>76.2</b>	<b>27.6</b>	<b>32.2</b>	39.1	<b>20.1</b>	<b>53.5</b>
	InvAD <a href="#">Zhang et al. (2024a)</a>	64.2	56.0	63.4	71.2	18.5	24.1	45.8	14.3	50.5
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	63.3	56.0	62.9	69.9	18.2	23.1	39.7	13.7	49.2
	MambaAD <a href="#">He et al. (2024a)</a>	62.8	55.2	62.8	68.9	16.7	22.0	41.6	12.9	48.8
	Hybrid UniAD <a href="#">You et al. (2022)</a>	55.2	49.3	61.7	64.6	12.8	19.0	34.3	10.9	44.0
	RD++ <a href="#">Tien et al. (2023)</a>	57.5	49.3	62.0	68.2	15.5	20.1	42.2	11.8	46.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	54.4	49.4	61.8	54.5	10.6	15.4	24.4	8.5	40.7

## B DETAILED QUANTITATIVE RESULTS ON ALL DATASET UNDER 300 EPOCHS

Table A12: Benchmarked results on MVTec AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	55.2	77.0	83.9	48.7	3.1	6.3	15.8	3.3	45.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	79.2	90.8	87.6	82.4	24.0	29.0	62.0	17.8	67.6
	RealNet <a href="#">Zhang et al. (2024c)</a>	82.9	93.3	90.9	69.8	50.0	40.4	51.2	28.5	70.9
Emb.	CFA <a href="#">Lee et al. (2022)</a>	55.8	78.8	84.5	43.9	4.8	8.9	19.3	4.7	46.1
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	92.7	97.2	94.0	95.8	46.8	49.6	89.0	34.0	82.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	66.2	84.3	85.1	74.2	17.2	19.6	40.0	11.4	58.1
Avg	RD Deng & Li (2022)	90.5	95.0	95.1	95.9	47.1	52.1	91.2	35.8	82.6
	DiAD He et al. (2024b)	92.0	96.8	94.4	89.3	27.3	32.7	64.4	21.3	71.0
	ViTAD Zhang et al. (2023a)	98.4	99.4	97.5	97.5	55.2	58.1	91.7	42.0	87.0
	InvAD Zhang et al. (2024a)	<b>98.9</b>	<b>99.6</b>	<b>98.2</b>	<b>98.1</b>	<b>57.1</b>	<b>59.6</b>	<b>94.4</b>	<b>43.1</b>	<b>88.1</b>
	InvAD-lite Zhang et al. (2024a)	98.1	99.1	96.8	97.3	55.0	58.1	93.1	41.7	86.9
	MambaAD He et al. (2024a)	98.5	99.5	97.7	97.6	56.1	58.7	93.6	42.3	87.5
	UniAD You et al. (2022)	96.8	98.9	97.0	96.8	45.0	50.2	91.0	34.2	84.2
Hybrid	RD++ Tien et al. (2023)	95.8	98.0	96.6	97.3	53.0	57.0	92.9	40.5	85.9
	DesTSeg Zhang et al. (2023c)	96.3	98.8	96.1	92.6	<b>75.8</b>	<b>71.3</b>	82.6	<b>56.6</b>	<b>88.8</b>

Table A13: Benchmarked results on MVTec 3D dataset [Bergmann et al. \(2022b\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	49.2	79.4	89.0	50.7	0.7	2.2	23.4	1.1	45.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	74.9	91.8	90.2	94.0	14.4	21.4	79.2	12.4	68.9
	CFA <a href="#">Lee et al. (2022)</a>	60.1	86.3	89.5	52.0	7.0	11.9	28.7	6.9	51.8
Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	74.8	91.4	90.5	96.9	21.6	26.8	89.2	15.9	72.1
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.5	80.8	88.6	87.2	5.9	10.4	68.0	5.6	58.4
	RD Deng & Li (2022)	79.3	93.0	92.3	98.3	28.6	35.4	93.5	22.1	76.1
Avg	DiAD He et al. (2024b)	78.8	91.3	91.7	91.8	5.2	10.5	75.1	5.6	63.5
	ViTAD Zhang et al. (2023a)	78.7	93.3	91.5	98.0	27.0	33.0	91.3	20.2	75.1
	InvAD Zhang et al. (2024a)	<b>86.3</b>	<b>95.9</b>	<b>93.4</b>	<b>98.7</b>	<b>36.2</b>	<b>41.1</b>	<b>94.9</b>	<b>26.4</b>	<b>79.8</b>
	InvAD-lite Zhang et al. (2024a)	85.1	95.6	92.3	98.4	34.4	39.0	93.4	24.6	78.7
	MambaAD He et al. (2024a)	85.8	95.5	92.6	98.6	37.1	40.8	94.1	26.0	79.5
	UniAD You et al. (2022)	77.0	92.6	91.0	96.8	23.7	30.6	89.4	18.6	73.5
	RD++ Tien et al. (2023)	80.1	93.5	92.2	98.4	31.5	37.2	93.6	23.4	76.9
Hybrid	DesTSeg Zhang et al. (2023c)	82.5	95.1	90.9	82.1	<b>43.8</b>	<b>45.2</b>	65.1	<b>30.2</b>	74.3

Table A14: Benchmarked results on MVTec LOCO dataset [Bergmann et al. \(2022a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.4	66.9	77.5	48.0	5.2	10.5	13.7	5.6	42.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	<b>81.8</b>	<b>89.1</b>	<b>82.5</b>	70.9	28.3	32.1	61.2	20.9	66.3
	CFA <a href="#">Lee et al. (2022)</a>	60.6	73.7	77.6	64.7	16.5	18.8	36.4	10.8	52.4
Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	76.0	85.0	79.9	70.9	25.6	28.4	70.0	17.7	64.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.1	70.4	77.4	55.5	16.8	14.4	20.4	8.1	47.7
	RD Deng & Li (2022)	73.7	84.6	79.4	70.7	21.0	26.2	67.5	15.9	62.8
Avg	DiAD He et al. (2024b)	77.2	84.6	81.5	72.1	18.6	25.3	54.4	15.2	59.1
	ViTAD Zhang et al. (2023a)	76.2	85.0	80.1	73.2	27.9	30.6	62.0	19.3	64.4
	InvAD Zhang et al. (2024a)	<b>82.3</b>	<b>89.9</b>	<b>82.4</b>	<b>77.7</b>	<b>30.9</b>	<b>34.1</b>	<b>72.8</b>	<b>22.4</b>	<b>69.4</b>
	InvAD-lite Zhang et al. (2024a)	78.0	86.8	81.6	77.0	28.0	32.0	69.4	20.4	66.9
	MambaAD He et al. (2024a)	78.2	87.1	81.8	77.5	28.0	32.9	68.6	20.8	67.1
	UniAD You et al. (2022)	78.7	87.1	80.9	74.6	<b>32.6</b>	<b>35.8</b>	70.7	<b>23.4</b>	67.8
	RD++ Tien et al. (2023)	75.7	85.9	79.3	72.1	24.2	28.5	67.9	17.8	64.2
Hybrid	DesTSeg Zhang et al. (2023c)	<b>81.2</b>	<b>88.6</b>	<b>81.8</b>	63.7	31.8	31.9	59.2	21.1	65.3

Table A15: Benchmarked results on VisA dataset [Zou et al. \(2022\)](#) by the suggested metrics in [Sec. 3.3](#).

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	56.2	64.6	74.9	45.0	0.7	1.8	16.0	0.9	40.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	80.7	83.8	79.3	94.4	29.2	33.1	74.2	22.1	69.5
		RealNet <a href="#">Zhang et al. (2024c)</a>	79.2	84.8	78.3	65.4	29.2	27.9	33.9	17.4	59.9
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	67.1	73.8	75.3	83.0	13.7	18.7	48.7	11.3	56.5
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	87.2	89.5	85.1	97.8	34.2	37.2	87.3	24.9	75.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	69.0	72.9	75.8	79.1	7.9	8.7	52.6	4.7	54.8
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	93.9	94.8	90.4	98.1	38.4	43.7	91.9	29.0	80.5
		DiAD <a href="#">He et al. (2024b)</a>	90.5	91.4	90.4	83.4	19.2	25.0	44.3	16.2	63.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	90.3	91.2	86.4	98.2	36.4	40.9	85.8	27.5	77.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>95.6</b>	<b>96.0</b>	<b>92.3</b>	<b>99.0</b>	<b>43.7</b>	<b>46.9</b>	<b>93.0</b>	<b>32.6</b>	<b>82.6</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	95.3	95.8	91.0	98.7	41.2	44.9	<b>93.2</b>	30.6	81.8
		MambaAD <a href="#">He et al. (2024a)</a>	93.6	93.9	89.8	98.2	34.0	39.3	90.5	25.9	79.0
Hybrid	UniAD <a href="#">You et al. (2022)</a>	91.4	93.3	87.5	98.5	35.3	40.2	89.0	26.5	78.2	
	RD++ <a href="#">Tien et al. (2023)</a>	93.1	94.1	90.0	98.4	40.4	44.8	91.4	29.9	80.6	
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	89.0	90.3	85.9	84.8	43.3	44.4	57.5	30.1	73.0	

Table A16: Benchmarked results on BTAD dataset [Mishra et al. \(2021\)](#) by the suggested metrics in [Sec. 3.3](#).

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	69.3	76.8	79.5	47.7	3.2	6.1	16.1	3.2	46.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	94.0	97.9	93.9	96.2	41.0	43.7	69.6	28.1	78.9
		RealNet <a href="#">Zhang et al. (2024c)</a>	93.1	96.3	92.5	87.2	48.0	55.5	57.9	38.7	78.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	92.7	97.8	94.6	96.2	46.7	49.7	69.0	33.2	80.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.6	95.6	89.7	96.9	46.0	49.0	72.7	33.0	79.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	85.3	81.7	79.0	76.1	27.7	23.4	43.1	15.0	62.3
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	94.1	96.8	93.8	<b>98.0</b>	57.1	58.0	<b>79.9</b>	41.0	<b>84.1</b>
		DiAD <a href="#">He et al. (2024b)</a>	90.2	88.3	92.6	91.9	20.5	27.0	70.3	16.0	68.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	94.0	97.0	93.7	97.6	58.3	56.5	72.8	39.9	83.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>95.3</b>	97.3	93.7	97.9	<b>58.7</b>	<b>58.8</b>	78.8	<b>41.7</b>	<b>84.5</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	94.2	97.9	94.4	97.7	55.7	57.0	77.4	40.0	83.7
		MambaAD <a href="#">He et al. (2024a)</a>	92.9	96.2	93.0	97.6	51.2	55.1	77.3	38.2	82.2
Hybrid	UniAD <a href="#">You et al. (2022)</a>	94.5	<b>98.4</b>	<b>94.9</b>	97.4	52.4	55.5	78.9	38.4	83.5	
	RD++ <a href="#">Tien et al. (2023)</a>	94.5	97.6	94.3	<b>98.0</b>	57.7	58.2	78.9	41.2	84.3	
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	93.5	96.7	93.8	94.8	39.1	38.5	72.9	24.6	78.0	

Table A17: Benchmarked results on MPDD dataset [Jezek et al. \(2021\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	60.2	67.5	75.1	50.4	5.4	4.7	21.8	2.6	44.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	90.6	94.1	89.7	97.1	33.6	35.7	90.0	25.6	77.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	86.0	90.0	87.3	74.7	39.2	39.7	52.3	28.0	69.6
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	92.0	93.5	90.2	95.7	29.0	33.0	83.2	23.8	76.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	80.4	85.1	84.7	97.3	28.4	30.1	90.9	21.5	72.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	72.5	76.2	77.6	89.0	12.4	15.8	68.5	9.1	60.9
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	90.3	92.8	90.5	98.3	39.6	40.6	95.2	30.2	79.8
		DiAD <a href="#">He et al. (2024b)</a>	85.8	89.2	86.5	91.4	15.3	19.2	66.1	12.0	64.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	87.4	90.8	87.0	97.8	34.6	37.8	92.9	28.0	77.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	96.0	97.1	94.5	98.5	44.1	46.4	95.3	34.4	83.5
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	92.8	93.2	91.4	98.3	41.4	43.9	94.6	32.1	81.0
		MambaAD <a href="#">He et al. (2024a)</a>	89.2	93.1	90.3	97.7	33.5	38.6	92.8	27.2	78.3
Hybrid	UniAD <a href="#">You et al. (2022)</a>	80.1	83.2	85.1	95.4	19.0	25.6	83.8	16.8	69.4	
	RD++ <a href="#">Tien et al. (2023)</a>	90.6	93.3	90.0	98.4	42.8	43.0	95.3	32.7	80.6	
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.6	91.8	92.8	90.8	30.6	32.9	78.3	24.1	75.3	

Table A18: Benchmarked results on MAD\_Real dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	46.3	82.5	90.2	42.5	0.5	1.2	14.9	0.6	43.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	36.1	77.0	89.6	77.2	2.6	6.3	48.9	3.3	50.7
		CFA <a href="#">Lee et al. (2022)</a>	48.5	81.2	91.4	83.3	10.4	15.0	64.1	8.6	58.5
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	57.4	85.9	91.2	90.9	10.8	15.3	74.1	8.8	63.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.6	82.9	90.5	88.6	7.5	12.0	68.8	6.7	59.4
		RD <a href="#">Deng &amp; Li (2022)</a>	56.0	84.9	90.7	86.9	8.7	13.2	66.9	7.4	60.6
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	58.0	85.7	91.1	87.8	5.1	9.6	69.4	5.2	58.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	44.5	81.3	90.2	86.9	4.5	8.9	65.0	4.8	56.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	63.5	86.5	92.7	91.6	18.9	24.2	77.2	14.9	66.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	57.3	84.8	91.9	90.8	11.4	16.3	74.7	9.5	63.1
		MambaAD <a href="#">He et al. (2024a)</a>	54.7	83.1	92.2	90.8	13.1	19.2	74.7	11.4	63.1
		UniAD <a href="#">You et al. (2022)</a>	45.4	80.3	90.8	87.8	6.4	11.6	68.3	6.4	57.8
Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	52.3	84.0	91.3	88.7	9.3	14.4	70.4	8.2	60.8	
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	36.1	77.9	89.8	82.5	3.2	6.0	52.7	3.2	52.0	



Table A19: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	48.8	88.1	93.8	47.9	0.7	1.5	20.0	47.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	51.5	88.6	93.8	86.1	2.3	4.5	63.9	58.6
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	55.7	91.1	93.8	71.8	3.7	7.7	45.3	56.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	56.9	90.9	93.8	86.9	3.4	5.1	63.7	60.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	49.0	88.1	93.8	84.4	2.4	5.0	62.7	57.8
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	57.9	91.3	93.8	88.3	4.4	8.2	73.7	62.3
		DiAD <a href="#">He et al. (2024b)</a>	65.6	93.4	<b>94.1</b>	87.7	4.4	8.8	61.4	59.4
		ViTAD <a href="#">Zhang et al. (2023a)</a>	59.0	91.4	93.8	89.0	4.8	9.3	73.6	62.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>70.4</b>	<b>94.5</b>	<b>94.0</b>	<b>90.7</b>	<b>8.9</b>	<b>15.3</b>	<b>79.1</b>	<b>67.4</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	65.3	93.4	93.9	89.7	6.6	11.4	76.4	65.1
		MambaAD <a href="#">He et al. (2024a)</a>	61.4	92.4	93.8	88.3	4.8	9.0	73.0	63.2
Hybrid	Hybrid	UniAD <a href="#">You et al. (2022)</a>	59.4	91.5	93.8	89.0	4.4	8.4	74.6	62.8
		RD++ <a href="#">Tien et al. (2023)</a>	58.6	91.7	93.8	88.3	4.4	8.1	73.2	62.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	59.2	91.9	93.8	56.8	5.7	8.6	41.8	54.9

Table A20: Benchmarked results on Uni-Medical dataset [Zhang et al. \(2023a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	58.5	63.2	71.7	32.5	2.0	6.1	9.1	38.4
		SimpleNet <a href="#">Liu et al. (2023)</a>	72.5	75.3	76.7	94.9	35.9	37.0	79.2	68.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	56.3	62.8	70.4	38.1	4.8	6.6	8.9	38.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.0	78.5	77.3	95.4	39.6	26.3	81.7	69.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	60.0	62.8	71.9	82.2	8.8	14.9	46.9	51.5
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	76.4	75.8	77.9	96.4	38.9	39.8	86.5	71.1
		DiAD <a href="#">He et al. (2024b)</a>	<b>82.9</b>	81.9	79.4	96.0	35.9	38.2	85.4	71.4
		ViTAD <a href="#">Zhang et al. (2023a)</a>	81.5	80.6	80.1	97.0	46.8	46.9	86.5	75.0
		InvAD <a href="#">Zhang et al. (2024a)</a>	81.3	80.0	79.9	<b>97.2</b>	45.4	45.5	<b>89.0</b>	74.8
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	77.6	77.2	79.3	96.2	38.7	39.7	85.7	71.6
		MambaAD <a href="#">He et al. (2024a)</a>	82.3	78.9	<b>81.3</b>	96.7	43.0	46.1	87.9	74.6
Hybrid	Hybrid	UniAD <a href="#">You et al. (2022)</a>	80.4	76.6	77.5	96.5	39.0	41.3	85.8	71.9
		RD++ <a href="#">Tien et al. (2023)</a>	77.2	76.1	78.5	96.7	41.0	41.9	87.4	72.0
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	82.0	<b>85.0</b>	79.7	83.2	<b>50.6</b>	<b>50.5</b>	66.1	72.4



## C DETAILED QUANTITATIVE RESULTS ON MVTEC AD DATASET UNDER 100 EPOCHS

Table A21: Benchmarked results on MVTEC AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
bottle	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	49.4	74.0	86.3	57.8	6.5	13.2	17.3	46.8
		SimpleNet <a href="#">Liu et al. (2023)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	97.4	57.3	65.9	89.1	88.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	95.6	98.8	95.1	69.8	53.9	46.6	60.9	77.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	64.2	87.4	86.3	65.3	11.0	15.1	35.5	8.2
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>98.9</b>	79.0	<b>77.1</b>	<b>96.1</b>	62.7
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.9	<b>100.</b>	99.2	97.4	61.8	63.6	91.9	46.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	77.1	93.1	86.3	77.7	16.9	23.9	40.9	13.6
		RD <a href="#">Deng &amp; Li (2022)</a>	40.6	77.5	86.3	93.4	29.6	48.5	80.4	32.0
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	97.7	99.1	99.2	93.5	45.7	49.5	76.0	32.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>98.8</b>	<b>79.9</b>	<b>75.8</b>	<b>94.9</b>	<b>61.0</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.6	75.2	73.6	<b>95.7</b>	58.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.4	75.2	73.5	<b>95.7</b>	58.1
		MambaAD <a href="#">He et al. (2024a)</a>	99.8	<b>100.</b>	99.2	98.7	<b>79.7</b>	75.7	<b>96.0</b>	60.9
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.4	<b>99.8</b>	<b>98.4</b>	98.1	73.5	70.7	<b>95.3</b>	54.7
		RD++ <a href="#">Tien et al. (2023)</a>	99.8	<b>99.9</b>	<b>98.4</b>	98.2	72.5	71.6	95.0	55.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	94.9	<b>87.2</b>	<b>81.1</b>	91.8	<b>68.3</b>
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.2	61.7	76.0	55.6	3.2	5.7	16.6	2.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	97.1	98.3	93.9	<b>96.6</b>	<b>48.5</b>	<b>55.0</b>	86.0	37.9
		RealNet <a href="#">Zhang et al. (2024c)</a>	70.0	83.0	76.0	61.5	23.5	25.9	33.3	14.9
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	50.3	59.9	76.3	52.8	3.7	7.5	22.3	3.9
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>99.8</b>	<b>99.9</b>	<b>99.5</b>	<b>97.7</b>	<b>51.6</b>	<b>55.2</b>	<b>93.6</b>	<b>38.1</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	89.6	93.7	86.0	89.8	27.3	33.3	78.0	20.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.2	73.7	76.0	82.8	19.0	16.4	41.6	8.9
		RD <a href="#">Deng &amp; Li (2022)</a>	81.9	88.7	81.4	84.0	26.6	34.4	77.3	20.8
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	88.5	94.3	88.9	90.7	27.0	33.3	63.9	20.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.8	<b>99.3</b>	<b>96.3</b>	96.3	43.6	46.8	<b>90.6</b>	30.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	97.9	98.7	95.1	<b>97.1</b>	46.7	50.8	<b>92.1</b>	34.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.0	98.2	94.0	90.9	39.4	47.5	87.7	31.2
		MambaAD <a href="#">He et al. (2024a)</a>	99.3	99.6	97.4	95.2	42.0	47.9	90.4	31.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	93.0	95.7	89.3	96.1	45.0	50.7	84.9	34.0
		RD++ <a href="#">Tien et al. (2023)</a>	93.7	96.3	91.3	93.2	37.7	45.1	86.8	29.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	97.5	98.7	94.6	95.2	<b>67.2</b>	<b>64.0</b>	85.1	<b>47.1</b>
capsule	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	58.0	86.3	90.5	48.3	0.8	1.8	14.8	0.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	85.4	96.7	92.7	98.1	36.9	46.8	87.1	30.6
		RealNet <a href="#">Zhang et al. (2024c)</a>	64.4	90.3	90.5	54.6	23.7	12.1	23.4	6.4
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	40.8	82.5	90.5	27.0	0.6	1.8	7.0	0.9
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>99.2</b>	<b>99.8</b>	<b>98.6</b>	<b>99.0</b>	<b>49.0</b>	<b>52.9</b>	<b>95.7</b>	<b>35.9</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	86.1	96.7	93.4	98.5	41.0	44.2	92.8	28.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.6	87.0	90.5	90.3	13.5	19.6	57.3	10.9
		RD <a href="#">Deng &amp; Li (2022)</a>	98.4	<b>99.7</b>	<b>96.9</b>	98.8	45.4	51.8	<b>96.1</b>	34.9
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	88.6	97.7	91.8	90.9	16.0	23.5	54.5	13.3
		ViTAD <a href="#">Zhang et al. (2023a)</a>	95.3	<b>99.0</b>	95.9	98.2	42.0	47.1	92.4	30.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	94.3	98.7	96.0	<b>98.9</b>	46.7	50.8	95.5	34.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.9	98.6	94.8	98.4	42.2	47.4	94.4	31.1
		MambaAD <a href="#">He et al. (2024a)</a>	91.8	98.2	93.2	98.3	43.5	47.8	93.0	31.4
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	69.8	90.4	91.6	97.5	32.6	36.9	86.9	22.6
		RD++ <a href="#">Tien et al. (2023)</a>	98.3	<b>99.7</b>	<b>97.3</b>	<b>99.0</b>	<b>47.1</b>	<b>52.1</b>	<b>96.3</b>	<b>35.3</b>
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	90.3	97.6	94.6	89.3	<b>56.4</b>	<b>58.1</b>	60.6	<b>41.0</b>
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	66.7	87.4	87.0	51.9	1.7	3.2	16.6	1.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	97.1	99.1	94.6	97.7	42.8	46.9	90.0	30.6
		RealNet <a href="#">Zhang et al. (2024c)</a>	96.5	99.1	96.0	89.2	<b>69.0</b>	<b>64.3</b>	84.0	47.4
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	47.5	78.0	86.4	50.9	7.0	11.4	31.9	6.1
		PatchCore <a href="#">Roth et al. (2022)</a>	98.4	99.5	<b>97.8</b>	99.1	<b>66.4</b>	<b>64.6</b>	95.2	47.7
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.2	<b>99.8</b>	97.2	98.8	55.9	59.4	94.3	42.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	44.6	73.5	86.4	79.2	8.5	15.1	52.3	8.2
		RD <a href="#">Deng &amp; Li (2022)</a>	99.0	<b>99.7</b>	<b>98.3</b>	<b>99.1</b>	59.8	61.1	95.8	44.0
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	64.5	87.8	86.4	87.9	17.0	26.5	67.0	15.3
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.5	<b>99.9</b>	<b>99.4</b>	99.0	59.8	64.1	94.7	47.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	98.6	99.6	97.2	<b>99.1</b>	60.8	62.1	95.8	45.1
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>99.8</b>	<b>99.9</b>	<b>99.4</b>	<b>99.1</b>	58.0	61.4	96.4	44.3
		MambaAD <a href="#">He et al. (2024a)</a>	<b>99.8</b>	<b>99.9</b>	<b>99.4</b>	<b>99.2</b>	64.0	63.8	<b>97.3</b>	46.8
carpet	Hybrid	UniAD <a href="#">You et al. (2022)</a>	<b>99.8</b>	<b>99.9</b>	<b>99.4</b>	98.5	53.6	55.6	<b>95.9</b>	38.5
		RD++ <a href="#">Tien et al. (2023)</a>	97.6	99.3	96.0	98.9	57.2	58.5	94.8	41.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	95.9	98.7	95.0	95.7	<b>68.7</b>	<b>64.9</b>	93.4	<b>48.0</b>

Table A22: Benchmarked results on MVTec AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
grid	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	47.3	72.2	84.4	46.4	0.6	1.4	13.5	0.7	41.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	98.2	99.5	98.2	96.9	26.4	33.0	88.3	19.7	79.9
		RealNet <a href="#">Zhang et al. (2024c)</a>	97.2	99.2	96.4	82.6	41.2	45.7	77.7	29.7	79.7
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	51.1	76.4	84.4	39.9	0.5	1.4	5.2	0.7	41.2
		PatchCore <a href="#">Roth et al. (2022)</a>	99.4	99.8	98.2	98.9	40.8	44.3	94.0	28.4	84.3
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	86.7	95.5	88.0	92.9	18.2	25.1	81.0	14.4	72.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	75.5	89.9	85.1	85.7	9.8	16.6	66.9	9.0	64.1
		RD <a href="#">Deng &amp; Li (2022)</a>	98.7	99.6	97.4	99.2	47.6	48.8	97.5	32.3	85.9
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	99.0	99.7	98.2	85.7	4.0	9.5	56.7	5.0	64.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.6	99.9	99.1	98.6	31.3	36.5	95.8	22.3	82.5
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.5	99.8	97.4	99.1	45.1	46.6	97.1	30.4	85.4
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.2	49.4	49.5	97.7	32.9	87.0
		MambaAD <a href="#">He et al. (2024a)</a>	99.8	99.9	99.1	98.9	48.4	48.5	96.9	32.0	86.4
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.0	99.7	98.2	94.8	26.6	34.0	89.3	20.5	80.1
		RD++ <a href="#">Tien et al. (2023)</a>	99.2	99.7	97.3	99.2	46.8	50.2	97.0	33.5	86.0
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.6	99.9	98.2	96.6	47.7	52.0	91.9	35.1	85.6
hazelnut	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	45.7	68.1	77.8	41.1	3.6	4.2	12.4	2.1	39.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	100.	100.	100.	98.1	49.0	52.4	93.9	35.5	86.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	100.	100.	100.	77.5	44.2	48.9	75.4	32.4	80.8
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	51.8	67.7	78.0	45.7	4.5	8.3	17.3	4.3	42.4
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	100.	99.0	61.2	63.6	96.2	46.6	90.0
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.9	100.	99.3	98.5	59.1	57.9	95.6	40.7	88.8
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	92.1	95.0	91.2	92.7	33.2	36.9	84.2	22.6	77.3
		RD <a href="#">Deng &amp; Li (2022)</a>	100.	100.	100.	98.7	58.6	59.6	96.5	42.5	89.2
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	96.9	98.6	96.3	95.3	27.2	36.9	91.3	22.6	76.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	100.	100.	100.	99.0	64.8	64.3	95.6	47.4	90.5
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.0	61.8	62.6	96.6	45.5	90.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.7	99.8	99.3	98.9	58.4	63.0	95.7	46.0	89.3
		MambaAD <a href="#">He et al. (2024a)</a>	100.	100.	100.	99.1	67.0	66.1	95.3	49.4	90.9
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.6	99.8	98.6	98.0	53.0	53.9	93.7	36.9	87.0
		RD++ <a href="#">Tien et al. (2023)</a>	94.8	96.2	92.0	98.8	59.1	58.7	96.4	41.6	86.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.6	99.8	98.6	96.8	84.7	80.2	92.9	66.9	94.0
leather	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.2	81.4	85.2	45.4	1.1	2.9	16.3	1.5	44.8
		SimpleNet <a href="#">Liu et al. (2023)</a>	100.	100.	100.	98.5	27.8	33.9	95.5	20.4	82.0
		RealNet <a href="#">Zhang et al. (2024c)</a>	100.	100.	100.	97.9	70.4	68.0	98.0	51.5	91.8
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	62.2	82.7	87.8	65.4	7.7	14.8	40.7	8.0	54.9
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	100.	99.4	52.1	51.2	97.8	34.5	87.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	100.	100.	100.	99.2	45.0	46.1	98.1	30.0	86.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	67.2	77.3	89.9	87.7	6.4	15.2	74.0	8.2	62.0
		RD <a href="#">Deng &amp; Li (2022)</a>	100.	100.	100.	99.3	39.1	46.6	97.9	30.4	85.4
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	97.6	99.1	95.8	90.6	5.9	11.9	68.3	6.3	67.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	100.	100.	100.	99.5	51.1	55.8	98.0	38.7	88.0
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.5	54.3	54.3	98.1	37.3	88.3
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.3	45.6	47.4	98.5	31.0	86.3
		MambaAD <a href="#">He et al. (2024a)</a>	100.	100.	100.	99.3	50.6	50.4	98.7	33.7	87.4
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	100.	100.	100.	99.1	41.1	43.5	98.3	27.8	85.2
		RD++ <a href="#">Tien et al. (2023)</a>	100.	100.	100.	99.3	40.4	47.1	97.5	30.8	85.5
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	100.	100.	100.	99.3	79.6	71.9	98.4	56.2	93.7
metal_nut	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	58.1	82.5	89.4	38.8	8.9	21.3	11.0	11.9	48.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	99.0	99.8	97.8	97.7	82.2	79.2	87.6	65.6	92.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	78.6	94.7	89.4	52.5	32.3	21.0	39.6	11.7	62.0
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	78.3	94.4	89.9	71.4	37.4	36.5	30.1	22.4	65.7
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	100.	98.8	88.9	85.8	95.6	75.1	96.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	96.9	99.3	96.2	96.0	71.2	71.7	88.5	55.8	89.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	63.0	89.9	90.2	81.6	41.9	45.8	37.3	29.7	66.3
		RD <a href="#">Deng &amp; Li (2022)</a>	99.9	100.	99.5	93.9	62.8	64.7	92.0	47.9	89.1
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	88.1	97.4	89.9	94.5	74.0	72.7	53.5	57.2	81.4
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.7	99.9	98.9	96.1	74.0	75.7	93.0	60.9	92.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	97.4	79.0	81.2	93.1	68.4	93.8
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.8	100.	98.9	97.2	78.3	79.5	93.8	66.0	93.4
		MambaAD <a href="#">He et al. (2024a)</a>	99.7	99.9	98.4	96.7	74.2	78.3	92.9	64.4	92.4
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	98.0	99.5	98.4	93.4	55.0	67.2	80.8	50.6	86.4
		RD++ <a href="#">Tien et al. (2023)</a>	100.	100.	100.	96.7	74.7	78.4	94.1	64.5	93.0
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.8	100.	98.9	95.8	88.2	82.5	94.8	70.2	94.9

Table A23: Benchmarked results on MVTec AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
pill	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	57.1	87.5	92.1	34.8	2.0	6.6	4.4	45.4
		SimpleNet <a href="#">Liu et al. (2023)</a>	90.6	98.1	94.2	96.7	74.7	70.6	85.3	88.1
		RealNet <a href="#">Zhang et al. (2024c)</a>	68.5	92.8	91.6	54.4	47.8	8.9	35.1	60.4
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	71.3	93.4	92.2	88.7	66.4	63.7	42.1	46.8
		PatchCore <a href="#">Roth et al. (2022)</a>	97.0	99.4	96.5	98.1	76.8	74.0	96.1	91.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	84.3	96.5	93.2	96.7	59.5	56.3	90.5	39.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	67.0	92.8	91.6	83.3	18.3	26.0	65.2	14.9
		RD <a href="#">Deng &amp; Li (2022)</a>	97.2	99.5	96.8	97.4	63.0	64.8	96.1	47.9
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	94.7	98.9	97.2	92.8	49.1	49.7	65.2	33.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	96.9	99.5	96.1	<b>98.7</b>	77.7	<b>75.0</b>	95.5	<b>59.9</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>98.6</b>	<b>99.8</b>	<b>97.5</b>	97.9	67.7	68.7	<b>96.6</b>	52.3
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.3	99.4	95.4	97.6	65.4	67.9	<u>96.4</u>	51.4
		MambaAD <a href="#">He et al. (2024a)</a>	94.7	99.0	96.5	96.2	55.0	58.9	95.2	41.7
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	75.1	94.3	91.6	90.0	21.4	28.6	89.2	16.7
		RD++ <a href="#">Tien et al. (2023)</a>	98.0	99.6	<b>97.5</b>	98.2	72.7	70.3	96.4	54.2
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.7	98.6	94.8	90.1	<b>78.7</b>	73.9	70.2	58.6
screw	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	48.4	71.5	85.3	41.4	0.2	0.5	9.3	0.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	77.5	90.6	86.7	95.8	15.8	23.8	83.1	13.5
		RealNet <a href="#">Zhang et al. (2024c)</a>	71.3	86.6	87.0	51.8	15.4	4.5	18.5	2.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	62.4	78.6	88.5	26.5	0.2	0.7	9.9	0.3
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>98.3</b>	<b>99.4</b>	<b>97.1</b>	<b>99.5</b>	41.5	44.6	97.2	28.7
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.4	85.1	85.3	96.5	13.6	18.5	87.7	10.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	63.7	78.7	87.0	71.4	0.9	2.1	21.5	1.0
		RD <a href="#">Deng &amp; Li (2022)</a>	97.8	<u>99.3</u>	<u>96.3</u>	<u>99.4</u>	42.3	<u>47.3</u>	97.1	31.0
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	63.2	82.8	86.9	86.3	3.3	9.2	57.4	4.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	91.6	97.2	91.4	98.9	32.3	39.9	93.6	24.9
		InvAD <a href="#">Zhang et al. (2024a)</a>	91.7	95.1	<u>96.0</u>	<b>99.5</b>	44.0	46.4	<u>97.6</u>	30.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.0	97.4	93.6	99.4	47.2	48.9	<u>97.5</u>	32.4
		MambaAD <a href="#">He et al. (2024a)</a>	92.7	96.8	94.0	<u>99.3</u>	45.3	45.1	<u>97.0</u>	29.1
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	88.4	94.4	92.3	98.2	19.2	28.4	90.9	16.5
		RD++ <a href="#">Tien et al. (2023)</a>	97.5	99.2	95.8	<b>99.5</b>	<u>45.5</u>	<u>48.9</u>	<b>97.7</b>	32.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	86.1	95.2	88.6	76.2	<b>52.1</b>	<b>50.0</b>	53.3	<b>33.3</b>
tile	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	68.0	84.7	84.0	48.2	6.3	13.3	14.0	7.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	<b>100.</b>	<b>100.</b>	99.4	95.4	<u>59.1</u>	60.4	82.5	43.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	97.5	99.3	97.6	93.9	<u>84.1</u>	<u>76.8</u>	<u>90.5</u>	<u>62.3</u>
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	46.0	74.5	83.6	40.3	8.5	13.2	16.6	7.0
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	99.4	96.4	58.7	67.1	86.6	50.5
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.8	99.9	99.4	96.0	56.0	62.1	86.5	45.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	78.6	92.2	83.6	75.7	55.1	28.1	34.4	16.3
		RD <a href="#">Deng &amp; Li (2022)</a>	99.0	<u>99.6</u>	97.0	95.3	48.7	61.0	86.3	43.9
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	93.4	96.6	95.1	76.1	24.1	32.9	49.7	19.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<u>96.7</u>	56.6	<u>69.0</u>	88.7	52.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	95.8	49.8	62.4	88.3	45.4
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	98.0	99.2	96.5	93.9	44.9	54.5	80.1	37.4
		MambaAD <a href="#">He et al. (2024a)</a>	96.8	98.8	93.8	93.0	43.9	52.6	79.5	35.7
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	96.7	98.8	95.8	89.2	38.9	47.5	77.6	31.1
		RD++ <a href="#">Tien et al. (2023)</a>	<b>100.</b>	<b>100.</b>	99.4	96.7	56.8	66.4	89.8	49.7
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.7	99.9	<u>98.2</u>	<b>97.5</b>	<b>89.4</b>	<b>81.9</b>	<b>95.7</b>	<b>69.4</b>
toothbrush	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	44.2	72.8	83.3	46.8	1.4	3.1	14.5	1.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	89.4	95.8	90.9	98.0	53.6	55.9	80.6	38.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	76.4	91.5	83.3	84.8	50.1	56.1	34.1	39.0
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	61.4	72.0	87.9	69.6	3.3	8.5	43.8	4.4
		PatchCore <a href="#">Roth et al. (2022)</a>	91.9	96.2	<u>95.2</u>	99.0	<u>54.8</u>	58.5	91.0	41.3
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	84.4	94.5	86.2	98.2	45.7	47.1	84.5	30.8
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	89.4	95.7	90.6	73.0	42.3	31.3	23.2	18.6
		RD <a href="#">Deng &amp; Li (2022)</a>	98.3	99.4	96.6	98.9	51.8	57.7	<b>92.6</b>	40.5
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	95.3	98.1	<u>95.2</u>	89.6	11.0	17.5	65.3	9.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	<b>98.6</b>	<b>99.5</b>	<b>96.8</b>	<b>99.1</b>	51.8	<u>62.2</u>	91.3	<u>45.1</u>
		InvAD <a href="#">Zhang et al. (2024a)</a>	93.9	97.4	<u>95.2</u>	99.0	50.6	59.7	91.6	42.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.8	99.1	<u>95.2</u>	98.9	48.1	59.1	91.9	41.9
		MambaAD <a href="#">He et al. (2024a)</a>	96.4	98.5	<b>96.8</b>	98.9	47.5	59.7	92.0	42.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	83.9	93.1	90.9	98.4	39.7	49.9	85.8	33.3
		RD++ <a href="#">Tien et al. (2023)</a>	95.8	98.3	95.1	<b>99.1</b>	<u>57.3</u>	<u>61.8</u>	<u>92.2</u>	44.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	91.7	96.5	<u>95.2</u>	95.6	<b>60.6</b>	<b>72.1</b>	65.5	<b>56.4</b>

Table A24: Benchmarked results on MVTec AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
transistor	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.8	44.1	57.1	51.7	4.6	9.3	17.8	4.9	36.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	97.8	96.6	91.6	95.4	60.4	57.6	82.5	40.4	84.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	79.7	83.0	73.3	60.9	40.2	28.3	44.6	16.5	61.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	68.9	64.8	63.4	60.5	17.6	20.4	22.0	11.3	47.9
		PatchCore <a href="#">Roth et al. (2022)</a>	99.8	99.7	97.5	96.0	62.3	59.2	90.8	42.0	88.0
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	90.5	91.4	84.2	84.8	38.3	39.0	73.0	24.2	73.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.8	53.8	57.1	75.9	13.2	19.5	26.1	10.8	43.8
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	94.2	94.8	89.5	85.1	41.8	44.7	74.5	28.8	77.2
		DiAD <a href="#">He et al. (2024b)</a>	99.0	98.1	97.5	97.8	71.8	67.6	85.7	51.1	88.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	97.7	96.7	91.6	93.6	57.5	54.3	76.6	37.3	82.9
		InvAD <a href="#">Zhang et al. (2024a)</a>	97.8	96.8	92.7	95.7	62.0	59.7	91.9	42.6	86.5
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	98.2	97.4	92.3	95.0	61.0	58.9	88.3	41.8	85.9
		MambaAD <a href="#">He et al. (2024a)</a>	99.9	99.8	98.7	96.0	63.8	61.6	90.4	44.5	88.7
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.3	98.9	97.6	97.3	66.8	66.4	92.2	49.7	89.6
		RD++ <a href="#">Tien et al. (2023)</a>	95.2	95.0	89.5	89.3	47.7	49.0	77.9	32.4	79.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	96.9	96.2	89.5	73.9	54.1	50.5	76.6	33.8	79.0
wood	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	74.3	90.2	87.2	49.7	4.4	7.5	14.6	3.9	51.5
		SimpleNet <a href="#">Liu et al. (2023)</a>	99.5	99.8	98.3	92.5	40.3	42.4	80.0	26.9	81.5
		RealNet <a href="#">Zhang et al. (2024c)</a>	99.6	99.9	99.2	90.4	76.1	71.9	88.8	56.1	90.7
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	72.5	90.1	87.0	54.4	6.8	9.3	31.6	4.9	54.4
		PatchCore <a href="#">Roth et al. (2022)</a>	98.7	99.6	96.7	95.2	52.1	52.3	91.3	35.4	85.5
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	98.4	99.5	96.6	94.2	45.7	49.8	90.2	33.1	84.1
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	86.7	95.5	88.5	62.6	39.5	17.9	32.3	9.8	64.2
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	99.6	99.9	98.3	95.5	49.7	51.6	91.7	34.8	85.7
		DiAD <a href="#">He et al. (2024b)</a>	94.3	97.8	94.3	82.8	15.1	22.2	57.5	12.5	66.3
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.8	99.6	96.7	96.3	61.3	59.2	89.3	42.0	87.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.2	99.8	98.3	95.3	51.3	52.1	91.7	35.2	85.8
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.9	99.0	95.9	94.4	44.8	47.6	89.1	31.2	83.1
		MambaAD <a href="#">He et al. (2024a)</a>	98.5	99.5	96.0	94.0	46.9	48.4	92.0	32.0	84.2
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	98.2	99.5	96.6	93.1	40.6	45.1	89.5	29.1	82.6
		RD++ <a href="#">Tien et al. (2023)</a>	98.9	99.7	97.5	95.6	52.2	52.4	91.0	35.5	85.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	98.6	99.5	97.6	93.2	79.5	72.5	95.0	56.8	91.8
zipper	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	44.4	79.9	88.1	55.4	2.7	6.1	20.7	3.2	46.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	99.1	99.8	97.5	97.9	57.8	55.4	91.9	38.3	87.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	77.3	94.1	88.1	67.6	51.9	42.6	47.7	27.1	69.5
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	34.8	72.3	88.1	64.4	3.2	7.5	23.4	3.9	44.8
		PatchCore <a href="#">Roth et al. (2022)</a>	99.6	99.9	98.7	98.9	63.4	64.6	96.4	47.8	90.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	95.6	98.5	96.7	97.9	50.2	54.8	92.4	37.7	85.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	83.3	95.1	89.1	81.0	15.4	16.3	55.7	8.9	65.6
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	99.5	99.9	99.2	98.5	56.0	61.0	95.5	43.8	88.6
		DiAD <a href="#">He et al. (2024b)</a>	73.5	90.3	90.0	84.4	14.3	24.0	56.7	13.7	61.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	97.5	99.2	97.0	95.9	44.1	50.1	89.5	33.4	83.9
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.4	99.8	98.3	98.2	50.2	57.7	94.5	40.5	87.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.5	99.3	96.7	98.6	58.4	61.4	95.8	44.3	88.2
		MambaAD <a href="#">He et al. (2024a)</a>	98.2	99.5	96.7	98.1	55.0	58.9	94.5	41.7	87.4
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	86.9	95.5	92.8	95.8	33.5	41.0	88.7	25.8	78.2
		RD++ <a href="#">Tien et al. (2023)</a>	99.3	99.8	98.7	98.4	53.5	59.2	94.8	42.1	87.9
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	97.6	99.0	98.3	90.6	71.9	66.9	86.2	50.3	88.6
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.5	76.3	83.6	47.6	3.2	6.7	14.3	3.5	44.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	95.4	98.3	95.7	96.8	48.8	51.9	86.9	36.4	83.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	84.8	94.1	90.9	72.6	48.2	41.4	56.8	28.8	72.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	57.6	78.3	84.7	54.8	11.9	14.7	25.3	8.9	50.1
		PatchCore <a href="#">Roth et al. (2022)</a>	98.8	99.5	98.4	98.3	59.9	61.0	94.2	44.9	88.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.6	96.7	93.4	95.7	45.9	48.6	88.3	33.2	81.8
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	70.2	85.5	85.5	80.0	22.3	22.0	47.5	12.8	61.7
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	93.6	97.2	95.6	95.8	48.2	53.6	91.2	37.0	83.8
		DiAD <a href="#">He et al. (2024b)</a>	88.9	95.8	93.5	89.3	27.0	32.5	63.9	21.1	70.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.3	99.3	97.3	97.6	55.2	58.4	92.0	42.3	87.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	98.1	99.0	97.6	98.0	56.3	59.2	94.4	42.8	87.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.9	99.2	96.8	97.3	54.4	57.8	93.3	41.4	86.8
		MambaAD <a href="#">He et al. (2024a)</a>	97.8	99.3	97.3	97.4	55.1	57.6	93.4	41.2	87.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	92.5	97.3	95.4	95.8	42.7	48.0	89.3	32.5	82.0
		RD++ <a href="#">Tien et al. (2023)</a>	97.9	98.8	96.4	97.3	54.7	58.0	93.2	41.5	86.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	96.4	98.6	96.2	92.0	71.1	68.2	83.4	52.8	87.9

## D DETAILED QUANTITATIVE RESULTS ON MVTEC 3D DATASET UNDER 100 EPOCHS

Table A25: Benchmarked results on MVTEC 3D dataset [Bergmann et al. \(2022b\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
bagel	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.3	84.7	88.9	53.5	2.5	6.3	32.2	3.3	49.8
	SimpleNet <a href="#">Liu et al. (2023)</a>	79.5	94.8	88.9	95.2	20.0	29.3	71.1	17.1	70.8
	Emb. CFA <a href="#">Lee et al. (2022)</a>	82.6	95.6	89.3	84.3	19.1	30.6	48.8	18.1	67.4
	PatchCore <a href="#">Roth et al. (2022)</a>	91.8	98.0	92.9	98.8	43.7	46.8	93.3	30.5	82.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	78.8	94.2	89.3	98.3	31.3	38.9	89.7	24.2	76.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.5	84.4	88.9	94.3	5.3	11.5	79.3	6.1	61.1
	Rec. RD Deng & Li (2022)	86.2	96.5	90.5	98.7	40.2	44.5	92.2	28.6	80.0
	DiAD He et al. (2024b)	75.8	93.5	90.5	89.7	4.3	10.1	66.4	5.3	61.5
	ViTAD Zhang et al. (2023a)	92.1	98.0	93.4	98.7	40.3	44.2	92.4	28.4	81.7
	InvAD Zhang et al. (2024a)	95.3	<b>98.8</b>	<b>94.6</b>	<b>99.1</b>	45.4	49.6	<b>95.0</b>	<b>33.0</b>	<b>84.3</b>
	InvAD-lite Zhang et al. (2024a)	87.8	97.0	90.9	98.6	41.9	45.6	92.1	29.5	80.7
	MambaAD He et al. (2024a)	93.4	98.3	93.3	98.7	41.0	45.3	94.6	29.3	82.5
	Hybrid UniAD You et al. (2022)	88.3	97.2	90.3	98.1	35.5	40.3	91.3	25.2	79.1
	RD++ Tien et al. (2023)	87.2	96.6	91.5	98.7	39.5	46.9	92.5	30.7	80.6
	DesTSeg Zhang et al. (2023c)	<b>95.4</b>	<b>98.8</b>	94.5	94.6	<b>63.2</b>	<b>60.2</b>	86.3	<b>43.1</b>	<b>86.2</b>
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	61.1	85.0	89.7	40.1	0.3	0.5	15.7	0.3	46.4
	SimpleNet <a href="#">Liu et al. (2023)</a>	75.8	92.5	91.1	96.3	15.6	23.9	87.9	13.6	71.2
cable gland	Emb. CFA <a href="#">Lee et al. (2022)</a>	61.2	87.5	89.2	71.0	1.8	4.6	38.7	2.4	54.2
	PatchCore <a href="#">Roth et al. (2022)</a>	96.4	99.0	96.1	99.5	37.3	43.6	98.3	27.9	83.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	69.7	90.2	90.1	96.7	9.4	16.2	90.0	8.8	68.2
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	64.4	88.9	89.7	87.6	1.3	2.9	62.9	1.5	59.8
	Rec. RD Deng & Li (2022)	91.2	97.5	95.0	99.5	39.7	44.8	98.5	28.9	82.6
	DiAD He et al. (2024b)	88.0	97.1	92.6	95.0	4.6	10.1	84.2	5.3	67.4
	ViTAD Zhang et al. (2023a)	84.5	94.2	92.1	98.7	22.6	31.4	95.7	18.6	76.2
	InvAD Zhang et al. (2024a)	<b>96.6</b>	<b>99.1</b>	<b>96.6</b>	<b>99.6</b>	40.6	47.1	<b>98.8</b>	30.8	<b>84.5</b>
	InvAD-lite Zhang et al. (2024a)	93.7	98.5	96.0	99.4	41.1	46.9	98.5	30.6	<b>83.8</b>
	MambaAD He et al. (2024a)	91.1	97.8	93.6	99.3	38.8	44.6	98.2	28.7	82.2
	Hybrid UniAD You et al. (2022)	73.3	91.0	89.8	97.1	14.2	22.0	91.7	12.4	70.5
	RD++ Tien et al. (2023)	<b>96.6</b>	<b>99.1</b>	96.0	<b>99.6</b>	46.1	49.3	98.7	32.7	<b>85.3</b>
	DesTSeg Zhang et al. (2023c)	89.9	97.5	92.9	89.9	<b>47.8</b>	<b>52.3</b>	85.3	<b>35.4</b>	81.1
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.8	83.6	90.7	56.2	0.6	0.9	35.4	0.5	49.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	82.4	96.1	92.5	98.1	13.3	20.6	92.6	11.5	73.2
	Emb. CFA <a href="#">Lee et al. (2022)</a>	58.6	88.6	91.0	83.1	3.0	9.4	54.0	5.0	58.4
	PatchCore <a href="#">Roth et al. (2022)</a>	<b>95.2</b>	<b>99.0</b>	95.6	<b>99.4</b>	25.9	30.8	97.7	18.2	<b>80.0</b>
carrot	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	85.2	96.8	92.3	98.9	20.0	27.2	96.0	15.7	76.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	59.9	87.4	90.7	97.8	13.0	18.8	92.5	10.4	67.4
	Rec. RD Deng & Li (2022)	85.4	96.2	92.5	<b>99.4</b>	27.9	33.8	97.7	20.4	78.0
	DiAD He et al. (2024b)	93.4	98.3	<b>98.1</b>	97.6	6.2	11.2	91.1	5.9	70.8
	ViTAD Zhang et al. (2023a)	77.4	93.0	92.2	98.8	19.3	25.9	95.9	14.8	73.8
	InvAD Zhang et al. (2024a)	90.5	97.6	94.5	99.3	24.9	30.1	97.6	17.7	78.6
	InvAD-lite Zhang et al. (2024a)	87.7	96.9	94.6	<b>99.4</b>	27.6	32.7	<b>98.0</b>	19.5	78.7
	MambaAD He et al. (2024a)	90.1	97.7	93.9	99.3	29.0	32.7	97.9	19.6	79.3
	Hybrid UniAD You et al. (2022)	75.0	93.8	91.4	98.2	15.6	22.8	94.2	12.9	72.2
	RD++ Tien et al. (2023)	89.3	97.2	93.9	<b>99.4</b>	28.2	<b>34.0</b>	97.7	<b>20.5</b>	79.1
	DesTSeg Zhang et al. (2023c)	78.2	93.7	91.3	67.6	<b>30.4</b>	33.4	46.1	20.0	66.1
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	<b>80.6</b>	<b>93.4</b>	<b>91.1</b>	47.3	1.7	5.2	20.5	2.7	53.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	66.9	89.0	88.0	92.5	27.2	34.6	71.5	21.0	68.9
	Emb. CFA <a href="#">Lee et al. (2022)</a>	61.2	86.8	88.4	72.4	19.4	27.6	38.3	16.0	59.1
	PatchCore <a href="#">Roth et al. (2022)</a>	71.0	91.6	88.0	98.0	<b>52.4</b>	<b>50.2</b>	<b>92.5</b>	<b>33.5</b>	<b>78.4</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	46.3	78.0	88.4	96.9	30.3	32.6	89.2	19.5	66.6
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	23.4	67.8	88.0	88.8	7.1	11.9	70.8	6.3	52.2
cookie	Rec. RD Deng & Li (2022)	50.2	80.1	88.0	96.7	28.1	33.2	87.4	19.9	67.1
	DiAD He et al. (2024b)	52.6	84.7	88.0	87.2	5.6	10.5	67.2	5.5	56.6
	ViTAD Zhang et al. (2023a)	70.7	90.9	88.2	97.7	47.6	48.8	87.6	32.3	76.8
	InvAD Zhang et al. (2024a)	63.5	88.5	88.0	<b>98.4</b>	48.8	49.3	<b>92.5</b>	32.7	76.1
	InvAD-lite Zhang et al. (2024a)	62.0	88.4	88.0	97.3	39.9	42.8	87.0	27.2	73.1
	MambaAD He et al. (2024a)	58.3	85.6	88.4	96.8	38.8	42.0	84.3	26.6	71.5
	Hybrid UniAD You et al. (2022)	62.3	86.9	88.0	96.0	24.2	29.6	88.1	17.4	69.3
	RD++ Tien et al. (2023)	56.7	82.8	88.4	97.6	39.6	42.6	89.2	27.1	71.6
	DesTSeg Zhang et al. (2023c)	61.7	87.9	88.4	83.7	43.9	45.2	57.8	29.2	68.5

Table A26: Benchmarked results on MVTec 3D dataset [Bergmann et al. \(2022b\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
dowel	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	38.5	75.0	88.9	42.1	0.7	2.2	24.6	1.1	42.4
	SimpleNet <a href="#">Liu et al. (2023)</a>	90.3	97.5	92.5	97.8	16.2	21.5	90.2	12.0	74.9
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	88.8	96.8	92.9	85.0	7.1	11.1	56.9	5.9	66.4
	PatchCore <a href="#">Roth et al. (2022)</a>	98.2	99.6	97.5	99.3	44.5	46.7	96.3	30.5	85.1
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	92.1	98.1	92.9	98.8	28.3	32.7	94.4	19.5	79.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	66.5	89.3	89.7	93.9	6.3	10.5	74.9	5.5	64.1
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	97.3	99.3	96.7	<b>99.7</b>	51.1	50.6	<b>98.8</b>	33.9	86.4
	DiAD <a href="#">He et al. (2024b)</a>	65.3	89.1	91.9	79.7	4.6	9.2	47.9	4.8	55.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	94.1	98.5	94.8	99.2	37.8	41.7	95.9	26.3	82.2
	InvAD <a href="#">Zhang et al. (2024a)</a>	<u>99.3</u>	<u>99.8</u>	<b>98.6</b>	<b>99.7</b>	49.5	48.6	<u>98.6</u>	32.1	<u>86.7</u>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.8	99.3	96.0	<u>99.6</u>	<u>51.4</u>	<b>51.5</b>	<u>97.7</u>	<b>34.7</b>	86.2
	MambaAD <a href="#">He et al. (2024a)</a>	96.5	99.2	95.3	99.5	50.1	48.9	97.4	32.3	85.5
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	87.1	96.9	90.1	98.9	34.0	39.0	95.3	24.2	79.1
	RD++ <a href="#">Tien et al. (2023)</a>	<b>99.6</b>	<b>99.9</b>	<b>98.6</b>	<b>99.7</b>	<b>53.9</b>	51.3	<b>98.8</b>	34.5	<b>87.6</b>
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	86.0	96.5	90.2	82.8	49.4	50.1	60.8	33.4	75.8
foam	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.3	81.6	88.9	46.7	0.2	0.4	14.4	0.2	44.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	78.7	94.5	89.4	86.4	12.1	22.1	67.9	12.4	67.3
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	66.1	90.6	89.4	45.1	8.0	21.0	32.6	11.8	54.4
	PatchCore <a href="#">Roth et al. (2022)</a>	78.9	94.4	89.9	<b>94.9</b>	18.8	29.6	83.4	17.4	72.2
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	75.0	93.5	89.3	85.5	15.8	27.2	57.5	15.7	66.2
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	65.6	90.2	88.9	71.4	11.0	18.2	49.9	10.0	59.6
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	70.2	91.7	89.4	93.9	14.4	27.1	81.0	15.6	68.9
	DiAD <a href="#">He et al. (2024b)</a>	78.3	94.4	89.2	87.5	1.4	3.9	59.7	2.0	59.2
	ViTAD <a href="#">Zhang et al. (2023a)</a>	82.9	95.4	90.8	94.0	14.3	26.0	81.3	14.9	71.8
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>83.5</b>	<b>95.8</b>	<u>91.2</u>	93.8	18.8	31.0	81.1	18.3	73.2
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	82.6	95.4	90.1	<u>94.4</u>	<u>24.1</u>	<u>32.9</u>	82.8	19.7	74.0
	MambaAD <a href="#">He et al. (2024a)</a>	79.9	94.7	89.9	<b>94.9</b>	<u>23.8</u>	<u>33.4</u>	<b>83.8</b>	<u>20.1</u>	<u>73.6</u>
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	76.8	94.0	88.9	85.0	10.3	23.0	60.1	13.0	65.6
	RD++ <a href="#">Tien et al. (2023)</a>	72.9	92.4	<b>91.9</b>	92.7	16.3	28.7	77.3	16.7	69.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	80.2	95.0	89.1	84.5	<b>44.3</b>	<b>49.5</b>	72.7	<b>32.9</b>	<b>75.4</b>
peach	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	61.6	86.9	89.5	46.7	0.5	1.0	22.5	0.5	48.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	70.0	90.5	90.1	92.2	5.5	11.0	73.3	5.8	64.5
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	49.9	81.6	89.1	67.4	1.2	5.7	39.0	2.9	50.9
	PatchCore <a href="#">Roth et al. (2022)</a>	75.2	92.7	91.2	98.2	26.4	32.4	93.3	19.3	74.5
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	72.2	91.3	90.4	97.9	17.1	18.9	92.1	10.4	70.6
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	62.0	86.7	89.8	96.4	6.6	11.0	87.3	5.8	64.9
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	64.0	85.0	91.6	98.4	15.6	21.7	93.7	12.2	68.8
	DiAD <a href="#">He et al. (2024b)</a>	<b>92.4</b>	93.5	<b>99.1</b>	95.5	4.4	8.0	84.9	4.2	68.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	66.6	88.8	89.1	98.1	19.5	25.2	92.5	14.4	70.2
	InvAD <a href="#">Zhang et al. (2024a)</a>	<u>90.4</u>	<b>97.3</b>	<u>94.1</u>	<u>99.3</u>	41.3	<b>46.5</b>	<u>97.1</u>	<b>30.3</b>	<b>82.5</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	85.4	95.3	<u>94.1</u>	<u>99.3</u>	<u>42.8</u>	<u>44.0</u>	<u>97.2</u>	28.2	81.2
	MambaAD <a href="#">He et al. (2024a)</a>	89.3	<u>97.1</u>	93.4	<b>99.4</b>	<u>42.9</u>	<u>44.0</u>	<b>97.5</b>	28.2	82.1
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	73.7	91.8	90.4	98.0	19.6	25.5	92.5	14.6	72.1
	RD++ <a href="#">Tien et al. (2023)</a>	74.2	89.8	92.0	<u>98.8</u>	26.2	31.7	94.8	18.8	74.1
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	70.6	91.5	89.4	76.7	<b>46.7</b>	<u>45.5</u>	56.1	<u>29.5</u>	70.0
potato	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.1	80.9	89.8	49.6	0.5	1.3	30.0	0.6	47.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	61.9	85.3	89.9	95.2	2.6	5.6	83.7	2.9	62.9
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	39.1	77.4	89.3	64.9	0.3	1.0	30.7	0.5	46.4
	PatchCore <a href="#">Roth et al. (2022)</a>	56.8	83.9	90.2	98.9	9.8	17.0	96.0	9.3	66.2
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	62.0	86.8	89.3	98.5	11.4	13.9	95.3	7.5	67.1
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	70.7	<u>91.2</u>	89.8	97.8	9.9	15.9	92.5	8.6	69.0
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	63.1	87.6	<b>91.1</b>	<b>99.2</b>	15.3	22.7	<u>96.6</u>	12.8	<u>69.5</u>
	DiAD <a href="#">He et al. (2024b)</a>	<b>82.2</b>	<b>95.8</b>	90.2	98.5	8.6	14.7	94.8	7.9	69.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	58.2	86.7	89.8	98.7	11.6	17.9	95.1	9.8	67.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	66.9	90.4	90.2	<u>99.1</u>	<b>17.8</b>	<b>24.8</b>	96.4	<b>14.1</b>	<b>71.0</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	67.8	<u>90.5</u>	<u>90.5</u>	<u>99.1</u>	<b>17.8</b>	22.4	95.9	12.6	<u>70.9</u>
	MambaAD <a href="#">He et al. (2024a)</a>	59.1	86.0	90.2	99.0	<u>17.7</u>	<u>22.8</u>	95.4	12.8	68.6
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	51.6	83.8	89.3	97.9	8.5	13.9	92.3	7.5	64.0
	RD++ <a href="#">Tien et al. (2023)</a>	67.0	90.0	90.6	<b>99.2</b>	<u>17.5</u>	<u>23.7</u>	<b>96.7</b>	<u>13.5</u>	70.9
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	58.2	86.8	90.2	54.8	8.5	9.2	22.5	4.8	51.1



Table A27: Benchmarked results on MVTec 3D dataset [Bergmann et al. \(2022b\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
rope	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	56.5	69.4	83.6	43.0	0.5	1.0	13.1	0.5	42.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	93.3	97.7	93.8	99.3	53.8	52.4	93.1	35.5	84.8
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	92.5	96.8	90.1	90.4	35.7	44.1	74.5	28.3	77.2
		PatchCore <a href="#">Roth et al. (2022)</a>	96.7	98.7	95.5	99.6	55.6	56.9	97.4	39.7	87.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	94.1	97.7	92.2	99.3	45.1	47.3	95.3	31.0	83.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	79.7	90.9	83.2	86.4	8.0	11.9	61.3	6.3	63.3
		RD <a href="#">Deng &amp; Li (2022)</a>	95.9	98.4	93.1	99.6	50.6	55.2	97.9	38.1	85.8
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	72.4	87.2	81.7	94.3	9.5	16.1	74.6	8.8	62.3
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.5	99.4	96.4	98.5	41.7	43.3	89.5	27.6	83.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	97.0	98.8	94.9	99.6	57.8	58.9	97.1	41.7	87.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	94.5	98.0	94.7	99.4	54.2	53.0	96.3	36.1	85.7
		MambaAD <a href="#">He et al. (2024a)</a>	96.1	98.4	93.2	99.3	45.1	48.1	96.1	31.7	84.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	95.9	98.5	95.6	99.3	41.5	47.8	96.4	31.4	84.0
		RD++ <a href="#">Tien et al. (2023)</a>	95.9	98.5	96.3	99.6	52.7	56.2	97.8	39.0	86.7
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.7	97.2	92.2	98.8	64.7	62.7	97.2	45.7	87.4
tire	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.7	76.9	87.4	40.6	0.1	0.3	10.2	0.2	42.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	59.5	85.7	87.4	93.9	6.9	13.1	78.3	7.0	62.8
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	70.7	90.8	87.4	52.5	1.2	5.3	18.9	2.7	51.2
		PatchCore <a href="#">Roth et al. (2022)</a>	80.1	93.6	87.9	99.1	22.6	31.1	95.8	18.4	74.7
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	56.1	83.9	87.4	97.5	7.0	11.2	90.7	5.9	63.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	44.2	79.2	87.4	93.7	3.7	7.3	78.0	3.8	58.0
		RD <a href="#">Deng &amp; Li (2022)</a>	54.2	79.2	87.4	99.0	13.5	21.5	95.5	12.1	65.5
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	54.0	76.1	87.4	92.5	3.4	8.1	78.1	4.2	57.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	70.6	89.3	89.6	97.9	17.4	28.3	90.6	16.5	70.9
		InvAD <a href="#">Zhang et al. (2024a)</a>	86.2	95.8	89.9	99.5	29.3	38.2	97.5	23.6	78.4
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	89.0	96.7	91.3	99.3	42.3	47.4	96.4	31.1	81.8
		MambaAD <a href="#">He et al. (2024a)</a>	87.3	95.9	91.1	99.3	42.1	46.3	96.7	30.1	81.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	68.8	87.5	88.7	97.0	8.4	15.4	87.5	8.4	66.9
		RD++ <a href="#">Tien et al. (2023)</a>	78.4	92.6	88.7	99.4	23.6	31.8	97.0	18.9	74.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	78.1	93.0	88.4	77.9	13.7	18.7	55.7	10.3	64.0
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	55.7	81.8	88.8	46.6	0.8	1.9	21.9	1.0	46.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	75.8	92.3	90.4	94.7	17.3	23.4	81.0	13.9	70.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	67.1	89.3	89.6	71.6	9.7	16.1	43.2	9.3	58.6
		PatchCore <a href="#">Roth et al. (2022)</a>	84.1	95.1	92.5	98.6	33.7	38.5	94.4	24.5	78.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	73.1	91.0	90.2	96.8	21.6	26.6	89.0	15.8	71.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.7	85.6	88.6	90.8	7.2	12.0	74.9	6.4	61.9
		RD <a href="#">Deng &amp; Li (2022)</a>	75.8	91.2	91.5	98.4	29.6	35.5	93.9	22.2	75.3
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	75.4	91.0	90.9	91.7	5.3	10.2	74.9	5.4	62.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	79.6	93.4	91.6	98.0	27.2	33.3	91.6	20.4	75.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	86.9	96.2	93.3	98.7	37.4	42.4	95.2	27.4	80.3
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	84.7	95.6	92.6	98.6	38.3	41.9	94.2	26.9	79.6
		MambaAD <a href="#">He et al. (2024a)</a>	84.1	95.1	92.2	98.6	36.9	40.8	94.2	25.9	79.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	75.3	92.1	90.3	96.6	21.2	27.9	88.9	16.7	72.3
		RD++ <a href="#">Tien et al. (2023)</a>	81.8	93.9	92.8	98.5	34.4	39.6	94.1	25.2	78.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	79.1	93.8	90.7	81.1	41.3	42.7	64.0	28.4	72.6



## E DETAILED QUANTITATIVE RESULTS ON MVTEC LOCO DATASET UNDER 100 EPOCHS

Table A28: Benchmarked results on MVTEC LOCO dataset [Bergmann et al. \(2022a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
breakfast_box	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	62.6	76.9	77.2	50.0	4.4	12.5	14.9	46.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	<b>88.9</b>	<b>94.1</b>	<b>85.5</b>	87.8	<u>56.9</u>	<u>55.3</u>	73.0	<u>38.3</u>
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	64.3	79.1	77.6	68.0	29.7	28.5	33.9	56.8
		PatchCore <a href="#">Roth et al. (2022)</a>	77.1	88.4	78.0	89.4	55.4	49.3	76.1	74.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	74.9	86.4	77.8	88.6	48.0	46.5	71.1	71.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.3	75.3	77.4	59.7	44.2	28.1	20.6	16.3
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	66.2	80.7	77.2	83.7	27.1	35.6	65.0	21.6
		DiAD <a href="#">He et al. (2024b)</a>	68.5	82.0	77.2	84.6	26.3	37.6	39.7	23.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	77.7	88.0	78.8	89.1	56.1	53.1	70.3	36.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	82.7	91.1	<u>80.5</u>	<b>90.2</b>	<u>63.7</u>	<b>60.8</b>	<b>79.7</b>	<b>43.6</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	77.1	87.9	77.6	88.6	50.5	49.0	77.2	32.5
		MambaAD <a href="#">He et al. (2024a)</a>	69.7	83.6	77.5	89.1	54.5	50.1	74.5	33.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	73.1	85.5	77.2	89.0	48.8	46.2	71.0	30.1
		RD++ <a href="#">Tien et al. (2023)</a>	69.8	84.3	77.2	86.8	41.4	45.1	69.6	29.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	85.5	92.7	82.1	82.6	<b>64.1</b>	59.4	72.6	42.2
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.1	74.3	83.4	31.3	3.9	10.1	7.3	5.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	96.7	98.8	94.8	91.6	48.9	54.6	86.1	37.5
		CFA <a href="#">Lee et al. (2022)</a>	85.1	94.3	85.4	73.6	20.3	22.0	51.7	12.4
juice_bottle	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	95.2	98.3	94.1	89.9	<u>56.2</u>	<u>57.8</u>	87.1	<u>40.6</u>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	95.9	98.4	93.6	<b>91.7</b>	44.1	47.3	84.1	31.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	48.6	74.9	83.5	54.2	9.7	10.1	24.9	5.3
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	90.1	96.6	89.3	89.2	46.9	47.7	84.4	31.4
		DiAD <a href="#">He et al. (2024b)</a>	97.3	98.8	96.1	83.2	40.0	42.4	74.9	26.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	90.3	96.4	88.7	88.6	48.4	49.1	83.4	32.5
		InvAD <a href="#">Zhang et al. (2024a)</a>	95.8	<u>98.5</u>	94.2	<u>90.6</u>	<u>53.9</u>	<b>58.3</b>	<b>88.4</b>	<b>41.2</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.0	97.3	92.7	<u>90.6</u>	53.4	<u>57.2</u>	<u>87.5</u>	40.0
		MambaAD <a href="#">He et al. (2024a)</a>	92.0	97.0	92.3	89.7	47.8	53.2	85.3	36.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	92.2	97.0	90.5	90.6	52.5	54.6	87.3	37.6
		RD++ <a href="#">Tien et al. (2023)</a>	90.6	96.5	88.8	90.1	49.2	50.9	85.2	34.2
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>98.5</b>	<b>99.5</b>	<b>97.2</b>	78.8	<b>57.0</b>	<u>57.2</u>	79.7	40.1
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.5	55.1	72.8	52.4	0.8	1.8	14.8	0.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	74.8	81.8	74.0	<b>68.9</b>	<u>3.7</u>	<u>8.8</u>	62.0	<u>4.6</u>
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	53.7	63.2	71.4	43.6	0.8	1.7	22.5	0.9
		PatchCore <a href="#">Roth et al. (2022)</a>	74.3	82.8	72.7	56.1	3.1	7.5	63.6	3.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	60.8	69.1	71.4	39.4	1.2	3.0	52.4	1.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	51.7	60.9	71.4	58.8	1.3	3.2	29.3	1.6
pushpins	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	71.4	80.4	71.7	51.2	2.2	7.6	68.1	4.0
		DiAD <a href="#">He et al. (2024b)</a>	57.6	65.7	73.0	62.8	1.4	3.2	36.4	1.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	66.8	73.6	72.2	46.1	2.2	6.0	57.1	3.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>81.0</b>	<b>87.4</b>	<b>76.7</b>	67.2	<u>3.8</u>	<u>9.1</u>	<b>75.1</b>	<u>4.8</u>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	77.9	84.0	<u>76.1</u>	60.0	3.0	8.4	67.8	4.4
		MambaAD <a href="#">He et al. (2024a)</a>	<u>79.8</u>	<u>85.9</u>	<u>76.3</u>	58.8	2.6	<b>9.4</b>	<u>72.7</u>	<b>5.0</b>
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	63.5	70.1	71.4	41.6	1.0	3.9	53.8	2.0
		RD++ <a href="#">Tien et al. (2023)</a>	77.0	84.0	74.6	52.3	2.5	7.5	67.5	3.9
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	59.9	71.1	71.7	54.0	<b>3.9</b>	8.2	42.3	4.3
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.1	65.9	78.4	49.3	6.7	13.7	10.1	7.4
		SimpleNet <a href="#">Liu et al. (2023)</a>	63.5	76.5	78.3	61.2	10.3	16.5	46.8	9.0
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	63.2	77.2	78.4	50.2	7.5	13.6	30.2	7.3
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>70.1</b>	<b>82.8</b>	78.2	72.1	<u>13.1</u>	22.0	62.1	<u>12.4</u>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	64.4	77.7	78.4	68.7	11.2	20.4	<b>67.0</b>	11.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.7	68.5	78.5	59.0	9.9	15.6	35.5	8.5
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	66.3	79.8	78.2	71.5	<u>12.6</u>	21.8	52.1	12.2
		DiAD <a href="#">He et al. (2024b)</a>	57.6	68.1	<b>79.3</b>	70.2	11.3	21.2	58.5	11.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	65.2	77.7	79.0	<u>72.5</u>	<b>13.2</b>	<u>21.9</u>	42.2	<u>12.3</u>
screw_bag		InvAD <a href="#">Zhang et al. (2024a)</a>	<u>68.5</u>	82.1	78.7	71.9	<b>13.2</b>	<u>21.9</u>	53.0	<u>12.3</u>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	68.2	79.7	78.7	72.2	<u>13.1</u>	<u>21.9</u>	49.1	<u>12.3</u>
		MambaAD <a href="#">He et al. (2024a)</a>	55.2	70.5	78.2	<b>73.1</b>	<b>13.2</b>	<b>22.7</b>	53.6	<b>12.8</b>
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	56.9	69.1	<u>78.8</u>	66.8	10.8	19.2	<u>64.8</u>	10.6
		RD++ <a href="#">Tien et al. (2023)</a>	66.8	80.8	78.2	69.4	12.1	20.2	53.0	11.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	<u>68.4</u>	<u>81.9</u>	78.4	51.2	9.7	13.6	44.0	7.3

Table A29: Benchmarked results on MVTEC LOCO dataset [Bergmann et al. \(2022a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
splicing-connectors	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	40.1	54.7	76.4	50.4	6.5	14.1	15.0	39.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	83.8	91.4	81.9	73.2	25.1	28.5	51.1	65.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	66.2	79.3	76.6	57.2	12.9	15.7	17.4	49.9
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>85.6</b>	<b>92.9</b>	<b>84.4</b>	68.1	21.5	22.3	60.8	12.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.3	89.3	77.8	65.2	20.3	22.3	<b>73.1</b>	12.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.9	67.0	76.4	56.7	9.8	15.7	18.2	8.5
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	79.2	89.1	78.0	58.0	16.3	17.9	68.8	9.9
		DiAD <a href="#">He et al. (2024b)</a>	75.7	83.0	78.8	58.1	15.9	19.6	32.4	10.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	82.1	90.6	79.6	70.5	23.7	25.8	62.4	14.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	81.9	90.5	79.7	62.2	20.8	23.8	68.7	13.5
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	80.8	89.9	79.3	67.9	22.6	24.5	65.5	14.0
		MambaAD <a href="#">He et al. (2024a)</a>	82.4	90.7	80.4	71.8	26.0	26.8	64.9	15.5
		UniAD <a href="#">You et al. (2022)</a>	80.4	88.7	80.1	<b>77.7</b>	<b>40.5</b>	<b>43.2</b>	46.5	<b>27.5</b>
	Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	77.7	88.5	77.3	59.2	16.2	17.5	68.9	9.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	77.5	88.1	77.0	53.8	<b>41.3</b>	14.0	28.4	7.5
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.5	65.4	77.6	46.7	4.5	10.4	12.4	5.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	81.6	88.5	<b>82.9</b>	<b>76.5</b>	29.0	32.7	63.8	21.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	66.5	78.6	77.9	58.5	14.2	16.3	31.1	9.1
		PatchCore <a href="#">Roth et al. (2022)</a>	80.5	89.0	81.5	75.1	29.9	31.8	69.9	20.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	75.1	84.2	79.8	70.7	25.0	27.9	69.5	17.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	53.4	69.3	77.5	57.7	15.0	14.5	25.7	8.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	74.6	85.3	78.9	70.7	21.0	26.1	67.7	15.8
		DiAD <a href="#">He et al. (2024b)</a>	71.3	79.5	80.9	71.8	19.0	24.8	48.4	14.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	76.4	85.2	79.6	73.4	28.7	31.2	63.1	19.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>82.0</b>	<b>89.9</b>	82.0	76.4	<b>31.1</b>	<b>34.8</b>	<b>73.0</b>	<b>23.1</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	79.4	87.8	80.9	75.8	28.5	32.2	69.4	20.6
		MambaAD <a href="#">He et al. (2024a)</a>	75.8	85.5	81.0	<b>76.5</b>	28.8	32.5	70.2	20.6
		UniAD <a href="#">You et al. (2022)</a>	73.2	82.1	79.6	73.1	<b>30.7</b>	<b>33.4</b>	64.7	21.6
	Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	76.4	86.8	79.2	71.5	24.3	28.3	68.8	17.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	77.9	86.7	81.3	64.1	<b>35.2</b>	30.5	53.4	20.3

## F DETAILED QUANTITATIVE RESULTS ON VISA DATASET UNDER 100 EPOCHS

Table A30: Benchmarked results on VisA dataset [Zou et al. \(2022\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
candle	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	36.0	45.5	66.7	32.0	0.1	0.3	5.5	0.2	29.4
	SimpleNet <a href="#">Liu et al. (2023)</a>	93.6	94.5	84.9	96.4	9.9	19.9	88.4	11.1	72.3
	RealNet <a href="#">Zhang et al. (2024c)</a>	52.7	57.8	66.7	51.8	9.8	5.2	28.5	2.7	41.4
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	71.8	73.7	70.6	76.2	3.7	12.2	59.7	6.5	55.0
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	93.0	93.3	85.3	98.8	13.9	23.0	93.8	13.0	74.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	43.4	44.9	66.7	77.9	0.5	2.3	55.8	1.2	42.9
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	93.1	93.4	86.9	99.1	24.2	35.4	95.5	21.5	77.3
	DiAD <a href="#">He et al. (2024b)</a>	92.3	93.6	84.5	80.2	1.0	4.1	43.1	2.1	57.0
	ViTAD <a href="#">Zhang et al. (2023a)</a>	90.0	91.3	81.6	96.1	16.2	27.9	86.6	16.2	72.2
	InvAD <a href="#">Zhang et al. (2024a)</a>	95.3	94.8	90.6	99.2	23.3	34.1	95.8	20.5	78.3
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>97.1</b>	<b>97.2</b>	<b>92.0</b>	99.0	21.7	30.6	<b>96.0</b>	18.1	<b>78.6</b>
	MambaAD <a href="#">He et al. (2024a)</a>	95.8	96.4	89.6	99.0	21.3	31.5	95.8	18.7	77.9
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	95.7	95.6	89.2	99.0	24.1	32.8	93.7	19.6	77.9
	RD++ <a href="#">Tien et al. (2023)</a>	92.5	92.9	87.8	<b>99.3</b>	26.2	37.1	95.5	22.7	77.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	89.7	90.5	86.1	79.6	<b>41.1</b>	<b>43.9</b>	61.7	<b>28.1</b>	72.7
capsules	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	49.0	68.2	76.9	54.8	0.4	0.7	20.3	0.3	41.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	76.8	87.0	78.3	95.5	42.0	45.5	66.1	29.4	71.5
	RealNet <a href="#">Zhang et al. (2024c)</a>	72.8	85.0	77.0	65.9	31.8	34.8	31.8	21.1	59.7
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	56.5	71.2	77.2	55.2	0.4	0.9	5.9	0.4	41.9
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	54.8	72.8	76.9	94.2	26.4	30.4	64.3	17.9	61.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.8	69.4	76.9	86.9	3.3	8.7	62.4	4.5	53.8
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	81.8	90.5	81.3	99.3	60.2	60.7	93.0	43.5	81.4
	DiAD <a href="#">He et al. (2024b)</a>	51.5	71.2	78.1	90.6	2.9	6.5	49.7	3.4	50.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>	80.4	88.2	78.9	98.2	31.0	41.6	75.5	26.2	72.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	90.1	94.2	86.8	<b>99.6</b>	<b>68.6</b>	<b>64.9</b>	<b>95.0</b>	<b>48.1</b>	<b>86.2</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>91.7</b>	<b>94.7</b>	<b>90.1</b>	99.3	60.5	58.5	<b>95.2</b>	41.3	<b>85.3</b>
	MambaAD <a href="#">He et al. (2024a)</a>	91.1	94.4	89.6	99.0	58.4	56.7	93.2	39.5	84.3
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	71.2	83.9	78.4	97.5	42.2	45.5	73.6	29.4	71.3
	RD++ <a href="#">Tien et al. (2023)</a>	84.3	91.4	83.5	99.4	64.1	63.6	93.2	46.6	83.2
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	85.4	91.8	83.3	95.9	39.0	43.6	82.6	27.9	76.1
cashew	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	84.4	92.9	84.0	32.3	0.7	2.2	8.7	1.1	49.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	93.2	96.8	90.2	98.6	<b>67.8</b>	<b>65.0</b>	82.0	<b>48.1</b>	<b>85.9</b>
	RealNet <a href="#">Zhang et al. (2024c)</a>	79.8	89.6	84.5	51.0	22.4	3.1	19.7	1.6	54.3
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	74.9	88.1	81.0	97.6	57.3	56.1	76.2	39.0	76.6
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	95.8	98.2	<b>93.3</b>	99.0	53.8	54.9	<b>94.6</b>	37.9	85.7
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	84.1	90.7	87.7	49.7	0.6	2.2	15.7	1.1	52.3
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	92.1	95.7	91.3	91.3	43.8	49.4	85.1	32.8	80.2
	DiAD <a href="#">He et al. (2024b)</a>	77.0	88.3	83.3	85.5	42.4	46.6	19.4	30.3	63.2
	ViTAD <a href="#">Zhang et al. (2023a)</a>	89.1	94.9	87.5	98.2	62.5	61.5	79.9	44.4	83.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>96.1</b>	<b>98.3</b>	93.2	96.5	58.4	61.1	90.6	44.0	86.3
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	94.1	97.0	90.8	94.4	51.6	55.5	90.5	38.4	83.5
	MambaAD <a href="#">He et al. (2024a)</a>	93.8	97.0	91.7	94.0	46.7	51.7	88.2	34.9	82.2
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	94.8	97.4	91.5	<b>99.2</b>	61.3	63.9	91.0	46.9	<b>86.7</b>
	RD++ <a href="#">Tien et al. (2023)</a>	93.4	96.3	92.2	95.1	56.4	58.9	87.2	41.7	84.2
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	88.0	94.2	87.5	85.9	65.9	62.6	58.8	45.5	79.1
chewinggum	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	56.4	72.6	79.0	34.4	0.3	1.1	1.1	0.6	39.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	97.4	98.8	93.8	98.3	31.5	36.9	75.1	22.6	78.6
	RealNet <a href="#">Zhang et al. (2024c)</a>	87.7	94.6	86.0	72.4	40.0	42.0	36.4	26.5	68.6
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	76.3	88.7	80.7	95.6	33.1	36.5	70.6	22.3	70.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	97.3	98.9	95.3	<b>99.2</b>	60.3	60.3	<b>87.9</b>	43.2	87.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	36.3	63.6	80.0	68.5	1.3	1.1	39.2	0.6	43.7
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	95.8	98.0	92.6	98.7	60.4	62.6	78.7	45.5	85.3
	DiAD <a href="#">He et al. (2024b)</a>	82.5	90.9	83.5	64.0	14.7	29.3	15.7	17.2	54.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	95.8	98.0	93.2	97.8	61.1	58.5	72.2	41.3	84.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>98.0</b>	<b>99.0</b>	94.9	98.7	60.4	62.8	81.3	45.8	86.5
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.5	98.9	94.8	98.3	56.0	57.6	80.6	40.4	85.1
	MambaAD <a href="#">He et al. (2024a)</a>	97.4	98.8	94.7	98.0	54.6	60.0	80.0	42.8	85.1
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	97.4	98.9	<b>96.3</b>	99.1	60.3	58.5	85.9	41.4	<b>86.7</b>
	RD++ <a href="#">Tien et al. (2023)</a>	97.1	98.7	94.2	98.7	58.8	61.8	79.8	44.7	85.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	96.3	98.6	95.8	98.0	<b>79.2</b>	<b>71.9</b>	68.9	<b>56.1</b>	<b>88.2</b>

Table A31: Benchmarked results on VisA dataset [Zou et al. \(2022\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
fryum	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	46.5	68.9	80.0	59.6	4.3	10.3	32.0	5.4	45.8
		SimpleNet <a href="#">Liu et al. (2023)</a>	84.0	92.8	83.6	94.9	46.2	48.5	81.7	32.0	77.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	66.2	83.4	80.6	53.8	35.7	10.4	19.2	5.5	53.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	68.7	84.0	81.0	79.4	26.1	32.5	49.8	19.4	62.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	90.1	95.5	88.3	<b>97.5</b>	<b>53.6</b>	<b>53.3</b>	87.4	<b>36.3</b>	82.1
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	68.7	83.5	81.0	81.7	12.7	19.0	62.7	10.5	60.9
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	95.4	97.9	<b>92.5</b>	96.9	47.5	51.6	<b>93.2</b>	34.8	<b>83.8</b>
		DiAD <a href="#">He et al. (2024b)</a>	83.7	92.6	84.3	97.1	<b>55.7</b>	<b>58.1</b>	69.0	<b>40.9</b>	77.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	93.9	97.2	90.6	97.4	46.4	50.3	88.7	33.6	82.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>96.0</b>	<b>98.2</b>	91.9	97.0	48.5	52.5	92.1	35.6	<b>83.9</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	95.6	98.0	90.9	96.8	47.2	51.6	92.8	34.7	83.5
	Hybrid	MambaAD <a href="#">He et al. (2024a)</a>	95.5	97.8	91.5	97.0	48.3	51.7	92.3	34.9	83.6
		UniAD <a href="#">You et al. (2022)</a>	86.0	93.4	85.7	97.2	46.3	<b>53.1</b>	81.9	36.2	79.0
		RD++ <a href="#">Tien et al. (2023)</a>	94.8	97.8	91.9	96.9	47.3	52.7	92.5	35.8	<b>83.6</b>
	macaroni1	Aug.	DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.2	96.6	88.8	68.9	48.9	43.8	49.2	28.0
DRAEM <a href="#">Zavrtanik et al. (2021)</a>			53.4	47.5	64.6	22.3	0.0	0.1	2.6	0.0	30.7
SimpleNet <a href="#">Liu et al. (2023)</a>			77.4	75.7	71.4	97.0	3.8	10.6	87.0	5.6	62.2
Emb.		RealNet <a href="#">Zhang et al. (2024c)</a>	76.2	81.5	72.0	60.1	13.2	19.7	27.5	10.9	53.3
		CFA <a href="#">Lee et al. (2022)</a>	57.9	61.6	68.1	73.5	0.4	2.7	58.8	1.4	48.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	80.6	77.5	75.3	99.1	7.6	13.3	94.9	7.1	65.8
Rec.		PyramidalFlow <a href="#">Lei et al. (2023)</a>	41.9	43.4	66.0	81.2	0.1	0.2	39.9	0.1	40.4
		RD <a href="#">Deng &amp; Li (2022)</a>	94.8	92.8	88.9	<b>99.8</b>	<b>23.8</b>	<b>31.1</b>	<b>97.4</b>	18.4	<b>77.6</b>
		DiAD <a href="#">He et al. (2024b)</a>	<b>97.9</b>	<b>97.2</b>	92.1	54.1	0.0	0.1	3.3	0.0	49.3
		ViTAD <a href="#">Zhang et al. (2023a)</a>	84.8	82.5	75.4	98.5	7.2	16.0	90.2	8.7	66.9
		InvAD <a href="#">Zhang et al. (2024a)</a>	94.3	92.8	87.1	99.7	21.7	30.1	<b>97.4</b>	17.7	<b>76.8</b>
Hybrid		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	92.9	90.4	86.0	99.7	18.6	25.6	97.2	14.7	75.0
		MambaAD <a href="#">He et al. (2024a)</a>	91.5	89.6	82.3	99.5	17.6	26.1	96.0	15.0	73.8
		UniAD <a href="#">You et al. (2022)</a>	84.2	81.4	77.0	99.0	8.0	16.4	94.0	8.9	67.6
macaroni2		Aug.	RD++ <a href="#">Tien et al. (2023)</a>	93.4	91.6	86.0	99.7	<b>24.1</b>	<b>34.2</b>	96.9	<b>20.7</b>
	DesTSeg <a href="#">Zhang et al. (2023c)</a>		95.2	93.3	<b>92.7</b>	79.7	15.7	24.4	46.2	13.9	67.6
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>		52.3	51.5	62.8	48.7	0.0	0.1	12.2	0.0	35.4
	Emb.	SimpleNet <a href="#">Liu et al. (2023)</a>	66.7	61.2	66.9	90.9	0.7	4.2	79.1	2.2	54.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	57.6	57.5	69.4	51.4	5.3	3.6	16.0	1.8	40.3
		CFA <a href="#">Lee et al. (2022)</a>	50.9	51.1	67.6	79.0	0.2	1.6	52.5	0.8	44.9
	Rec.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	64.3	62.7	66.2	97.2	1.5	5.5	88.2	2.8	56.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	67.8	71.0	69.2	63.9	0.0	0.1	8.3	0.0	43.7
		RD <a href="#">Deng &amp; Li (2022)</a>	<b>87.4</b>	<b>83.0</b>	<b>82.8</b>	<b>99.6</b>	<b>12.8</b>	<b>22.4</b>	97.2	<b>12.6</b>	<b>71.2</b>
		DiAD <a href="#">He et al. (2024b)</a>	50.6	42.5	63.4	56.2	0.0	0.1	12.3	0.0	32.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	77.1	69.9	71.4	98.0	3.4	9.1	87.5	4.8	61.1
	Hybrid	InvAD <a href="#">Zhang et al. (2024a)</a>	85.9	81.9	<b>81.2</b>	<b>99.6</b>	10.8	18.1	97.4	10.0	<b>69.7</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>86.5</b>	<b>83.0</b>	80.4	<b>99.6</b>	<b>10.9</b>	17.9	<b>97.9</b>	9.8	<b>69.9</b>
		MambaAD <a href="#">He et al. (2024a)</a>	84.5	80.6	77.1	99.5	8.8	16.9	96.5	9.2	68.1
	pebl	Aug.	UniAD <a href="#">You et al. (2022)</a>	76.5	76.6	69.4	97.3	5.0	12.4	88.0	6.6
RD++ <a href="#">Tien et al. (2023)</a>			83.7	78.6	77.8	<b>99.5</b>	10.3	<b>18.7</b>	96.3	<b>10.3</b>	68.1
DesTSeg <a href="#">Zhang et al. (2023c)</a>			70.6	70.0	71.7	69.2	<b>11.3</b>	<b>19.1</b>	44.7	<b>10.6</b>	53.4
Emb.		DRAEM <a href="#">Zavrtanik et al. (2021)</a>	56.1	52.2	68.4	33.6	0.3	0.9	11.4	0.5	35.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	92.8	93.9	87.9	98.7	<b>80.0</b>	<b>74.9</b>	78.9	<b>59.8</b>	87.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	76.6	79.6	71.2	70.5	36.9	41.9	25.1	26.5	59.7
Rec.		CFA <a href="#">Lee et al. (2022)</a>	80.9	81.5	75.6	93.0	62.4	65.3	46.0	48.5	73.0
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	93.5	93.5	86.5	99.1	72.4	68.7	87.8	52.3	86.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	83.3	80.9	82.1	92.8	49.3	45.5	40.5	29.5	69.6
		RD <a href="#">Deng &amp; Li (2022)</a>	54.8	47.6	74.9	98.6	18.8	38.3	92.5	23.7	60.6
		DiAD <a href="#">He et al. (2024b)</a>	92.8	<b>95.3</b>	<b>94.5</b>	96.6	27.9	38.4	60.8	23.8	72.3
Hybrid		ViTAD <a href="#">Zhang et al. (2023a)</a>	95.3	93.7	90.7	<b>99.4</b>	63.2	61.1	89.0	43.9	85.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>96.5</b>	<b>96.1</b>	93.1	<b>99.8</b>	<b>81.3</b>	<b>75.9</b>	<b>96.1</b>	<b>61.2</b>	<b>91.8</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.2	94.4	<b>93.7</b>	<b>99.8</b>	<b>79.3</b>	<b>73.2</b>	<b>96.1</b>	57.8	90.9
Hybrid		MambaAD <a href="#">He et al. (2024a)</a>	95.7	94.5	<b>93.3</b>	<b>99.8</b>	79.0	72.9	94.3	57.4	90.5
	UniAD <a href="#">You et al. (2022)</a>	94.4	93.1	91.1	99.3	62.9	59.9	89.1	42.8	85.3	
	RD++ <a href="#">Tien et al. (2023)</a>	<b>96.6</b>	<b>96.2</b>	91.7	<b>99.3</b>	67.7	61.0	<b>95.2</b>	43.9	87.8	
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	82.7	81.2	77.0	96.3	70.0	66.4	71.9	49.7	78.2	

Table A32: Benchmarked results on VisA dataset Zou et al. (2022) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
pcb2	Aug.	DRAEM Zavrtanik et al. (2021)	59.6	70.8	66.7	38.0	0.1	0.4	7.3	0.2	38.6
		SimpleNet Liu et al. (2023)	90.1	91.8	83.4	96.6	13.9	23.5	80.6	13.3	71.0
		RealNet Zhang et al. (2024c)	71.6	78.8	67.4	64.1	12.9	19.8	32.7	11.0	52.5
	Emb.	CFA Lee et al. (2022)	74.3	75.9	71.5	74.7	6.5	14.9	46.5	8.1	54.8
		CFLOW-AD Gudovskiy et al. (2022)	92.4	93.0	85.8	96.6	12.5	18.7	82.3	10.3	71.5
		PyramidalFlow Lei et al. (2023)	72.8	76.3	70.8	93.9	8.8	15.9	71.9	8.7	60.5
	Rec.	RD Deng & Li (2022)	97.3	96.9	94.1	97.8	22.1	30.0	91.6	17.6	78.2
		DiAD He et al. (2024b)	97.7	98.0	92.8	83.8	3.8	9.9	50.9	5.2	62.4
		ViTAD Zhang et al. (2023a)	90.2	89.4	85.4	97.9	12.9	21.0	82.7	11.7	71.0
		InvAD Zhang et al. (2024a)	97.0	97.1	93.1	99.1	16.1	23.8	92.5	13.5	76.8
		InvAD-lite Zhang et al. (2024a)	94.7	94.7	89.9	98.9	12.9	23.0	91.4	13.0	74.8
		MambaAD He et al. (2024a)	95.2	95.0	90.2	98.8	13.9	24.1	90.0	13.7	75.1
	Hybrid	UniAD You et al. (2022)	90.8	91.5	85.4	97.9	9.0	17.3	83.6	9.4	70.6
		RD++ Tien et al. (2023)	98.3	98.5	94.9	97.9	28.6	34.6	91.1	20.9	80.1
		DesTSeg Zhang et al. (2023c)	90.1	89.1	83.0	93.6	20.9	29.6	66.3	17.4	70.0
pcb3	Aug.	DRAEM Zavrtanik et al. (2021)	36.1	46.1	66.4	38.5	0.2	0.5	7.9	0.3	30.7
		SimpleNet Liu et al. (2023)	86.4	88.3	78.0	97.6	19.7	27.7	80.8	16.1	70.3
		RealNet Zhang et al. (2024c)	78.8	84.0	72.5	71.5	29.8	36.6	35.7	22.4	60.9
	Emb.	CFA Lee et al. (2022)	63.0	68.7	66.9	85.5	11.5	20.3	39.6	11.3	52.7
		CFLOW-AD Gudovskiy et al. (2022)	80.5	83.6	73.6	96.3	22.6	26.8	80.3	15.4	67.9
		PyramidalFlow Lei et al. (2023)	53.8	56.4	66.4	56.4	0.5	2.7	7.6	1.3	37.8
	Rec.	RD Deng & Li (2022)	96.2	96.1	90.7	98.0	25.3	34.8	93.6	21.1	78.6
		DiAD He et al. (2024b)	94.2	93.8	89.1	88.5	3.8	10.2	48.0	5.4	61.1
		ViTAD Zhang et al. (2023a)	90.4	90.6	84.6	98.2	23.5	29.6	87.9	17.4	74.2
		InvAD Zhang et al. (2024a)	96.6	97.0	92.1	99.2	17.3	28.7	93.1	16.8	77.4
		InvAD-lite Zhang et al. (2024a)	93.8	94.3	86.1	99.1	17.6	28.2	92.6	16.4	75.4
		MambaAD He et al. (2024a)	95.0	95.2	88.8	99.1	21.7	27.6	92.0	16.0	76.5
	Hybrid	UniAD You et al. (2022)	82.8	83.8	76.9	98.2	13.6	24.1	80.9	13.7	67.7
		RD++ Tien et al. (2023)	95.7	95.8	89.9	98.0	33.2	35.6	93.7	21.6	79.5
		DesTSeg Zhang et al. (2023c)	93.4	94.1	87.3	89.9	31.9	33.6	56.9	20.2	72.3
pcb4	Aug.	DRAEM Zavrtanik et al. (2021)	68.0	58.0	76.4	32.8	0.5	1.3	6.6	0.7	38.9
		SimpleNet Liu et al. (2023)	97.6	97.8	92.0	95.2	22.1	30.9	79.0	18.2	76.3
		RealNet Zhang et al. (2024c)	72.5	79.2	68.3	58.3	28.0	23.1	24.0	13.1	53.3
	Emb.	CFA Lee et al. (2022)	72.5	75.7	69.8	75.2	10.0	19.1	44.2	10.6	54.9
		CFLOW-AD Gudovskiy et al. (2022)	98.5	98.4	96.1	96.7	21.9	30.9	85.4	18.3	78.2
		PyramidalFlow Lei et al. (2023)	48.9	52.7	66.4	89.5	5.0	8.9	66.3	4.7	49.2
	Rec.	RD Deng & Li (2022)	100.	100.	99.5	97.8	30.2	36.0	89.2	22.0	81.6
		DiAD He et al. (2024b)	99.7	99.7	99.0	95.4	9.9	18.2	83.5	10.0	72.2
		ViTAD Zhang et al. (2023a)	99.1	98.7	97.0	99.0	42.8	47.9	93.4	31.5	84.5
		InvAD Zhang et al. (2024a)	99.8	99.8	98.0	98.6	46.6	45.1	91.1	29.2	84.8
		InvAD-lite Zhang et al. (2024a)	99.8	99.8	98.0	98.7	50.6	49.4	90.8	32.8	85.8
		MambaAD He et al. (2024a)	99.6	99.7	97.0	98.7	47.4	47.6	90.8	31.2	84.9
	Hybrid	UniAD You et al. (2022)	99.2	99.2	95.5	97.1	29.1	33.7	83.1	20.3	79.4
		RD++ Tien et al. (2023)	100.	100.	99.0	97.4	32.8	38.7	86.8	24.0	81.8
		DesTSeg Zhang et al. (2023c)	98.8	98.7	95.1	94.3	53.4	52.2	74.3	35.3	83.0
pipe.fryum	Aug.	DRAEM Zavrtanik et al. (2021)	63.5	74.5	83.1	22.9	0.7	2.5	4.9	1.2	40.7
		SimpleNet Liu et al. (2023)	80.7	90.9	83.2	98.8	70.8	66.2	71.3	49.5	80.9
		RealNet Zhang et al. (2024c)	64.0	83.5	80.5	61.3	43.2	31.4	32.3	18.6	59.0
	Emb.	CFA Lee et al. (2022)	48.2	71.5	80.0	90.9	53.7	52.7	59.2	35.8	65.3
		CFLOW-AD Gudovskiy et al. (2022)	97.4	98.8	96.0	99.2	60.8	61.3	94.6	44.2	88.2
		PyramidalFlow Lei et al. (2023)	41.6	63.3	80.0	81.3	4.7	9.1	43.0	4.8	48.1
	Rec.	RD Deng & Li (2022)	98.1	99.0	96.5	99.1	55.8	58.2	96.3	41.1	87.6
		DiAD He et al. (2024b)	97.4	98.5	98.0	98.6	52.5	57.1	78.4	40.0	82.9
		ViTAD Zhang et al. (2023a)	98.1	99.1	95.5	99.5	67.0	67.2	95.0	50.6	89.9
		InvAD Zhang et al. (2024a)	99.2	99.6	97.5	99.4	66.3	64.7	94.8	47.9	90.0
		InvAD-lite Zhang et al. (2024a)	98.6	99.3	96.0	99.0	55.3	57.4	95.7	40.2	87.4
		MambaAD He et al. (2024a)	99.0	99.5	97.0	99.0	53.9	57.5	95.6	40.3	87.5
	Hybrid	UniAD You et al. (2022)	95.5	97.7	92.9	99.0	52.1	58.2	93.3	41.1	85.5
		RD++ Tien et al. (2023)	96.8	98.3	94.1	99.0	57.6	58.8	95.4	41.6	87.0
		DesTSeg Zhang et al. (2023c)	96.3	98.4	92.1	88.8	81.4	75.2	51.5	60.2	84.9

Table A33: Benchmarked results on VisA dataset Zou et al. (2022) by the suggested metrics in Sec. 3.3.

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	55.1	62.4	72.9	37.5	0.6	1.7	10.0	0.9	38.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	86.4	89.1	82.8	96.6	34.0	37.8	79.2	25.7	74.0
		RealNet <a href="#">Zhang et al. (2024c)</a>	71.4	79.5	74.7	61.0	25.7	22.6	27.4	13.5	54.7
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	66.3	74.3	74.2	81.3	22.1	26.2	50.8	17.0	58.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	86.5	88.8	84.9	97.7	33.9	37.2	86.8	24.9	75.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.2	66.3	74.4	77.0	7.2	9.6	42.8	5.6	50.2
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	90.6	90.9	89.3	98.0	35.4	42.5	91.9	27.9	78.6
		DiAD <a href="#">He et al. (2024b)</a>	84.8	88.5	86.9	82.5	17.9	23.2	44.5	14.9	61.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	90.4	91.1	86.0	98.2	36.4	41.0	85.7	27.5	77.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>95.4</b>	<b>95.7</b>	<b>91.6</b>	<b>98.9</b>	<b>43.3</b>	<b>46.8</b>	<b>93.1</b>	<b>32.5</b>	<b>82.4</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	94.9	95.2	90.7	98.6	40.2	44.0	<b>93.1</b>	29.8	81.3
		MambaAD <a href="#">He et al. (2024a)</a>	94.5	94.9	90.2	98.4	39.3	43.7	92.1	29.5	80.8
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	89.0	91.0	85.8	98.3	34.5	39.6	86.5	26.4	76.7
		RD++ <a href="#">Tien et al. (2023)</a>	93.9	94.7	90.2	98.4	42.3	46.3	91.9	31.2	81.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	89.9	91.4	86.7	86.7	<b>46.6</b>	<b>47.2</b>	61.1	<b>32.7</b>	74.9

## G DETAILED QUANTITATIVE RESULTS ON BTAD DATASET UNDER 100 EPOCHS

Table A34: Benchmarked results on BTAD dataset [Mishra et al. \(2021\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
01	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	82.6	93.6	84.7	47.0	3.0	6.3	14.3	52.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	98.3	99.4	97.9	95.0	41.6	45.1	64.7	80.1
		RealNet <a href="#">Zhang et al. (2024c)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	95.7	<b>69.5</b>	<b>67.6</b>	<b>81.3</b>	<b>89.3</b>
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	98.2	99.4	99.0	94.7	37.8	44.2	64.6	79.6
		PatchCore <a href="#">Roth et al. (2022)</a>	99.6	99.8	99.0	97.1	55.5	56.6	75.8	85.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	94.8	98.1	93.5	94.7	36.6	43.4	66.2	77.8
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	94.5	96.7	98.0	89.2	18.9	6.3	66.6	70.8
		RD <a href="#">Deng &amp; Li (2022)</a>	99.8	99.9	99.0	97.8	57.5	58.5	<b>84.4</b>	41.4
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	99.4	99.8	99.0	90.5	24.3	31.4	73.7	18.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	97.9	99.2	95.9	96.5	55.0	55.1	69.8	38.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.9	<b>100.</b>	99.0	<b>98.0</b>	63.7	62.9	<b>84.1</b>	45.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.8	99.2	96.9	97.3	<u>59.3</u>	<u>61.4</u>	77.3	44.3
		MambaAD <a href="#">He et al. (2024a)</a>	97.4	99.0	94.7	97.1	<u>55.3</u>	58.1	76.5	41.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.7	99.9	98.0	97.4	57.2	58.4	79.2	41.3
		RD++ <a href="#">Tien et al. (2023)</a>	98.6	99.5	97.9	<u>97.5</u>	53.6	57.8	80.9	40.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	98.1	99.3	96.9	85.8	25.4	39.3	68.2	24.4
02	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	70.6	94.7	92.8	51.7	7.9	11.5	18.2	6.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	81.7	96.8	<b>93.6</b>	94.5	46.3	49.4	47.4	32.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	72.9	95.3	92.8	83.9	38.8	50.3	38.6	33.6
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	80.3	96.6	92.8	94.7	51.2	53.9	48.8	36.9
		PatchCore <a href="#">Roth et al. (2022)</a>	83.8	97.3	92.8	96.0	59.3	59.8	54.1	42.7
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.6	96.7	92.8	96.4	61.4	61.0	54.5	43.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	73.7	95.6	92.8	86.8	64.1	62.5	38.0	45.4
		RD <a href="#">Deng &amp; Li (2022)</a>	84.0	<u>97.3</u>	<u>93.4</u>	<u>96.7</u>	<u>64.5</u>	<u>64.3</u>	58.8	47.4
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	72.6	95.4	92.8	86.9	27.3	35.5	44.8	21.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	83.5	97.2	93.0	<b>96.9</b>	<b>74.1</b>	<b>67.8</b>	51.9	<b>51.2</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>88.7</b>	<b>98.1</b>	93.5	96.6	62.0	61.9	<u>59.6</u>	44.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	81.8	97.0	93.2	96.6	61.8	62.4	<b>60.2</b>	45.4
		MambaAD <a href="#">He et al. (2024a)</a>	82.5	97.2	93.0	96.3	55.1	60.0	<u>59.6</u>	42.8
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	<u>85.0</u>	<u>97.6</u>	92.8	94.8	41.8	51.8	<u>59.4</u>	35.0
		RD++ <a href="#">Tien et al. (2023)</a>	<u>85.5</u>	<u>97.6</u>	93.2	<u>96.7</u>	<u>65.2</u>	<u>64.2</u>	57.2	47.2
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	81.2	96.9	92.8	94.6	45.9	58.4	50.9	41.2
03	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	60.7	47.1	56.5	48.4	0.3	1.5	16.0	0.8
		SimpleNet <a href="#">Liu et al. (2023)</a>	99.7	95.7	88.6	99.4	36.5	38.5	97.5	23.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	96.3	90.5	85.7	72.2	36.0	40.1	40.3	25.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	99.7	96.6	88.9	99.4	53.3	52.5	95.2	35.6
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>99.8</b>	<u>97.3</u>	<u>92.1</u>	99.5	50.1	48.2	98.0	31.8
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.0	89.5	78.6	99.4	38.8	46.0	97.3	29.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	92.9	57.1	52.2	96.7	5.9	12.0	87.7	6.4
		RD <a href="#">Deng &amp; Li (2022)</a>	99.4	92.5	89.6	<b>99.8</b>	<u>56.8</u>	54.6	<u>98.9</u>	37.6
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	98.3	69.9	86.1	97.6	7.2	13.1	92.7	7.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.6	94.2	90.9	99.6	48.5	47.2	98.0	30.9
		InvAD <a href="#">Zhang et al. (2024a)</a>	<u>99.7</u>	95.2	90.3	<b>99.8</b>	<b>62.0</b>	<b>59.4</b>	<u>98.9</u>	<b>42.2</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.7	96.0	<b>93.8</b>	99.6	56.5	<u>55.3</u>	98.4	38.2
		MambaAD <a href="#">He et al. (2024a)</a>	99.5	92.2	89.9	99.6	47.1	49.9	98.4	33.2
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	<b>99.8</b>	<b>97.5</b>	<u>91.8</u>	99.5	51.9	51.3	97.9	34.5
		RD++ <a href="#">Tien et al. (2023)</a>	99.7	96.4	91.2	<b>99.8</b>	60.1	<u>57.6</u>	<b>99.0</b>	40.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.2	91.4	87.1	96.3	33.1	35.4	90.8	21.5
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	71.3	78.5	78.0	49.0	3.7	6.5	16.2	3.4
		SimpleNet <a href="#">Liu et al. (2023)</a>	93.2	97.3	93.3	96.3	41.5	44.3	69.8	28.6
		RealNet <a href="#">Zhang et al. (2024c)</a>	89.7	95.3	92.8	84.0	48.1	52.7	53.4	36.6
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	92.7	97.5	93.5	96.3	47.4	50.2	69.5	33.6
		PatchCore <a href="#">Roth et al. (2022)</a>	94.4	<u>98.2</u>	<b>94.6</b>	97.5	55.0	54.9	76.0	38.0
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.2	94.8	88.3	96.8	45.6	50.1	72.7	33.8
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	87.0	83.1	81.0	90.9	29.6	26.9	64.1	18.3
		RD <a href="#">Deng &amp; Li (2022)</a>	94.4	96.6	94.0	<b>98.1</b>	<u>59.6</u>	59.2	<u>80.7</u>	42.1
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	90.1	88.4	92.6	91.7	19.6	26.7	70.4	15.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	93.6	96.8	93.3	97.6	<u>59.2</u>	56.7	73.2	40.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>96.1</b>	<u>97.8</u>	<u>94.3</u>	<b>98.1</b>	<b>62.6</b>	<b>61.4</b>	<b>80.9</b>	<b>44.3</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.1	97.4	<b>94.6</b>	97.9	<u>59.2</u>	<u>59.7</u>	78.6	42.6
		MambaAD <a href="#">He et al. (2024a)</a>	93.1	96.1	92.5	97.7	52.5	56.0	78.2	39.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	94.8	<b>98.3</b>	94.2	97.2	50.3	53.8	78.8	36.9
		RD++ <a href="#">Tien et al. (2023)</a>	94.6	<u>97.8</u>	94.1	98.0	59.6	59.8	<u>79.0</u>	42.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.8	95.9	92.3	92.2	34.8	44.3	70.0	29.0



## H DETAILED QUANTITATIVE RESULTS ON MPDD DATASET UNDER 100 EPOCHS

Table A35: Benchmarked results on MPDD dataset [Jezek et al. \(2021\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
bracket_black	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	39.0	51.7	74.6	45.1	0.1	0.4	24.0	0.2	36.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	74.0	83.3	78.5	92.8	3.1	9.7	86.1	5.1	63.3
	RealNet <a href="#">Zhang et al. (2024c)</a>	63.0	72.7	75.2	65.9	2.3	6.8	50.7	3.5	50.9
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	58.4	72.8	74.6	74.6	0.2	0.5	31.9	0.2	47.7
	PatchCore <a href="#">Roth et al. (2022)</a>	<b>88.4</b>	<b>92.7</b>	<b>83.9</b>	<b>98.5</b>	<b>11.0</b>	<b>21.0</b>	<b>96.7</b>	<b>11.8</b>	<b>72.6</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	60.8	70.3	75.8	95.5	1.7	4.1	85.2	2.1	57.8
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	65.8	72.7	77.0	95.3	1.8	5.0	81.4	2.6	58.9
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	<u>84.2</u>	<u>88.3</u>	83.1	<u>97.7</u>	6.6	12.7	<u>94.1</u>	6.8	<u>69.0</u>
	DiAD <a href="#">He et al. (2024b)</a>	70.9	81.7	79.0	89.8	0.4	1.0	65.3	0.5	55.5
	VITAD <a href="#">Zhang et al. (2023a)</a>	78.3	86.2	<u>83.6</u>	95.5	2.5	8.0	89.1	4.2	65.7
	InvAD <a href="#">Zhang et al. (2024a)</a>	83.4	<u>90.9</u>	81.0	97.4	<u>7.1</u>	<u>15.2</u>	94.0	<u>8.2</u>	<u>69.3</u>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	75.4	84.6	78.6	95.2	<u>7.9</u>	<u>16.8</u>	89.6	<u>9.1</u>	<u>66.0</u>
	MambaAD <a href="#">He et al. (2024a)</a>	81.9	<u>88.3</u>	81.7	94.5	5.3	11.2	88.4	5.9	66.9
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	78.1	84.9	79.2	93.0	0.6	1.6	79.2	0.8	62.2
	RD++ <a href="#">Tien et al. (2023)</a>	82.7	86.6	82.9	98.0	4.2	10.1	<u>94.1</u>	5.3	67.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	83.4	87.3	<b>85.7</b>	72.4	5.7	13.5	59.0	7.3	61.6
bracket_brown	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	42.5	61.1	79.7	46.8	0.8	1.9	27.5	1.0	40.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	90.4	93.8	93.6	94.4	7.9	16.9	86.7	9.2	72.0
	RealNet <a href="#">Zhang et al. (2024c)</a>	91.0	94.0	92.6	69.9	12.1	19.1	50.5	10.6	65.2
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	88.7	94.9	88.9	85.1	3.2	6.9	52.6	3.6	63.9
	PatchCore <a href="#">Roth et al. (2022)</a>	95.6	<u>97.2</u>	<u>95.3</u>	<b>98.6</b>	<u>26.2</u>	<b>32.0</b>	<b>95.4</b>	<b>19.0</b>	<b>79.5</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	74.4	77.6	85.2	95.9	5.9	12.0	91.1	6.4	65.1
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	63.6	76.4	81.0	94.0	5.7	12.5	69.6	6.7	59.6
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	86.2	89.6	92.7	96.0	13.1	23.1	93.9	13.1	73.0
	DiAD <a href="#">He et al. (2024b)</a>	53.2	69.1	82.9	90.0	2.8	7.0	66.6	3.6	53.1
	VITAD <a href="#">Zhang et al. (2023a)</a>	86.5	86.0	92.6	<u>98.0</u>	16.3	24.9	<u>95.0</u>	14.2	73.5
	InvAD <a href="#">Zhang et al. (2024a)</a>	93.7	<u>95.5</u>	<u>95.2</u>	95.5	15.2	22.8	90.8	12.8	75.4
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	89.5	<u>93.0</u>	90.1	<u>97.9</u>	14.9	25.0	94.3	14.3	74.4
	MambaAD <a href="#">He et al. (2024a)</a>	<b>95.7</b>	<b>97.5</b>	<u>95.3</u>	<u>97.5</u>	<b>26.3</b>	<u>30.8</u>	92.8	18.2	79.0
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	91.4	95.0	92.7	<u>98.0</u>	<u>23.9</u>	<b>32.0</b>	90.7	<b>19.0</b>	<u>77.1</u>
	RD++ <a href="#">Tien et al. (2023)</a>	84.4	89.9	91.9	96.6	17.2	24.4	<u>94.9</u>	13.9	73.5
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	95.0	92.5	<b>96.2</b>	61.6	4.8	10.5	30.1	5.5	60.7
bracket_white	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	34.0	44.3	66.7	42.3	0.0	0.1	9.0	0.0	30.6
	SimpleNet <a href="#">Liu et al. (2023)</a>	85.6	89.3	80.0	97.7	2.1	6.5	85.6	3.4	66.5
	RealNet <a href="#">Zhang et al. (2024c)</a>	77.3	86.2	80.8	85.2	<b>18.4</b>	<b>30.6</b>	47.4	<b>18.0</b>	63.4
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	80.2	86.0	77.8	89.8	3.9	14.9	47.3	8.0	60.2
	PatchCore <a href="#">Roth et al. (2022)</a>	<u>93.3</u>	<u>94.8</u>	<u>88.9</u>	98.8	10.0	19.3	93.9	10.7	<u>73.9</u>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	62.9	64.1	69.8	98.2	1.2	3.5	93.0	1.8	57.3
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	76.8	84.8	78.4	98.9	5.6	14.5	91.1	7.8	66.3
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	85.3	86.5	81.4	99.0	2.3	6.4	<b>95.2</b>	3.3	67.6
	DiAD <a href="#">He et al. (2024b)</a>	84.0	90.7	<u>88.9</u>	96.5	1.0	3.6	82.5	1.8	63.9
	VITAD <a href="#">Zhang et al. (2023a)</a>	78.9	84.0	78.7	95.7	0.9	2.9	86.7	1.5	63.5
	InvAD <a href="#">Zhang et al. (2024a)</a>	92.1	<u>94.7</u>	<u>90.0</u>	98.9	9.8	21.9	94.1	<u>12.3</u>	<u>74.2</u>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	90.2	92.2	84.7	<u>99.2</u>	5.2	10.6	94.8	5.6	70.7
	MambaAD <a href="#">He et al. (2024a)</a>	<b>97.1</b>	<b>97.5</b>	<b>90.9</b>	<b>99.3</b>	12.2	20.4	<u>95.0</u>	11.3	<b>75.9</b>
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	63.6	67.1	69.6	95.0	0.3	0.8	79.6	0.4	55.3
	RD++ <a href="#">Tien et al. (2023)</a>	81.4	86.0	76.4	98.7	2.9	10.0	93.4	5.2	66.3
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	91.1	89.8	88.5	90.4	1.0	2.7	51.2	1.4	63.1
connector	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	21.7	22.2	48.3	35.1	0.6	2.1	16.8	1.1	22.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	96.2	92.0	90.3	98.3	46.4	47.0	94.5	30.7	82.2
	RealNet <a href="#">Zhang et al. (2024c)</a>	99.0	97.9	96.6	85.8	38.9	44.1	75.8	28.3	79.5
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	96.9	89.0	93.3	83.5	11.2	16.3	59.2	8.9	67.8
	PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>99.5</b>	<b>71.2</b>	<b>63.3</b>	<b>98.4</b>	<b>46.3</b>	<b>91.5</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.2	85.3	78.6	96.7	27.9	29.3	89.4	17.2	72.9
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	69.0	42.7	63.4	90.7	3.7	7.2	70.0	3.7	50.6
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<u>99.2</u>	60.6	55.5	<u>97.5</u>	38.4	<u>89.1</u>
	DiAD <a href="#">He et al. (2024b)</a>	57.1	48.0	56.3	90.1	2.9	6.5	68.4	3.4	47.1
	VITAD <a href="#">Zhang et al. (2023a)</a>	96.2	91.9	86.7	<u>99.3</u>	44.3	47.6	<u>97.7</u>	31.2	81.9
	InvAD <a href="#">Zhang et al. (2024a)</a>	96.7	83.4	96.6	98.9	57.9	<u>58.1</u>	96.4	41.0	85.0
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.1	90.8	93.3	<u>99.2</u>	<u>62.2</u>	<u>58.1</u>	97.3	41.0	86.5
	MambaAD <a href="#">He et al. (2024a)</a>	99.5	99.1	96.3	<u>99.2</u>	<u>54.5</u>	<u>56.5</u>	97.3	39.3	87.6
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	69.8	49.9	58.5	<u>95.2</u>	7.6	14.9	83.9	8.1	54.9
	RD++ <a href="#">Tien et al. (2023)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<u>99.2</u>	<u>67.0</u>	<u>61.8</u>	97.4	<u>44.8</u>	<u>90.7</u>
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.1	81.4	82.4	76.6	33.8	37.6	61.1	23.1	68.8



Table A36: Benchmarked results on MPDD dataset [Jezek et al. \(2021\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max				
metal-plate	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	41.9	76.3	84.5	36.3	10.8	21.2	13.3	11.9	44.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.4	89.8	81.7	89.2	69.1	94.9
		RealNet <a href="#">Zhang et al. (2024c)</a>	99.9	<b>100.</b>	99.3	97.7	90.5	84.1	93.6	72.6	95.6
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	99.7	99.9	98.6	97.6	89.8	81.8	83.1	69.2	93.7
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.0	93.5	86.1	94.1	75.7	96.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.9	<b>100.</b>	99.3	98.5	89.0	83.3	92.4	71.4	95.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	96.7	98.7	95.2	88.7	61.3	21.1	60.8	11.8	77.4
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.1	92.9	87.7	<b>96.7</b>	78.1	97.0
		DiAD <a href="#">He et al. (2024b)</a>	89.3	96.4	89.9	88.4	54.6	52.8	55.5	35.9	75.3
		ViTAD <a href="#">Zhang et al. (2023a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>99.3</b>	<b>95.5</b>	<b>88.0</b>	94.9	<b>78.6</b>	<b>97.2</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.0	92.2	87.2	96.0	77.2	96.8
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.8	99.9	98.6	98.4	86.4	82.9	94.2	70.8	95.0
		MambaAD <a href="#">He et al. (2024a)</a>	99.8	99.9	98.6	98.2	83.8	82.2	94.3	69.8	94.5
		UniAD <a href="#">You et al. (2022)</a>	47.5	74.3	85.0	90.7	41.2	56.9	73.6	39.8	67.3
	Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	99.8	99.9	98.6	99.1	92.1	87.2	95.7	77.3	96.5
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	95.6	91.4	87.0	88.8	77.0	95.3
tubes	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	34.8	64.0	81.2	47.0	1.1	2.0	23.2	1.0	39.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	84.0	93.9	85.0	97.6	42.8	45.8	91.7	29.7	78.6
		RealNet <a href="#">Zhang et al. (2024c)</a>	80.1	90.1	85.2	95.3	54.3	53.0	90.4	36.1	79.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	65.4	83.7	81.2	78.8	9.2	17.4	47.1	9.5	57.4
		PatchCore <a href="#">Roth et al. (2022)</a>	90.4	96.6	92.4	98.8	64.5	63.8	95.5	46.9	86.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	65.0	83.3	81.7	96.2	32.0	35.6	86.0	21.7	69.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	69.8	86.6	81.2	97.1	48.2	46.4	90.3	30.2	74.8
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	91.9	97.1	93.3	99.0	67.1	65.6	96.0	48.8	88.0
		DiAD <a href="#">He et al. (2024b)</a>	55.4	81.1	83.6	87.7	3.9	7.6	58.2	4.0	53.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	86.6	94.8	86.6	98.5	51.5	53.3	93.5	36.4	81.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>96.4</b>	<b>98.6</b>	<b>95.5</b>	<b>99.3</b>	<b>72.3</b>	<b>69.0</b>	<b>97.4</b>	<b>52.7</b>	<b>90.7</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.0	96.9	91.3	98.3	61.4	62.0	94.0	44.9	86.3
		MambaAD <a href="#">He et al. (2024a)</a>	58.4	77.0	81.7	96.1	19.6	27.8	85.8	16.1	64.8
		UniAD <a href="#">You et al. (2022)</a>	72.5	84.8	83.1	91.4	8.6	13.5	71.1	7.2	63.1
	Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	93.0	97.5	93.0	<b>99.3</b>	<b>74.6</b>	<b>70.8</b>	97.2	<b>54.8</b>	90.0
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	86.4	93.8	88.4	95.6	59.2	56.1	89.4	39.0	82.3
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	35.6	53.3	72.5	42.1	2.2	4.6	19.0	2.5	35.4
		SimpleNet <a href="#">Liu et al. (2023)</a>	88.4	92.0	87.9	96.5	32.0	34.6	89.0	24.5	76.2
		RealNet <a href="#">Zhang et al. (2024c)</a>	85.1	90.2	88.3	83.3	36.1	39.6	68.1	28.2	72.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	81.6	87.7	85.7	84.9	19.6	22.9	53.5	16.6	65.1
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>94.6</b>	<b>96.9</b>	<b>93.4</b>	<b>98.9</b>	<b>46.1</b>	<b>47.6</b>	<b>95.7</b>	<b>35.0</b>	<b>83.5</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	75.7	80.1	81.7	96.8	26.3	28.0	89.5	20.1	69.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	73.6	77.0	79.4	94.1	21.1	17.8	77.2	10.4	64.6
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	91.3	93.6	91.8	98.3	40.4	41.8	95.5	31.4	80.6
		DiAD <a href="#">He et al. (2024b)</a>	68.3	77.9	80.1	90.4	10.9	13.1	66.1	8.2	58.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	87.8	90.5	88.0	97.7	35.2	37.4	92.8	27.7	77.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	93.7	93.9	93.0	98.2	42.4	45.7	94.8	34.0	81.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	90.9	92.9	89.5	98.0	39.7	42.6	94.0	30.9	79.8
		MambaAD <a href="#">He et al. (2024a)</a>	88.7	93.2	90.8	97.5	33.6	38.1	92.3	26.8	78.1
		UniAD <a href="#">You et al. (2022)</a>	70.5	76.0	78.0	93.9	13.7	19.9	79.7	12.5	63.3
	Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	90.2	93.3	90.5	98.5	43.0	44.1	95.5	33.6	80.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	91.3	90.8	90.2	82.0	32.6	34.6	63.3	25.6	71.9

# I DETAILED QUANTITATIVE RESULTS ON MAD\_REAL DATASET UNDER 100 EPOCHS

Table A37: Benchmarked results on MAD\_Real dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Bear	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	43.3	83.5	92.3	54.0	0.2	1.1	34.1	47.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	24.2	72.7	90.6	94.9	3.0	10.4	87.2	55.7
		CFA <a href="#">Lee et al. (2022)</a>	15.0	69.1	90.6	99.1	4.2	10.3	96.5	55.4
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	84.2	96.8	91.7	99.6	17.6	29.5	98.6	76.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	76.7	94.4	92.3	99.4	6.0	12.3	97.6	70.8
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	46.7	78.6	90.6	98.2	2.3	4.9	93.9	60.9
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	76.7	94.6	94.1	97.7	5.2	7.9	93.2	4.1
		DiAD <a href="#">He et al. (2024b)</a>	52.5	88.7	90.6	97.4	5.1	13.5	90.3	7.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	35.0	76.8	90.6	97.3	1.9	6.9	91.0	3.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>95.8</b>	<b>99.1</b>	<b>98.0</b>	<b>99.7</b>	<b>39.9</b>	<b>44.1</b>	<b>98.9</b>	<b>28.3</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	82.5	96.1	93.9	98.4	5.0	11.6	95.1	6.2
		MambaAD <a href="#">He et al. (2024a)</a>	32.5	75.1	90.6	93.3	1.0	4.0	80.3	2.0
Bird	Hybrid	UniAD <a href="#">You et al. (2022)</a>	83.3	96.5	90.6	99.0	4.0	9.6	96.3	5.0
		RD++ <a href="#">Tien et al. (2023)</a>	77.5	94.4	93.9	99.0	8.5	15.3	96.8	8.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	26.7	76.9	90.6	80.3	0.4	1.3	56.6	0.6
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	60.9	89.6	89.8	57.7	0.7	1.0	22.1	0.5
		SimpleNet <a href="#">Liu et al. (2023)</a>	58.2	87.8	91.7	82.7	2.4	6.2	53.7	3.2
		CFA <a href="#">Lee et al. (2022)</a>	55.5	83.1	89.8	86.6	4.6	10.9	56.9	5.7
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	71.8	92.6	<b>93.6</b>	<b>96.4</b>	<b>32.2</b>	<b>39.7</b>	<b>84.2</b>	<b>24.8</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	35.5	74.4	89.8	89.3	2.7	6.3	64.4	3.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	17.3	69.0	89.8	91.2	2.9	6.4	66.7	3.3
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	51.8	85.9	89.8	87.1	7.7	16.6	57.2	9.1
		DiAD <a href="#">He et al. (2024b)</a>	9.1	70.5	89.8	93.1	4.3	10.4	71.1	5.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	67.3	89.7	<b>93.6</b>	89.6	9.8	17.6	62.6	9.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	84.5	96.4	93.3	89.0	10.1	20.0	66.1	11.1
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	53.6	78.6	91.7	92.8	6.2	13.4	73.8	7.2
		MambaAD <a href="#">He et al. (2024a)</a>	<b>86.4</b>	<b>97.1</b>	91.3	95.1	17.8	28.5	77.9	16.6
Elephant	Hybrid	UniAD <a href="#">You et al. (2022)</a>	38.2	74.3	89.8	87.1	2.4	6.5	63.3	3.4
		RD++ <a href="#">Tien et al. (2023)</a>	45.5	82.2	89.8	89.6	6.8	15.4	63.2	8.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	60.0	82.7	<b>93.6</b>	66.2	5.4	13.8	35.4	7.4
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	<b>77.8</b>	<b>93.9</b>	<b>90.0</b>	50.1	0.4	1.2	18.7	0.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	20.0	68.9	87.8	76.4	6.1	14.5	42.9	7.8
		CFA <a href="#">Lee et al. (2022)</a>	35.6	71.5	87.8	86.8	5.7	10.6	58.4	5.6
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	27.8	69.5	87.8	93.7	<b>11.1</b>	<b>18.3</b>	78.8	<b>10.1</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	23.3	71.6	87.8	90.6	8.6	11.5	66.4	6.1
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	51.1	84.2	87.8	93.0	2.8	6.0	76.5	3.1
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	43.3	82.7	87.8	88.2	2.1	5.4	65.6	2.8
		DiAD <a href="#">He et al. (2024b)</a>	36.7	76.9	<b>90.0</b>	91.8	2.0	4.3	74.1	2.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	46.7	77.4	87.8	<b>96.1</b>	9.1	18.0	<b>85.6</b>	<b>9.9</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	32.2	72.6	87.8	91.3	6.5	13.2	71.4	7.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	36.7	72.7	87.8	91.5	4.7	10.1	75.2	5.3
		MambaAD <a href="#">He et al. (2024a)</a>	47.8	79.2	87.8	90.7	4.7	9.2	72.5	4.8
Parrot	Hybrid	UniAD <a href="#">You et al. (2022)</a>	11.1	63.1	87.8	79.1	1.3	4.0	38.7	2.0
		RD++ <a href="#">Tien et al. (2023)</a>	41.1	80.3	87.8	85.2	1.7	4.1	59.6	2.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	58.9	83.6	<b>90.0</b>	66.6	1.2	5.0	32.6	2.6
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	<b>64.3</b>	87.0	<b>92.0</b>	49.2	0.6	1.3	14.6	0.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	16.5	71.6	90.2	61.9	0.9	1.8	32.7	0.9
		CFA <a href="#">Lee et al. (2022)</a>	4.3	65.9	90.2	42.3	0.5	1.3	17.0	0.7
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	5.2	66.2	90.2	<b>81.7</b>	<b>2.1</b>	<b>5.1</b>	<b>64.0</b>	<b>2.6</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	16.5	68.0	90.2	66.7	1.0	2.5	41.9	1.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	25.2	77.3	90.2	64.2	0.9	2.2	31.8	1.1
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	1.7	64.6	90.2	64.3	0.9	2.0	34.3	1.0
		DiAD <a href="#">He et al. (2024b)</a>	60.9	<b>91.6</b>	90.2	63.6	0.9	2.0	41.7	1.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	16.5	69.8	90.2	69.8	1.1	2.6	40.8	1.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	11.3	68.6	90.2	52.1	0.7	1.4	32.7	0.7
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	4.3	65.4	90.2	60.4	0.8	1.8	38.4	0.9
		MambaAD <a href="#">He et al. (2024a)</a>	6.1	66.6	90.2	72.4	1.1	2.6	45.6	1.3
Hybrid	Hybrid	UniAD <a href="#">You et al. (2022)</a>	33.9	76.4	90.2	61.2	0.8	1.8	37.7	0.9
		RD++ <a href="#">Tien et al. (2023)</a>	7.0	66.2	90.2	63.1	0.9	2.0	33.5	1.0
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	3.5	65.1	90.2	48.7	0.6	1.3	18.5	0.6

Table A38: Benchmarked results on MAD\_Real dataset Zhou et al. (2024) by the suggested metrics in Sec. 3.3.

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Pig	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	67.1	89.5	87.2	52.2	0.5	1.2	23.8	0.6	50.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	49.4	76.5	87.2	93.9	10.1	21.9	72.9	12.3	60.4
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	55.3	77.6	89.5	93.0	5.0	11.2	73.0	5.9	59.8
		PatchCore <a href="#">Roth et al. (2022)</a>	56.5	78.8	89.5	98.5	19.9	28.7	89.7	16.7	67.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	57.6	78.8	87.2	96.5	5.8	12.0	85.2	6.4	62.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	57.6	84.2	87.2	95.7	5.2	10.0	81.9	5.3	62.3
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	60.0	80.2	89.5	98.4	21.1	31.0	92.5	18.3	68.7
		DiAD <a href="#">He et al. (2024b)</a>	56.5	87.9	87.2	92.9	2.7	5.9	71.7	3.0	57.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	37.6	71.6	87.2	97.7	8.6	17.2	89.8	9.4	59.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	58.8	77.1	89.5	98.1	11.7	22.1	91.1	12.4	65.4
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	47.1	73.7	89.5	98.4	13.0	24.1	92.9	13.7	63.6
		MambaAD <a href="#">He et al. (2024a)</a>	61.2	80.3	87.2	97.7	12.2	22.8	87.1	12.8	65.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	50.6	83.9	87.2	88.8	1.6	4.2	62.2	2.1	56.5
		RD++ <a href="#">Tien et al. (2023)</a>	61.2	80.3	91.4	98.0	14.3	23.0	91.0	13.0	67.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	48.2	74.8	89.5	71.1	2.3	6.0	43.6	3.1	50.8
Puppy	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.0	82.9	88.9	46.3	0.4	1.9	23.9	1.0	46.5
		SimpleNet <a href="#">Liu et al. (2023)</a>	68.0	90.6	90.9	94.5	4.1	10.3	72.4	5.4	64.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	83.0	95.3	93.0	98.6	7.1	14.5	92.3	7.8	71.8
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	100.	99.2	13.4	25.1	92.1	14.3	78.7
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.0	94.3	93.0	99.2	27.9	33.3	94.2	20.0	76.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	56.0	85.5	88.9	95.1	7.6	16.9	75.0	9.3	62.7
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	78.0	94.4	90.0	95.8	4.4	9.1	87.2	4.7	68.3
		DiAD <a href="#">He et al. (2024b)</a>	76.0	94.7	88.9	94.6	1.8	5.0	78.3	2.6	62.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	58.0	87.6	88.9	92.5	1.2	2.9	75.8	1.5	60.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.8	45.6	44.9	98.1	28.9	86.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.0	99.0	97.6	96.9	5.9	11.9	90.3	6.3	74.4
		MambaAD <a href="#">He et al. (2024a)</a>	82.0	94.7	92.3	88.1	1.8	5.3	71.1	2.7	65.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	74.0	92.9	90.9	98.6	14.1	21.9	91.0	12.3	71.2
		RD++ <a href="#">Tien et al. (2023)</a>	66.0	87.6	93.0	98.1	4.8	11.2	92.4	5.9	66.9
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	49.0	81.8	88.9	97.6	11.2	11.6	87.7	6.2	62.6
Scorpion	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	33.0	80.7	90.2	46.8	1.4	2.9	14.6	1.5	42.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	43.5	84.0	90.2	70.9	6.0	13.0	33.4	6.9	51.7
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	30.4	81.6	90.2	60.9	5.6	13.4	26.4	7.2	47.0
		PatchCore <a href="#">Roth et al. (2022)</a>	13.0	70.7	90.2	88.2	8.8	17.0	61.6	9.3	50.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	64.3	90.1	90.2	79.1	4.0	7.8	35.9	4.1	56.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	47.8	85.3	90.2	68.0	2.7	5.9	22.1	3.0	49.6
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	64.3	91.8	90.2	64.7	2.0	4.8	20.3	2.5	52.5
		DiAD <a href="#">He et al. (2024b)</a>	56.5	79.2	93.9	73.2	2.9	7.0	30.8	3.6	49.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	46.1	84.4	90.2	62.9	1.9	4.2	17.3	2.2	47.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	45.2	86.6	90.2	68.4	2.3	5.0	22.0	2.6	49.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	50.4	83.8	90.2	67.4	2.2	4.9	18.6	2.5	49.0
		MambaAD <a href="#">He et al. (2024a)</a>	53.0	84.0	90.2	66.6	2.1	4.8	17.0	2.4	49.2
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	32.2	75.9	90.2	81.2	4.8	10.1	44.9	5.3	50.7
		RD++ <a href="#">Tien et al. (2023)</a>	22.6	73.5	90.2	70.9	2.5	5.8	26.5	3.0	44.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	31.3	81.2	90.2	48.6	1.3	2.9	11.1	1.5	41.8
Turtle	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	73.3	93.3	89.4	47.9	1.3	4.0	31.0	2.0	53.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	95.2	99.0	95.2	98.2	15.2	24.7	93.1	14.1	77.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	100.	100.	100.	99.3	41.9	43.0	96.8	27.4	85.1
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	100.	99.5	43.1	48.4	97.9	31.9	86.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.0	99.8	97.7	99.1	30.0	34.8	96.7	21.1	82.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	81.9	95.6	90.5	97.7	15.1	24.5	92.8	13.9	73.4
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	90.5	98.0	92.3	98.4	22.8	29.0	94.4	17.0	77.4
		DiAD <a href="#">He et al. (2024b)</a>	96.2	99.1	95.5	93.2	7.0	13.8	82.6	7.4	69.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	83.8	96.0	91.3	95.6	6.3	12.8	85.6	6.9	70.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.7	53.8	55.4	98.7	38.3	88.5
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.2	99.2	95.2	97.9	17.7	25.3	94.8	14.5	77.9
		MambaAD <a href="#">He et al. (2024a)</a>	87.6	97.1	91.3	96.3	13.7	20.1	90.2	11.2	73.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	94.3	98.7	95.5	97.8	18.7	28.5	89.6	16.6	77.4
		RD++ <a href="#">Tien et al. (2023)</a>	100.	100.	100.	99.2	24.3	38.2	96.7	23.6	82.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	67.6	90.7	89.4	95.1	20.6	26.3	86.2	15.2	69.8

Table A39: Benchmarked results on MAD\_Real dataset [Zhou et al. \(2024\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Unicorn	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	72.4	91.3	91.3	47.5	0.2	0.5	14.5	0.2	50.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	17.1	70.1	89.4	61.4	0.4	1.5	23.8	0.7	40.3
		CFA <a href="#">Lee et al. (2022)</a>	34.3	76.8	89.4	68.2	0.8	3.5	33.8	1.8	46.7
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	43.8	74.1	93.3	97.3	6.8	14.1	90.3	7.6	61.3
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	72.4	93.2	91.3	90.3	1.4	3.0	66.6	1.5	63.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	46.7	77.8	89.4	83.6	0.9	2.3	52.2	1.2	53.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	40.0	76.4	89.4	77.0	0.6	1.4	39.3	0.7	49.1
		DiAD <a href="#">He et al. (2024b)</a>	42.9	85.6	89.4	83.4	0.8	2.0	56.4	1.0	51.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	20.0	68.6	89.4	74.7	0.5	1.1	32.1	0.6	43.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	37.1	76.5	89.4	85.3	1.0	2.5	54.8	1.3	51.8
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	40.0	75.4	89.4	79.0	0.9	2.3	51.5	1.2	50.8
		MambaAD <a href="#">He et al. (2024a)</a>	18.1	70.9	89.4	79.1	0.9	3.1	47.0	1.6	46.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	21.9	68.2	89.4	91.8	1.7	4.1	72.6	2.1	51.2
		RD++ <a href="#">Tien et al. (2023)</a>	37.1	77.2	89.4	83.1	0.8	1.8	48.4	0.9	50.7
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	33.3	74.0	89.4	59.0	0.4	1.3	29.3	0.7	44.0
Whale	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	46.2	89.5	92.8	42.6	0.3	1.5	25.6	0.7	46.8
		SimpleNet <a href="#">Liu et al. (2023)</a>	86.2	97.4	94.1	96.4	5.6	11.7	86.4	6.2	71.3
		CFA <a href="#">Lee et al. (2022)</a>	80.0	96.2	93.5	98.6	29.5	32.8	90.5	19.6	76.4
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	95.0	99.1	98.5	99.7	46.8	47.4	97.8	31.0	85.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	73.1	95.3	92.8	99.1	19.6	30.1	95.0	17.7	74.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	90.6	98.1	98.5	97.4	9.3	15.4	88.7	8.3	74.2
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	48.8	89.5	92.8	98.7	15.6	21.0	93.7	11.7	67.1
		DiAD <a href="#">He et al. (2024b)</a>	11.9	76.2	92.8	94.0	1.7	4.4	76.4	2.2	51.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	58.8	91.4	92.8	96.8	4.1	9.8	85.2	5.2	65.0
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.8	49.4	53.9	98.6	36.9	87.7
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.9	99.5	97.0	99.6	34.2	37.8	98.5	23.3	82.7
		MambaAD <a href="#">He et al. (2024a)</a>	86.9	97.9	92.8	99.1	19.3	28.1	96.5	16.4	76.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	36.2	83.4	92.8	97.8	8.2	14.9	89.7	8.0	61.7
		RD++ <a href="#">Tien et al. (2023)</a>	88.8	97.8	97.0	99.3	29.9	32.3	96.0	19.2	79.5
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	75.6	92.1	95.4	94.1	6.3	12.9	81.9	6.9	68.2
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	59.1	88.1	90.4	49.4	0.6	1.7	22.3	0.8	48.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	47.8	81.9	90.7	83.1	5.4	11.6	59.8	6.3	56.7
		CFA <a href="#">Lee et al. (2022)</a>	49.3	81.7	91.4	83.3	10.5	15.2	64.2	8.7	58.7
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	59.7	84.8	93.5	95.4	20.2	27.3	85.5	16.6	68.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	59.8	86.0	91.2	90.9	10.7	15.4	74.4	8.8	63.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.1	83.6	90.3	88.4	5.0	9.4	68.2	5.1	59.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	55.5	85.8	90.6	87.0	8.2	12.8	67.8	7.2	60.6
		DiAD <a href="#">He et al. (2024b)</a>	49.9	85.1	90.8	87.7	2.9	6.8	67.4	3.6	55.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	47.0	81.3	90.2	87.3	4.5	9.3	66.6	5.0	57.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	66.5	87.7	93.8	88.3	22.1	26.2	73.2	16.8	67.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	60.4	84.3	92.2	88.2	9.0	14.3	72.9	8.1	62.5
		MambaAD <a href="#">He et al. (2024a)</a>	56.2	84.3	90.3	87.8	7.5	12.8	68.5	7.2	60.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	47.6	81.3	90.4	88.2	5.8	10.6	68.6	5.8	58.2
		RD++ <a href="#">Tien et al. (2023)</a>	54.7	83.9	92.3	88.5	9.4	14.9	70.4	8.5	61.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	45.4	80.3	90.7	72.7	5.0	8.2	48.3	4.5	52.8

## J DETAILED QUANTITATIVE RESULTS ON MAD\_SIM DATASET UNDER 100 EPOCHS

Table A40: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
01Gorilla	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	62.6	94.3	94.9	50.1	0.7	1.8	20.9	0.9	51.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	62.7	94.7	94.9	91.1	8.0	15.0	69.5	8.1	65.0
	Emb. CFA <a href="#">Lee et al. (2022)</a>	56.4	93.3	94.9	80.3	9.9	19.5	63.7	10.8	62.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	51.4	92.1	<b>95.1</b>	90.8	4.6	5.2	65.1	2.7	60.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	39.2	89.3	94.9	87.3	3.3	5.0	70.3	2.6	58.0
	RD <a href="#">Deng &amp; Li (2022)</a>	57.6	92.0	94.9	93.3	4.9	9.6	77.2	5.0	63.9
	DiAD <a href="#">He et al. (2024b)</a>	<b>78.2</b>	<b>97.3</b>	94.9	91.3	3.4	8.1	63.2	4.2	62.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	62.4	92.9	<b>95.1</b>	<u>93.5</u>	5.3	10.0	76.1	5.3	64.8
	InvAD <a href="#">Zhang et al. (2024a)</a>	66.9	<u>95.3</u>	94.9	<b>95.1</b>	<b>15.8</b>	<b>25.2</b>	<b>82.8</b>	<b>14.4</b>	<b>70.2</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	68.9	95.0	<b>95.1</b>	<u>93.6</u>	6.7	12.9	<u>78.5</u>	6.9	<u>67.1</u>
	MambaAD <a href="#">He et al. (2024a)</a>	72.0	95.5	94.9	92.8	5.5	10.4	75.6	5.5	<u>66.8</u>
	Hybrid UniAD <a href="#">You et al. (2022)</a>	49.6	91.1	94.9	91.9	4.1	7.9	76.1	4.1	61.8
	RD++ <a href="#">Tien et al. (2023)</a>	54.9	91.1	<u>94.9</u>	92.9	4.2	8.5	75.8	4.5	62.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	55.4	92.5	94.9	54.4	4.2	6.3	32.1	3.2	52.6
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.6	91.4	<u>95.2</u>	57.1	0.7	0.9	23.6	0.5	50.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	76.0	96.7	<u>95.2</u>	83.7	2.0	5.0	59.4	2.6	63.4
02Unicom	Emb. CFA <a href="#">Lee et al. (2022)</a>	66.3	95.7	<b>95.5</b>	72.7	1.3	2.9	43.6	1.5	<u>58.0</u>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	53.7	93.0	<u>95.2</u>	84.5	2.6	3.7	55.2	1.9	58.6
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	42.9	89.5	<b>95.5</b>	73.4	0.8	1.8	46.3	0.9	53.3
	RD <a href="#">Deng &amp; Li (2022)</a>	60.1	93.9	<u>95.2</u>	85.3	2.0	4.2	71.4	2.1	61.9
	DiAD <a href="#">He et al. (2024b)</a>	71.0	96.6	<u>95.2</u>	78.9	1.4	3.9	45.8	2.0	56.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>	63.8	95.2	<u>95.2</u>	86.4	2.4	5.6	67.6	2.9	62.6
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>79.4</b>	<b>97.5</b>	95.4	<b>87.5</b>	4.1	<b>11.1</b>	<b>75.6</b>	<b>5.9</b>	<b>67.7</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<u>72.4</u>	96.6	<u>95.2</u>	<u>86.2</u>	2.5	5.4	<u>73.2</u>	2.8	64.9
	MambaAD <a href="#">He et al. (2024a)</a>	66.8	95.7	<u>95.2</u>	84.6	2.7	5.4	69.6	2.8	63.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	64.7	95.1	<u>95.2</u>	86.2	2.1	5.3	61.9	2.7	61.9
	RD++ <a href="#">Tien et al. (2023)</a>	64.4	94.5	<u>95.2</u>	85.3	2.2	4.8	69.5	2.5	62.6
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	68.3	95.5	<b>95.5</b>	53.2	<b>4.7</b>	6.4	29.3	3.3	54.9
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	38.8	88.1	<b>95.4</b>	49.8	1.3	1.9	18.2	1.0	46.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	36.2	87.6	<b>95.4</b>	84.9	4.8	<u>12.1</u>	55.4	6.4	56.2
	Emb. CFA <a href="#">Lee et al. (2022)</a>	32.2	87.5	<b>95.4</b>	75.4	4.6	<u>12.8</u>	46.7	6.9	53.3
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	41.3	91.4	<b>95.4</b>	84.9	3.7	5.1	53.1	2.6	56.4
03Mallard	PyramidalFlow <a href="#">Lei et al. (2023)</a>	46.0	88.7	<b>95.4</b>	82.1	2.4	4.9	55.0	2.5	56.4
	RD <a href="#">Deng &amp; Li (2022)</a>	47.9	91.2	<b>95.4</b>	84.3	4.5	9.1	57.9	4.8	58.6
	DiAD <a href="#">He et al. (2024b)</a>	<b>74.2</b>	<b>96.4</b>	<b>95.4</b>	82.4	2.3	4.5	47.5	2.3	57.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	44.9	91.3	<b>95.4</b>	<u>85.5</u>	<u>5.8</u>	11.9	60.4	6.3	<u>59.0</u>
	InvAD <a href="#">Zhang et al. (2024a)</a>	44.7	90.0	<b>95.4</b>	<b>85.9</b>	<b>7.2</b>	<b>14.5</b>	<b>61.6</b>	<b>7.8</b>	<u>59.5</u>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	39.9	89.3	<b>95.4</b>	85.1	<u>5.2</u>	11.7	59.6	6.2	57.6
	MambaAD <a href="#">He et al. (2024a)</a>	57.4	93.6	<b>95.4</b>	84.1	5.1	10.5	57.6	5.5	<b>60.7</b>
	Hybrid UniAD <a href="#">You et al. (2022)</a>	29.6	86.4	<b>95.4</b>	<u>85.3</u>	3.4	8.6	59.5	4.5	54.8
	RD++ <a href="#">Tien et al. (2023)</a>	41.2	88.7	<b>95.4</b>	84.2	3.5	7.8	57.7	4.1	56.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	32.1	88.0	<b>95.4</b>	56.5	3.7	7.8	32.2	4.0	48.4
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	40.6	87.6	94.9	53.6	1.0	1.3	27.2	0.7	47.6
	SimpleNet <a href="#">Liu et al. (2023)</a>	41.9	90.6	94.9	82.8	2.9	6.0	51.7	3.1	55.8
	Emb. CFA <a href="#">Lee et al. (2022)</a>	27.8	87.2	<u>94.9</u>	71.7	2.6	3.9	45.7	2.0	50.5
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	64.5	94.5	94.9	86.5	4.2	6.4	58.0	3.3	61.7
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	33.7	86.7	94.9	80.1	1.6	4.0	48.3	2.0	52.6
04Turtle	RD <a href="#">Deng &amp; Li (2022)</a>	62.7	93.7	94.9	91.3	9.4	16.9	72.5	9.2	65.6
	DiAD <a href="#">He et al. (2024b)</a>	<b>86.2</b>	<b>98.4</b>	<b>95.8</b>	91.2	6.1	12.6	60.9	6.7	64.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	59.0	93.6	<u>94.9</u>	90.8	7.8	15.6	70.0	8.5	64.3
	InvAD <a href="#">Zhang et al. (2024a)</a>	75.8	96.0	<u>95.1</u>	<b>93.1</b>	<b>13.5</b>	<b>24.6</b>	<b>78.5</b>	<b>14.0</b>	<b>70.7</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	61.8	93.7	94.9	91.8	<u>10.8</u>	<u>19.7</u>	<u>74.2</u>	<u>10.9</u>	<u>66.3</u>
	MambaAD <a href="#">He et al. (2024a)</a>	68.9	95.5	94.9	91.0	9.3	18.0	71.2	9.9	<u>66.9</u>
	Hybrid UniAD <a href="#">You et al. (2022)</a>	45.1	88.6	94.9	87.2	3.2	5.8	66.0	3.0	58.4
	RD++ <a href="#">Tien et al. (2023)</a>	61.9	94.4	<u>94.9</u>	90.5	6.9	12.8	71.2	6.8	64.5
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	35.2	89.3	<u>94.9</u>	52.3	2.6	4.0	36.6	2.0	48.5

Table A41: Benchmarked results on MAD\_Sim dataset Zhou et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
05Whale	Aug. DRAEM Zavrtanik et al. (2021)	54.6	91.4	94.4	47.3	0.7	1.4	25.9	0.7	49.5
	SimpleNet Liu et al. (2023)	63.1	93.9	94.4	82.6	2.3	4.9	60.5	2.5	60.7
	Emb. CFA Lee et al. (2022)	65.2	94.4	94.4	73.4	2.3	3.8	54.3	1.9	59.1
	CFLOW-AD Gudovskiy et al. (2022)	54.5	91.0	94.4	85.4	2.7	4.4	63.3	2.2	59.5
	PyramidalFlow Lei et al. (2023)	37.9	84.7	94.4	73.6	1.0	2.4	49.4	1.2	52.0
	Rec. RD Deng & Li (2022)	56.5	92.6	94.5	87.0	3.6	7.1	74.8	3.7	62.2
	DiAD He et al. (2024b)	48.7	91.0	94.4	80.3	2.3	6.6	50.3	3.4	53.4
	ViTAD Zhang et al. (2023a)	58.0	92.5	94.4	88.3	4.0	8.4	76.0	4.4	62.9
	InvAD Zhang et al. (2024a)	<b>75.7</b>	<b>96.6</b>	94.4	<b>89.7</b>	<b>8.6</b>	<b>17.6</b>	<b>81.5</b>	<b>9.6</b>	<b>69.1</b>
	InvAD-lite Zhang et al. (2024a)	64.9	94.5	94.4	89.0	6.1	11.7	78.5	6.2	65.5
	MambaAD He et al. (2024a)	60.2	93.5	94.4	87.5	4.9	9.8	74.4	5.1	63.4
	Hybrid UniAD You et al. (2022)	72.4	95.7	94.5	89.5	3.8	8.2	76.9	4.3	66.1
	RD++ Tien et al. (2023)	52.4	91.7	94.4	86.7	3.7	8.0	74.4	4.1	61.4
	DesTSeg Zhang et al. (2023c)	52.0	91.5	94.4	58.1	4.2	9.0	45.7	4.7	54.3
	Aug. DRAEM Zavrtanik et al. (2021)	44.4	88.1	94.4	44.1	1.0	2.0	23.7	1.0	46.7
	SimpleNet Liu et al. (2023)	63.6	93.5	94.4	90.3	5.5	9.1	71.1	4.8	63.9
06Bird	Emb. CFA Lee et al. (2022)	65.7	92.3	94.7	83.8	4.6	10.8	62.3	5.7	62.3
	CFLOW-AD Gudovskiy et al. (2022)	63.8	91.5	94.4	90.4	3.9	7.1	70.9	3.7	63.2
	PyramidalFlow Lei et al. (2023)	75.7	96.1	94.4	92.6	<b>7.0</b>	<b>13.5</b>	76.6	<b>7.2</b>	68.1
	Rec. RD Deng & Li (2022)	58.5	91.8	94.4	90.6	4.7	8.3	75.4	4.3	63.2
	DiAD He et al. (2024b)	79.5	97.3	<b>95.4</b>	<b>93.3</b>	6.0	12.4	77.0	6.6	65.9
	ViTAD Zhang et al. (2023a)	64.4	93.3	94.5	91.2	4.8	9.8	75.9	5.1	64.7
	InvAD Zhang et al. (2024a)	<b>83.3</b>	<b>97.6</b>	94.7	91.9	6.7	12.5	<b>78.5</b>	6.7	<b>69.6</b>
	InvAD-lite Zhang et al. (2024a)	74.8	95.6	94.7	91.5	5.6	9.9	77.2	5.2	67.2
	MambaAD He et al. (2024a)	64.5	93.7	94.5	91.2	5.0	9.1	76.4	4.7	64.8
	Hybrid UniAD You et al. (2022)	51.3	89.6	94.4	90.2	3.9	7.5	73.0	3.9	61.0
	RD++ Tien et al. (2023)	62.9	92.1	94.5	90.9	4.7	8.3	75.7	4.4	64.0
	DesTSeg Zhang et al. (2023c)	57.1	91.6	94.4	52.2	4.0	4.6	25.6	2.4	51.3
	Aug. DRAEM Zavrtanik et al. (2021)	59.2	88.7	92.8	47.6	0.7	1.8	27.1	0.9	49.8
	SimpleNet Liu et al. (2023)	67.0	92.0	<b>93.4</b>	88.8	3.5	7.5	66.8	3.9	62.9
	Emb. CFA Lee et al. (2022)	58.3	90.8	93.0	73.4	3.2	7.4	53.8	3.8	57.6
	CFLOW-AD Gudovskiy et al. (2022)	64.1	91.9	92.8	90.0	5.7	5.0	66.4	2.6	62.4
07Owl	PyramidalFlow Lei et al. (2023)	44.7	85.0	93.0	85.3	2.2	5.2	64.2	2.7	56.7
	Rec. RD Deng & Li (2022)	63.4	92.2	93.0	91.9	5.0	9.2	77.9	4.8	64.4
	DiAD He et al. (2024b)	62.6	92.5	92.8	93.8	4.9	10.2	71.6	5.3	61.2
	ViTAD Zhang et al. (2023a)	66.8	92.3	92.8	92.5	5.0	10.2	77.6	5.4	65.1
	InvAD Zhang et al. (2024a)	<b>71.0</b>	<b>93.8</b>	<b>93.4</b>	<b>94.0</b>	10.3	<b>19.4</b>	<b>82.5</b>	<b>10.8</b>	<b>68.8</b>
	InvAD-lite Zhang et al. (2024a)	67.4	93.7	92.8	92.4	6.5	11.9	78.6	6.3	66.0
	MambaAD He et al. (2024a)	67.8	93.6	92.8	91.2	4.6	8.2	76.0	4.3	64.9
	Hybrid UniAD You et al. (2022)	61.1	91.5	93.0	91.5	4.1	7.9	74.3	4.1	63.2
	RD++ Tien et al. (2023)	69.4	93.4	92.8	92.0	5.1	9.2	78.2	4.8	65.7
	DesTSeg Zhang et al. (2023c)	65.2	92.6	93.2	53.2	<b>10.7</b>	7.9	35.5	4.1	55.2
	Aug. DRAEM Zavrtanik et al. (2021)	60.4	90.6	93.2	45.8	0.5	0.9	24.3	0.4	49.6
	SimpleNet Liu et al. (2023)	54.4	90.2	93.0	83.8	1.7	2.8	57.6	1.4	57.8
	Emb. CFA Lee et al. (2022)	55.6	89.9	93.0	76.3	2.5	5.1	54.6	2.6	57.1
	CFLOW-AD Gudovskiy et al. (2022)	61.5	90.9	93.2	86.7	1.8	3.4	58.7	1.7	59.8
	PyramidalFlow Lei et al. (2023)	65.2	93.3	93.0	77.6	1.1	2.4	49.2	1.2	58.2
	Rec. RD Deng & Li (2022)	67.4	93.2	93.2	87.9	2.1	3.6	67.2	1.8	62.4
08Sabertooth	DiAD He et al. (2024b)	<b>89.2</b>	<b>98.4</b>	<b>93.8</b>	85.1	1.5	3.0	48.5	1.5	59.9
	ViTAD Zhang et al. (2023a)	61.8	91.9	93.2	88.8	2.1	3.8	67.5	2.0	61.4
	InvAD Zhang et al. (2024a)	73.7	94.9	93.0	<b>90.5</b>	3.5	<b>5.8</b>	<b>74.0</b>	<b>3.0</b>	<b>65.3</b>
	InvAD-lite Zhang et al. (2024a)	69.3	93.7	93.2	88.3	2.8	4.0	68.0	2.1	63.1
	MambaAD He et al. (2024a)	63.3	92.5	93.2	86.9	2.5	3.7	63.9	1.9	61.1
	Hybrid UniAD You et al. (2022)	55.5	89.1	93.0	88.2	2.1	3.7	71.2	1.9	60.2
	RD++ Tien et al. (2023)	64.0	92.2	93.0	87.7	2.2	3.7	66.6	1.9	61.6
	DesTSeg Zhang et al. (2023c)	61.1	92.1	93.0	51.6	<b>4.5</b>	<b>4.5</b>	31.0	2.3	52.5



Table A42: Benchmarked results on MAD\_Sim dataset Zhou et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max			
09Swan	Aug.									
	DRAEM Zavrtanik et al. (2021)	41.6	83.8	93.1	44.7	0.6	1.0	23.4	0.5	45.1
	SimpleNet Liu et al. (2023)	52.6	89.0	93.1	83.7	2.0	4.8	58.1	2.4	57.7
	CFA Lee et al. (2022)	56.6	89.3	93.3	75.1	2.5	7.4	48.4	3.8	56.5
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	47.4	86.7	93.1	85.8	2.2	4.0	60.6	2.0	56.9
	PyramidalFlow Lei et al. (2023)	43.9	85.2	93.1	75.7	1.1	2.6	42.6	1.3	52.3
	RD Deng & Li (2022)	55.6	89.6	93.1	87.7	2.5	4.5	71.1	2.3	60.4
	DiAD He et al. (2024b)	59.6	90.5	<b>93.8</b>	86.8	<b>5.9</b>	<b>11.8</b>	54.7	<b>6.3</b>	57.6
	ViTAD Zhang et al. (2023a)	52.8	88.1	93.2	90.0	3.0	6.0	73.1	3.1	60.5
	InvAD Zhang et al. (2024a)	<b>68.9</b>	<b>93.7</b>	93.1	<b>91.6</b>	<b>5.9</b>	<b>11.5</b>	<b>80.1</b>	<b>6.1</b>	<b>66.3</b>
	InvAD-lite Zhang et al. (2024a)	59.9	90.7	93.1	89.8	4.0	7.8	76.1	4.1	62.8
	MambaAD He et al. (2024a)	54.7	88.7	93.1	87.2	2.4	4.3	69.0	2.2	59.8
	Rec.									
	UniAD You et al. (2022)	52.5	87.5	93.1	88.4	2.7	5.0	71.3	2.5	59.8
	RD++ Tien et al. (2023)	53.9	88.9	93.1	87.6	2.4	4.5	70.6	2.3	60.0
	DesTSeg Zhang et al. (2023c)	54.7	89.3	93.1	50.9	2.5	2.3	29.0	1.2	50.1
10Sheep	Hybrid									
	DRAEM Zavrtanik et al. (2021)	44.9	86.4	92.7	44.1	0.8	1.7	27.5	0.9	46.6
	SimpleNet Liu et al. (2023)	60.4	91.3	92.7	90.5	3.8	6.8	76.8	3.5	63.0
	CFA Lee et al. (2022)	65.9	92.2	93.1	85.1	3.9	8.6	67.7	4.5	62.5
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	61.4	89.8	92.9	92.0	3.8	6.1	79.3	3.1	63.3
	PyramidalFlow Lei et al. (2023)	54.4	89.6	92.7	90.6	2.3	5.0	71.8	2.6	60.7
	RD Deng & Li (2022)	64.4	92.6	92.7	92.6	5.3	9.2	84.5	4.8	65.6
	DiAD He et al. (2024b)	<b>85.0</b>	<b>96.8</b>	<b>94.1</b>	93.3	4.1	8.5	76.0	4.4	65.4
	ViTAD Zhang et al. (2023a)	64.8	92.0	92.7	93.4	4.8	9.3	84.8	4.9	65.6
	InvAD Zhang et al. (2024a)	84.6	<b>97.1</b>	93.6	<b>94.0</b>	<b>8.2</b>	<b>13.6</b>	<b>87.1</b>	<b>7.3</b>	<b>71.2</b>
	InvAD-lite Zhang et al. (2024a)	78.7	95.9	93.4	93.5	6.7	10.1	85.2	5.3	69.1
	MambaAD He et al. (2024a)	70.1	93.8	92.9	92.8	5.5	9.4	84.0	4.9	66.8
	Rec.									
	UniAD You et al. (2022)	57.4	90.3	92.7	93.3	4.8	8.2	83.3	4.3	63.8
11Pig	Hybrid									
	RD++ Tien et al. (2023)	71.4	94.2	92.9	92.7	6.2	10.6	84.3	5.6	67.3
	DesTSeg Zhang et al. (2023c)	67.5	93.7	92.7	53.1	<b>8.5</b>	8.1	39.0	4.2	55.9
	DRAEM Zavrtanik et al. (2021)	51.2	90.2	94.0	54.8	1.0	1.6	28.9	0.8	50.0
	SimpleNet Liu et al. (2023)	54.8	90.9	94.0	94.0	6.4	12.8	75.7	6.8	63.6
	CFA Lee et al. (2022)	54.7	90.6	94.0	87.4	7.5	14.9	61.9	8.1	61.3
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	51.4	89.3	94.0	92.3	3.5	5.5	74.5	2.8	61.1
	PyramidalFlow Lei et al. (2023)	56.4	91.0	94.0	89.8	2.7	5.5	66.9	2.8	60.8
	RD Deng & Li (2022)	58.2	91.8	94.0	94.3	6.5	11.8	83.5	6.3	65.2
	DiAD He et al. (2024b)	44.0	90.1	94.0	93.7	9.4	16.8	70.9	9.2	59.9
	ViTAD Zhang et al. (2023a)	58.4	91.1	94.0	95.9	8.8	17.0	83.3	9.3	66.2
	InvAD Zhang et al. (2024a)	<b>72.3</b>	<b>95.1</b>	<b>94.4</b>	<b>96.9</b>	<b>18.9</b>	<b>27.6</b>	<b>87.9</b>	<b>16.0</b>	<b>72.5</b>
	InvAD-lite Zhang et al. (2024a)	71.8	<b>95.1</b>	94.2	96.3	16.4	24.4	86.4	13.9	71.5
	MambaAD He et al. (2024a)	67.4	94.2	94.2	95.2	10.6	18.5	84.5	10.2	68.7
12Zalika	Rec.									
	UniAD You et al. (2022)	46.7	86.8	94.0	93.6	3.8	7.3	78.8	3.8	60.9
	RD++ Tien et al. (2023)	58.7	92.1	94.0	94.7	7.2	14.1	83.9	7.6	65.8
	DesTSeg Zhang et al. (2023c)	63.0	92.9	94.0	57.5	7.1	11.7	37.9	6.2	55.9
	Hybrid									
	DRAEM Zavrtanik et al. (2021)	43.6	84.1	92.9	43.4	1.1	2.3	25.0	1.2	45.7
	SimpleNet Liu et al. (2023)	57.1	88.2	<b>93.1</b>	84.2	4.0	8.4	59.5	4.4	59.2
	CFA Lee et al. (2022)	54.8	90.0	92.9	73.9	4.2	9.2	53.5	4.8	57.2
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	51.4	88.0	92.9	86.0	4.4	6.9	55.3	3.6	57.8
	PyramidalFlow Lei et al. (2023)	43.8	85.3	92.9	79.1	2.2	4.1	57.5	2.1	54.9
	RD Deng & Li (2022)	59.3	92.0	92.9	87.2	4.9	8.6	69.9	4.5	62.0
	DiAD He et al. (2024b)	46.6	86.6	92.9	85.2	4.4	6.9	42.0	3.6	52.1
	ViTAD Zhang et al. (2023a)	54.9	91.0	92.9	87.3	4.7	8.7	67.5	4.6	60.8
	InvAD Zhang et al. (2024a)	<b>64.0</b>	<b>92.3</b>	92.9	<b>90.2</b>	10.0	<b>18.1</b>	<b>76.5</b>	10.0	<b>65.9</b>
	InvAD-lite Zhang et al. (2024a)	60.9	92.1	92.9	88.6	7.0	11.5	72.3	6.1	63.4
	MambaAD He et al. (2024a)	58.3	91.6	92.9	87.2	5.2	8.7	68.9	4.5	61.7
12Zalika	Rec.									
	UniAD You et al. (2022)	52.1	88.9	92.9	85.9	3.4	6.0	64.8	3.1	59.0
	RD++ Tien et al. (2023)	55.5	90.5	92.9	87.0	5.1	8.2	69.3	4.3	61.0
	DesTSeg Zhang et al. (2023c)	52.3	88.9	92.9	52.2	4.0	5.7	38.5	2.9	51.6



Table A43: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
13Pheonix	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.9	89.6	94.3	45.4	0.6	1.0	22.8	0.5	48.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	55.7	90.2	94.4	80.7	1.5	3.3	56.9	1.7	57.9
	Emb. CFA <a href="#">Lee et al. (2022)</a>	54.1	90.4	94.3	77.4	2.0	5.5	58.0	2.8	57.7
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	52.1	89.7	94.3	82.4	1.4	2.7	57.2	1.4	57.3
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	48.0	87.6	94.3	72.8	0.9	2.1	54.1	1.0	54.6
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	53.5	90.5	94.3	83.6	2.5	3.5	70.0	1.8	59.7
	DiAD <a href="#">He et al. (2024b)</a>	41.5	86.8	94.3	83.2	1.4	3.0	49.1	1.5	51.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	52.6	89.9	94.3	84.8	1.8	3.5	68.4	1.8	59.3
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>62.7</b>	<b>92.9</b>	<b>94.6</b>	<b>87.0</b>	<b>3.6</b>	<b>7.2</b>	<b>77.5</b>	<b>3.7</b>	<b>63.6</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	56.0	91.6	94.3	85.3	3.2	5.3	74.0	2.7	61.3
	MambaAD <a href="#">He et al. (2024a)</a>	55.7	91.7	94.4	83.7	2.8	3.7	70.7	1.9	60.4
	Hybrid UniAD <a href="#">You et al. (2022)</a>	55.1	90.2	94.3	83.8	1.5	3.1	64.5	1.6	59.0
	RD++ <a href="#">Tien et al. (2023)</a>	54.7	90.6	94.4	84.1	1.9	3.6	71.0	1.8	60.0
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	53.3	91.0	94.3	52.5	2.2	4.2	35.5	2.1	51.6
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.4	89.5	<b>93.9</b>	52.4	1.1	1.9	25.9	0.9	49.1
	SimpleNet <a href="#">Liu et al. (2023)</a>	58.7	91.9	<b>93.9</b>	64.9	2.2	4.9	54.8	2.5	56.6
14Elephant	Emb. CFA <a href="#">Lee et al. (2022)</a>	54.2	90.9	<b>93.9</b>	61.8	1.9	3.8	45.8	1.9	54.0
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	55.7	91.4	<b>93.9</b>	68.2	2.2	3.8	49.7	1.9	55.7
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	44.5	87.3	<b>93.9</b>	63.7	1.4	3.1	45.2	1.6	51.8
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	58.3	91.7	<b>93.9</b>	69.9	2.9	6.6	64.6	3.4	58.6
	DiAD <a href="#">He et al. (2024b)</a>	<b>68.7</b>	<b>95.1</b>	<b>93.9</b>	<b>74.2</b>	1.9	3.9	44.7	2.0	54.6
	ViTAD <a href="#">Zhang et al. (2023a)</a>	57.4	91.9	<b>93.9</b>	70.8	3.1	7.4	64.0	3.8	58.7
	InvAD <a href="#">Zhang et al. (2024a)</a>	63.1	93.3	<b>93.9</b>	72.3	4.4	<b>10.8</b>	<b>68.4</b>	<b>5.7</b>	<b>61.2</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	66.2	94.2	<b>93.9</b>	70.5	3.6	8.2	66.0	4.3	60.9
	MambaAD <a href="#">He et al. (2024a)</a>	66.2	94.4	<b>93.9</b>	69.6	3.1	7.2	63.5	3.7	60.3
	Hybrid UniAD <a href="#">You et al. (2022)</a>	55.7	90.5	<b>93.9</b>	68.5	1.9	4.1	59.2	2.1	56.7
	RD++ <a href="#">Tien et al. (2023)</a>	60.7	92.5	<b>93.9</b>	70.2	3.0	6.9	63.5	3.6	59.1
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	60.0	91.9	<b>93.9</b>	53.5	<b>5.3</b>	8.1	46.9	4.2	55.2
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.8	86.4	91.8	48.6	0.8	1.4	24.1	0.7	47.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	62.2	90.3	91.8	80.3	2.4	4.8	53.2	2.4	58.3
	Emb. CFA <a href="#">Lee et al. (2022)</a>	55.6	88.6	91.8	69.4	2.2	5.0	44.5	2.5	54.5
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	52.9	86.3	<b>92.0</b>	83.5	2.9	5.2	60.5	2.7	57.5
15Parrot	PyramidalFlow <a href="#">Lei et al. (2023)</a>	<b>62.3</b>	90.4	<b>92.0</b>	81.5	3.0	6.6	66.1	3.4	60.4
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	54.6	87.9	<b>92.0</b>	83.9	3.2	6.7	67.2	3.5	59.2
	DiAD <a href="#">He et al. (2024b)</a>	52.4	88.4	91.8	83.6	2.5	5.6	63.4	2.9	55.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	50.5	87.3	91.8	83.7	3.2	7.1	66.6	3.7	58.3
	InvAD <a href="#">Zhang et al. (2024a)</a>	60.8	<b>90.9</b>	<b>92.0</b>	<b>86.3</b>	6.5	<b>13.4</b>	<b>73.9</b>	<b>7.2</b>	<b>63.1</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	57.0	89.6	91.8	85.1	4.2	8.4	69.1	4.4	60.6
	MambaAD <a href="#">He et al. (2024a)</a>	55.1	88.9	91.8	84.1	3.5	6.5	65.9	3.4	59.3
	Hybrid UniAD <a href="#">You et al. (2022)</a>	42.9	83.7	91.8	84.4	2.9	5.4	65.8	2.8	56.2
	RD++ <a href="#">Tien et al. (2023)</a>	49.2	86.2	<b>92.0</b>	84.1	3.2	6.6	66.7	3.4	58.0
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	52.4	88.7	91.8	52.0	<b>9.9</b>	5.6	24.8	2.9	50.4
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.5	89.9	94.3	43.0	0.6	1.5	24.4	0.7	47.8
	SimpleNet <a href="#">Liu et al. (2023)</a>	58.3	91.8	94.3	92.1	2.5	5.7	79.3	2.9	63.2
	Emb. CFA <a href="#">Lee et al. (2022)</a>	54.6	90.9	<b>94.4</b>	82.6	2.7	8.1	59.8	4.2	59.1
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	52.0	90.1	94.3	93.1	2.3	4.8	80.5	2.5	62.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	49.2	88.6	94.3	91.1	1.7	3.8	70.2	1.9	59.5
16Cat	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	52.4	90.1	94.3	93.6	3.1	6.3	84.8	3.3	62.9
	DiAD <a href="#">He et al. (2024b)</a>	45.8	88.0	94.3	93.7	3.0	5.3	81.8	2.7	58.8
	ViTAD <a href="#">Zhang et al. (2023a)</a>	57.2	92.0	94.3	93.8	3.2	6.3	84.6	3.3	64.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>58.9</b>	92.1	94.3	<b>94.5</b>	<b>5.3</b>	<b>11.0</b>	<b>86.9</b>	<b>5.8</b>	<b>65.6</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	58.5	<b>92.5</b>	94.3	94.2	3.7	7.4	85.6	3.9	64.7
	MambaAD <a href="#">He et al. (2024a)</a>	54.5	91.0	<b>94.4</b>	94.0	3.5	7.0	84.9	3.6	63.7
	Hybrid UniAD <a href="#">You et al. (2022)</a>	51.7	89.5	94.3	93.8	2.7	5.6	82.4	2.9	62.3
	RD++ <a href="#">Tien et al. (2023)</a>	53.9	90.8	94.3	93.4	3.4	6.3	84.5	3.3	63.3
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	56.2	90.5	94.3	52.8	1.4	3.1	30.6	1.6	51.2

Table A44: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
17Scorpion	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	48.4	86.4	92.9	51.5	0.7	1.4	25.6	0.7	47.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	72.7	94.5	93.1	88.4	4.0	6.5	67.9	3.4	64.2
	Emb. CFA <a href="#">Lee et al. (2022)</a>	68.3	92.4	93.0	78.9	4.1	7.0	55.9	3.6	60.5
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	59.7	91.0	92.9	89.6	4.6	4.9	68.1	2.5	61.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	57.6	87.3	93.1	83.4	1.9	5.1	53.1	2.6	57.6
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	60.1	91.2	92.9	91.3	4.8	7.4	82.3	3.8	63.9
	DiAD <a href="#">He et al. (2024b)</a>	<b>84.8</b>	<b>96.9</b>	<b>93.8</b>	87.0	1.9	3.5	56.5	1.8	60.6
	ViTAD <a href="#">Zhang et al. (2023a)</a>	60.1	90.5	93.1	91.2	3.3	7.7	77.6	4.0	63.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	81.5	96.7	93.3	<b>93.6</b>	<b>7.2</b>	<b>10.5</b>	<b>86.1</b>	<b>5.6</b>	<b>69.9</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	73.5	94.7	92.9	93.3	6.1	8.6	84.8	4.5	67.6
	MambaAD <a href="#">He et al. (2024a)</a>	73.0	94.6	93.0	93.0	5.5	8.2	83.6	4.3	67.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	63.5	90.9	92.9	91.7	4.4	7.2	79.1	3.8	64.0
	RD++ <a href="#">Tien et al. (2023)</a>	64.1	92.3	92.9	91.7	5.4	7.9	82.4	4.1	65.0
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	77.8	95.9	93.1	60.6	5.4	9.7	44.3	5.1	59.5
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	43.9	87.1	94.1	47.5	1.0	1.8	26.9	0.9	47.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	63.3	93.6	94.1	92.4	15.8	21.7	81.6	12.2	68.3
18Obesobeso	Emb. CFA <a href="#">Lee et al. (2022)</a>	62.9	93.2	94.1	81.8	12.6	20.0	64.6	11.1	64.1
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	59.6	91.6	94.1	92.5	5.8	8.8	79.4	4.6	64.2
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	61.7	93.2	94.1	91.9	4.5	8.8	74.7	4.6	64.0
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	64.6	94.0	94.1	93.5	11.6	20.7	87.8	11.5	68.8
	DiAD <a href="#">He et al. (2024b)</a>	<b>87.5</b>	<b>98.3</b>	<b>94.4</b>	<b>95.1</b>	10.2	17.7	82.9	9.7	69.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	67.5	94.4	94.1	94.3	<b>18.2</b>	24.7	88.3	14.1	70.9
	InvAD <a href="#">Zhang et al. (2024a)</a>	83.5	97.6	94.2	94.8	16.6	<b>26.3</b>	<b>90.8</b>	<b>15.1</b>	<b>74.4</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	70.3	95.3	94.2	93.7	12.9	21.2	88.1	11.8	70.3
	MambaAD <a href="#">He et al. (2024a)</a>	69.6	95.0	94.2	93.0	10.9	20.2	86.4	11.3	69.4
	Hybrid UniAD <a href="#">You et al. (2022)</a>	64.9	93.4	94.1	92.2	6.9	12.9	82.4	6.9	66.4
	RD++ <a href="#">Tien et al. (2023)</a>	67.7	94.0	<b>94.4</b>	93.2	9.1	17.4	86.5	9.5	68.5
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	63.1	93.1	94.2	61.1	16.2	22.4	45.0	12.6	59.8
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.1	89.3	93.3	49.3	0.8	1.3	23.0	0.7	48.7
	SimpleNet <a href="#">Liu et al. (2023)</a>	63.0	92.8	93.5	88.4	7.0	12.8	68.6	6.8	63.7
	Emb. CFA <a href="#">Lee et al. (2022)</a>	63.0	92.4	93.5	80.7	5.5	12.1	57.5	6.4	61.0
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	60.9	91.3	93.3	88.9	3.7	6.4	64.6	3.3	61.4
19Bear	PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.6	89.6	93.6	87.2	3.6	6.3	61.0	3.3	59.1
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	62.9	92.2	93.6	90.8	6.2	10.8	76.8	5.7	64.5
	DiAD <a href="#">He et al. (2024b)</a>	59.1	92.9	93.3	89.4	4.2	10.5	62.6	5.5	58.8
	ViTAD <a href="#">Zhang et al. (2023a)</a>	60.9	91.2	93.5	91.1	5.5	11.5	75.1	6.1	63.8
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>73.9</b>	<b>95.4</b>	93.3	<b>92.5</b>	<b>13.8</b>	<b>21.7</b>	<b>82.0</b>	<b>12.2</b>	<b>70.0</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	67.7	93.2	93.3	92.2	11.3	18.1	78.9	10.0	67.4
	MambaAD <a href="#">He et al. (2024a)</a>	64.2	92.9	93.5	91.2	7.9	13.4	76.1	7.2	65.3
	Hybrid UniAD <a href="#">You et al. (2022)</a>	56.8	90.6	93.3	90.0	4.2	7.9	77.2	4.1	62.5
	RD++ <a href="#">Tien et al. (2023)</a>	65.3	93.0	93.5	90.8	7.7	11.8	76.9	6.3	65.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	66.8	93.5	<b>93.7</b>	58.5	9.4	13.7	43.7	7.3	58.0
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	44.7	84.1	92.7	47.9	0.5	0.9	20.7	0.4	45.7
	SimpleNet <a href="#">Liu et al. (2023)</a>	54.6	89.8	92.9	83.1	2.6	4.9	54.4	2.5	57.7
	Emb. CFA <a href="#">Lee et al. (2022)</a>	56.3	90.2	92.9	71.2	3.0	6.9	51.5	3.6	56.5
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	57.5	90.1	92.7	85.2	1.9	4.5	57.1	2.3	58.6
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	56.0	89.4	92.9	81.1	1.5	3.2	53.1	1.6	57.1
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	54.0	89.6	<b>93.0</b>	86.8	3.6	6.3	66.5	3.3	59.8
20Puppy	DiAD <a href="#">He et al. (2024b)</a>	48.7	88.8	92.7	83.4	1.4	2.7	51.9	1.4	52.8
	ViTAD <a href="#">Zhang et al. (2023a)</a>	52.0	87.4	<b>93.0</b>	87.6	2.4	4.9	66.3	2.5	58.9
	InvAD <a href="#">Zhang et al. (2024a)</a>	62.9	92.5	92.9	<b>89.3</b>	5.9	<b>11.0</b>	<b>73.3</b>	<b>5.8</b>	<b>63.8</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	54.0	90.0	<b>93.0</b>	87.5	3.5	6.2	68.2	3.2	60.2
	MambaAD <a href="#">He et al. (2024a)</a>	49.2	87.7	92.7	86.6	2.6	5.3	64.8	2.7	58.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	55.6	89.8	92.7	86.5	3.4	7.9	68.4	4.1	60.5
	RD++ <a href="#">Tien et al. (2023)</a>	59.0	91.5	92.9	87.1	4.1	8.1	66.8	4.2	61.3
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>64.6</b>	<b>93.0</b>	92.9	53.7	<b>13.3</b>	9.5	32.9	5.0	55.4
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	49.5	88.3	93.8	48.4	0.8	1.5	24.5	0.7	48.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	58.9	91.7	93.8	85.5	4.2	8.0	63.9	4.2	60.9
	Emb. CFA <a href="#">Lee et al. (2022)</a>	56.4	91.1	93.8	76.6	4.2	8.7	54.7	4.6	58.2
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	55.8	90.6	93.8	86.9	3.4	5.2	63.9	2.7	60.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.8	88.9	93.8	82.0	2.3	4.8	58.8	2.5	57.4
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	58.6	91.7	93.8	88.3	4.7	8.5	74.2	4.5	62.6
	DiAD <a href="#">He et al. (2024b)</a>	65.7	93.3	<b>94.1</b>	87.2	3.9	7.9	60.1	4.2	58.9
	ViTAD <a href="#">Zhang et al. (2023a)</a>	58.5	91.5	93.8	89.0	5.0	9.5	73.5	5.0	62.8
Avg	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>70.4</b>	<b>94.6</b>	93.9	<b>90.5</b>	<b>8.8</b>	<b>15.7</b>	<b>79.3</b>	<b>8.6</b>	<b>67.4</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	64.7	93.3	93.8	89.4	6.4	11.2	76.1	6.0	64.9
	MambaAD <a href="#">He et al. (2024a)</a>	63.0	92.9	93.8	88.3	5.2	9.4	73.3	5.0	63.6
	Hybrid UniAD <a href="#">You et al. (2022)</a>	54.2	90.0	93.8	88.1	3.5	6.8	71.8	3.5	60.9
	RD++ <a href="#">Tien et al. (2023)</a>	59.3	91.7	93.8	88.3	4.6	8.5	73.8	4.4	62.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	57.9	91.8	93.8	54.5	6.2	7.7	35.8	4.1	53.6

## K DETAILED QUANTITATIVE RESULTS ON UNI-MEDICAL DATASET UNDER 100 EPOCHS

Table A45: Benchmarked results on Uni-Medical dataset [Zhang et al. \(2023a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
brain	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	47.1	82.8	90.6	33.8	2.2	6.1	7.9	43.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	84.8	96.3	91.0	94.5	43.4	43.9	71.4	77.0
		CFA <a href="#">Lee et al. (2022)</a>	82.5	95.9	90.6	75.6	33.0	39.0	36.5	67.8
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	85.7	96.2	91.9	94.5	56.6	17.2	73.8	75.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	62.4	86.1	90.9	85.7	10.4	18.0	50.5	60.5
		RD <a href="#">Deng &amp; Li (2022)</a>	83.9	94.6	91.9	96.5	45.6	48.9	82.8	79.3
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	93.2	97.7	<b>95.2</b>	94.9	35.2	39.8	79.5	76.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	89.4	97.3	93.0	97.7	<b>61.8</b>	58.8	84.0	41.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	90.8	97.7	93.2	97.7	59.1	58.3	86.2	41.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	84.9	95.9	91.8	96.5	46.2	49.2	82.5	32.6
		MambaAD <a href="#">He et al. (2024a)</a>	<b>93.7</b>	<b>98.5</b>	94.2	<b>97.9</b>	60.8	<b>61.5</b>	<b>87.5</b>	<b>44.4</b>
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	90.2	97.7	92.6	97.4	56.2	55.6	82.9	38.5
		RD++ <a href="#">Tien et al. (2023)</a>	84.8	95.5	91.8	96.9	48.5	51.5	84.2	34.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	87.1	95.9	92.2	70.2	52.2	42.7	33.9	27.2
liver	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.1	49.7	61.6	20.0	0.4	1.5	10.2	0.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	60.5	50.6	62.2	94.2	6.0	11.6	81.5	6.2
		CFA <a href="#">Lee et al. (2022)</a>	52.9	48.1	61.3	88.0	4.7	11.1	60.5	5.9
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.9	<b>56.1</b>	63.0	95.9	2.9	5.6	87.4	2.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	47.2	43.2	60.9	75.0	3.3	11.5	9.0	6.1
		RD <a href="#">Deng &amp; Li (2022)</a>	55.5	45.8	64.4	96.6	5.5	10.4	91.1	5.5
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	56.5	51.7	62.0	96.4	5.5	10.6	89.6	5.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	63.9	54.9	65.1	<b>97.9</b>	13.2	<b>21.4</b>	92.6	<b>12.0</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>64.2</b>	52.8	<b>65.9</b>	97.0	7.8	14.5	<b>92.9</b>	7.8
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	57.0	46.6	63.8	96.4	5.3	9.8	90.6	5.1
		MambaAD <a href="#">He et al. (2024a)</a>	<b>64.2</b>	54.6	64.5	97.0	10.0	17.4	92.6	9.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	60.3	48.3	63.1	97.1	7.9	14.0	92.7	7.5
		RD++ <a href="#">Tien et al. (2023)</a>	55.6	44.8	64.4	96.6	5.5	10.3	91.5	5.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	58.5	47.8	61.4	57.6	<b>13.8</b>	15.6	31.4	8.5
retinal	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.7	49.4	59.7	47.8	3.5	9.6	13.3	5.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	87.0	86.2	76.8	94.2	53.9	52.5	78.2	35.6
		CFA <a href="#">Lee et al. (2022)</a>	77.7	75.8	67.4	71.4	20.7	24.5	37.3	14.0
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	88.0	86.5	76.8	95.8	61.6	57.9	84.1	40.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.3	42.7	59.7	75.9	11.4	21.8	43.2	12.2
		RD <a href="#">Deng &amp; Li (2022)</a>	89.0	86.8	78.2	96.4	65.1	60.1	86.5	43.0
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	86.6	82.0	76.0	96.1	61.8	56.2	83.8	39.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	92.1	90.0	81.9	95.6	69.8	64.2	83.5	47.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	92.2	<b>91.0</b>	82.4	<b>97.1</b>	<b>71.9</b>	<b>65.5</b>	<b>88.7</b>	<b>48.7</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	91.7	89.2	81.8	95.7	65.3	59.0	84.4	41.9
		MambaAD <a href="#">He et al. (2024a)</a>	<b>93.8</b>	89.1	<b>86.9</b>	95.5	66.4	63.5	84.6	46.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	86.3	82.4	75.8	95.3	53.8	53.7	82.5	36.7
		RD++ <a href="#">Tien et al. (2023)</a>	91.2	89.2	81.3	96.7	70.4	64.9	87.6	48.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	90.0	87.4	81.0	69.2	59.0	43.7	40.4	27.9
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.6	60.6	70.6	33.8	2.0	5.7	10.5	3.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	77.5	77.7	76.7	94.3	34.4	36.0	77.0	23.3
		CFA <a href="#">Lee et al. (2022)</a>	71.0	73.3	73.1	78.3	19.5	24.9	44.7	14.7
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.2	79.6	77.2	95.4	40.4	26.9	81.8	17.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	53.9	57.3	70.5	78.8	8.4	17.1	34.2	9.4
		RD <a href="#">Deng &amp; Li (2022)</a>	76.1	75.7	78.2	96.5	38.8	39.8	86.8	26.9
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	78.8	77.2	77.7	95.8	34.2	35.5	84.3	23.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	81.8	80.7	80.0	97.1	<b>48.3</b>	<b>48.2</b>	86.7	<b>33.7</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	82.4	80.5	80.5	<b>97.3</b>	46.2	46.1	<b>89.3</b>	32.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	77.9	77.3	79.1	96.2	39.0	39.3	85.8	26.5
		MambaAD <a href="#">He et al. (2024a)</a>	<b>83.9</b>	<b>80.8</b>	<b>81.9</b>	96.8	45.8	47.5	88.2	33.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	79.0	76.1	77.1	96.6	39.3	41.1	86.0	27.6
		RD++ <a href="#">Tien et al. (2023)</a>	77.2	76.5	79.2	96.7	41.5	42.2	87.8	29.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	78.5	77.0	78.2	65.7	41.7	34.0	35.3	21.2

## L DETAILED QUANTITATIVE RESULTS ON REAL-IAD DATASET UNDER 100 EPOCHS

Table A46: Benchmarked results on Real-IAD dataset [Wang et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
audiojack	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.0	36.9	51.4	42.8	0.1	0.3	13.7	0.2	30.7
	SimpleNet <a href="#">Liu et al. (2023)</a>	51.4	36.3	50.9	66.0	0.2	0.9	37.6	0.5	36.2
	Emb. CFA <a href="#">Lee et al. (2022)</a>	57.3	41.9	52.1	86.5	0.5	1.6	57.1	0.8	43.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	77.4	70.8	60.9	95.4	16.4	15.4	73.2	8.3	59.9
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	51.7	34.9	50.7	81.7	0.2	0.4	40.7	0.2	38.3
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	76.0	62.8	60.6	96.7	13.1	22.1	80.6	12.4	59.8
	DiAD <a href="#">He et al. (2024b)</a>	76.5	54.3	65.7	91.6	1.0	3.9	63.3	2.0	50.9
	ViTAD <a href="#">Zhang et al. (2023a)</a>	80.6	72.8	63.5	96.8	21.3	31.5	79.5	18.7	64.8
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>85.2</b>	<b>80.7</b>	<b>69.3</b>	<b>98.5</b>	<b>33.9</b>	<b>43.8</b>	<b>89.6</b>	<b>28.0</b>	<b>72.4</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	84.3	78.7	67.8	98.1	<u>32.4</u>	40.8	87.0	25.6	70.8
	MambaAD <a href="#">He et al. (2024a)</a>	84.9	<u>77.7</u>	<u>68.2</u>	98.0	22.2	30.4	86.2	17.9	68.1
	Hybrid UniAD <a href="#">You et al. (2022)</a>	81.7	76.2	65.4	97.6	20.7	31.1	84.1	18.4	66.4
	RD++ <a href="#">Tien et al. (2023)</a>	76.0	60.0	61.5	96.6	10.6	20.1	80.4	11.2	58.9
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	81.6	74.7	66.5	88.3	<b>44.9</b>	<b>50.7</b>	64.5	<b>34.0</b>	<u>68.2</u>
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	46.9	40.9	60.2	35.2	0.0	0.1	9.7	0.0	30.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	47.4	41.0	60.2	80.1	0.5	3.7	35.8	1.9	39.8
bottle_cap	Emb. CFA <a href="#">Lee et al. (2022)</a>	55.7	49.7	60.2	85.2	0.5	2.4	57.0	1.2	45.7
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	80.0	78.3	71.7	98.8	13.6	22.6	91.9	12.7	66.7
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.4	46.7	60.3	93.2	0.7	2.6	72.0	1.3	48.1
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	89.6	86.3	81.2	<u>99.4</u>	18.6	28.6	96.3	16.7	73.2
	DiAD <a href="#">He et al. (2024b)</a>	91.6	94.0	<b>87.9</b>	94.6	4.9	11.4	73.0	6.0	65.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	82.2	78.8	74.8	98.7	16.7	27.5	91.5	16.0	68.6
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>95.5</b>	<b>94.9</b>	85.9	99.6	<u>24.9</u>	<b>33.9</b>	97.2	<b>20.4</b>	<b>78.0</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	92.6	91.2	81.9	99.6	21.2	28.5	<b>97.5</b>	16.6	<u>75.1</u>
	MambaAD <a href="#">He et al. (2024a)</a>	<u>93.2</u>	<u>92.6</u>	<u>82.7</u>	<b>99.7</b>	<b>29.9</b>	<u>33.8</u>	97.4	<u>20.3</u>	<u>77.3</u>
	Hybrid UniAD <a href="#">You et al. (2022)</a>	91.6	90.6	80.4	99.4	21.0	30.5	95.8	18.0	74.6
	RD++ <a href="#">Tien et al. (2023)</a>	89.7	86.7	81.5	99.3	18.9	30.4	95.6	17.9	73.5
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	75.5	74.5	65.9	71.1	<u>27.3</u>	<u>31.7</u>	43.2	18.9	57.6
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	34.4	46.9	72.4	51.8	0.5	0.9	17.8	0.4	34.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	60.4	68.6	72.4	78.0	9.4	15.4	38.3	8.4	51.2
	Emb. CFA <a href="#">Lee et al. (2022)</a>	53.2	57.9	72.5	84.3	1.6	3.2	54.8	1.6	48.6
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	66.0	75.1	72.7	95.6	29.2	25.8	74.8	14.8	63.8
button_battery	PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.5	56.4	72.5	50.2	17.5	0.8	15.0	0.4	40.7
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	74.7	79.7	75.9	97.7	34.5	39.4	86.4	24.5	70.6
	DiAD <a href="#">He et al. (2024b)</a>	80.5	71.3	70.6	84.1	1.4	5.3	66.9	2.7	54.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	77.0	82.2	77.6	<u>98.3</u>	49.1	49.6	82.7	32.9	74.4
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>90.4</b>	<b>92.5</b>	<b>84.6</b>	<b>99.1</b>	<b>57.2</b>	<b>56.1</b>	<b>92.6</b>	<b>39.0</b>	<b>82.7</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	82.0	86.9	78.4	98.5	<u>51.1</u>	<u>52.4</u>	89.0	35.5	<u>77.6</u>
	MambaAD <a href="#">He et al. (2024a)</a>	82.8	87.4	79.2	98.3	48.6	49.6	88.1	33.0	<u>77.1</u>
	Hybrid UniAD <a href="#">You et al. (2022)</a>	72.8	79.8	74.6	96.5	29.5	33.7	78.7	20.3	67.7
	RD++ <a href="#">Tien et al. (2023)</a>	76.5	82.2	75.8	97.9	38.4	42.7	87.1	27.2	72.3
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	84.6	87.8	<u>81.2</u>	92.2	<u>55.7</u>	<u>53.7</u>	60.4	<u>36.7</u>	75.0
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	48.1	57.5	72.9	54.9	0.1	0.3	21.0	0.1	39.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	52.4	59.6	72.9	65.5	0.3	1.8	39.0	0.9	44.1
	Emb. CFA <a href="#">Lee et al. (2022)</a>	55.3	62.5	73.3	72.8	0.4	2.7	40.0	1.4	46.3
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.7	72.7	72.9	87.6	3.5	5.9	60.3	3.0	54.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.7	63.8	73.0	77.2	0.4	1.9	33.2	1.0	46.2
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	80.0	84.0	78.2	96.5	12.3	<u>21.9</u>	89.4	<u>12.3</u>	67.9
end_cap	DiAD <a href="#">He et al. (2024b)</a>	<b>85.1</b>	83.4	<b>84.8</b>	81.3	2.0	6.9	38.2	3.6	54.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	72.6	77.1	75.2	93.8	5.7	12.2	75.9	6.5	60.9
	InvAD <a href="#">Zhang et al. (2024a)</a>	84.1	<b>87.7</b>	<u>80.3</u>	<b>98.0</b>	<b>14.7</b>	<b>22.7</b>	<b>93.5</b>	<b>12.8</b>	<b>70.6</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	79.8	84.2	<u>78.3</u>	97.4	13.5	21.0	91.5	11.8	68.3
	MambaAD <a href="#">He et al. (2024a)</a>	78.6	83.1	<u>77.4</u>	97.2	12.2	19.5	90.3	10.8	67.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	80.9	<u>86.3</u>	77.8	95.5	9.5	17.7	86.4	9.7	67.0
	RD++ <a href="#">Tien et al. (2023)</a>	79.7	84.3	77.8	96.8	<u>12.6</u>	22.6	90.4	<u>12.7</u>	<u>68.1</u>
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	72.7	76.8	74.9	75.3	10.3	18.7	53.2	10.3	57.1

Table A47: Benchmarked results on Real-IAD dataset Wang et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
eraser	Aug.									
	DRAEM Zavrtanik et al. (2021)	53.8	42.8	55.9	42.6	0.1	0.2	11.2	0.1	32.2
	SimpleNet Liu et al. (2023)	53.4	46.3	55.8	87.6	3.8	8.7	59.8	4.6	45.9
	CFA Lee et al. (2022)	51.2	43.0	55.9	78.5	1.8	5.8	57.6	3.0	43.0
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	88.6	87.5	77.6	98.9	23.2	26.9	93.4	15.6	72.6
	PyramidalFlow Lei et al. (2023)	57.8	42.5	57.3	88.8	0.7	2.6	60.3	1.3	45.3
	Rec.									
	RD Deng & Li (2022)	90.0	88.5	79.4	<b>99.5</b>	30.6	35.9	96.3	21.9	75.8
	DiAD He et al. (2024b)	80.0	80.0	77.3	91.1	7.7	15.4	67.5	8.4	59.9
	ViTAD Zhang et al. (2023a)	86.0	85.1	74.5	98.5	24.8	32.4	89.3	19.3	71.6
	InvAD Zhang et al. (2024a)	<b>92.1</b>	<b>90.3</b>	<b>81.7</b>	<u>99.4</u>	<u>30.4</u>	<u>36.1</u>	<u>95.1</u>	<u>22.0</u>	<b>76.6</b>
	InvAD-lite Zhang et al. (2024a)	88.7	87.2	77.4	<u>99.3</u>	28.9	33.6	94.8	20.2	74.3
	MambaAD He et al. (2024a)	88.4	86.9	76.7	99.2	27.4	35.7	93.8	21.7	74.0
	Hybrid									
	UniAD You et al. (2022)	90.2	88.8	<u>80.2</u>	99.3	25.4	32.0	94.4	19.1	74.6
	RD++ Tien et al. (2023)	90.6	89.4	<u>79.7</u>	<b>99.5</b>	29.2	35.9	<b>96.8</b>	21.9	76.0
	DesTSeg Zhang et al. (2023c)	80.5	79.5	68.4	83.3	<b>53.8</b>	<b>53.0</b>	56.0	<b>36.1</b>	68.8
fire hood	Aug.									
	DRAEM Zavrtanik et al. (2021)	56.3	39.5	53.4	42.7	0.1	0.2	9.9	0.1	31.5
	SimpleNet Liu et al. (2023)	51.3	39.9	52.9	76.8	1.1	4.8	39.9	2.5	39.3
	CFA Lee et al. (2022)	56.2	40.6	52.9	79.6	0.4	1.4	42.0	0.7	40.4
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	80.3	73.8	68.2	98.1	21.6	22.7	86.0	12.8	65.6
	PyramidalFlow Lei et al. (2023)	56.5	39.1	54.1	50.0	0.2	0.1	15.4	0.1	33.2
	Rec.									
	RD Deng & Li (2022)	78.4	70.8	64.5	<u>98.9</u>	<u>28.3</u>	<u>34.6</u>	88.4	20.9	66.9
	DiAD He et al. (2024b)	<b>83.3</b>	<b>81.7</b>	<b>80.5</b>	91.8	3.2	9.2	66.7	4.8	59.5
	ViTAD Zhang et al. (2023a)	75.6	67.8	60.6	98.0	18.0	27.8	82.5	16.1	62.3
	InvAD Zhang et al. (2024a)	82.1	75.1	68.3	<b>99.0</b>	28.2	35.3	<b>89.4</b>	21.5	<b>69.1</b>
	InvAD-lite Zhang et al. (2024a)	80.0	73.6	65.6	98.8	24.4	31.6	87.5	18.7	66.8
	MambaAD He et al. (2024a)	79.9	73.5	65.4	98.7	25.9	33.0	86.8	19.7	67.0
	Hybrid									
	UniAD You et al. (2022)	80.3	<u>74.5</u>	66.8	98.6	25.6	33.5	84.8	20.1	<u>67.2</u>
	RD++ Tien et al. (2023)	80.5	73.7	66.7	98.9	<b>29.2</b>	<b>36.6</b>	<b>89.4</b>	<b>22.4</b>	<u>68.6</u>
	DesTSeg Zhang et al. (2023c)	75.6	65.6	61.5	78.4	26.7	34.1	45.9	20.6	56.9
mint	Aug.									
	DRAEM Zavrtanik et al. (2021)	51.8	46.9	64.0	45.3	0.1	0.1	13.9	0.1	34.5
	SimpleNet Liu et al. (2023)	55.7	51.9	63.8	73.1	0.5	3.0	26.8	1.5	41.5
	CFA Lee et al. (2022)	51.2	49.0	63.8	77.1	0.1	0.3	39.2	0.2	41.9
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	63.6	64.1	63.7	92.8	8.7	12.8	61.4	6.8	53.9
	PyramidalFlow Lei et al. (2023)	57.0	51.2	63.8	50.0	0.0	0.1	15.0	0.1	36.8
	Rec.									
	RD Deng & Li (2022)	66.3	64.6	65.1	94.9	12.8	23.8	73.5	13.5	58.3
	DiAD He et al. (2024b)	76.7	76.7	<b>76.0</b>	91.1	5.7	11.6	64.2	6.2	57.4
	ViTAD Zhang et al. (2023a)	69.2	70.1	64.9	94.7	13.9	26.6	70.0	15.3	59.7
	InvAD Zhang et al. (2024a)	<b>76.8</b>	<b>77.1</b>	68.9	<b>98.2</b>	<u>18.5</u>	<b>29.1</b>	<b>82.8</b>	<b>17.0</b>	<b>65.7</b>
	InvAD-lite Zhang et al. (2024a)	72.0	73.1	<u>66.2</u>	<u>97.3</u>	<u>17.9</u>	28.6	<u>80.0</u>	<u>16.7</u>	<u>63.2</u>
	MambaAD He et al. (2024a)	72.6	73.8	<u>66.2</u>	97.1	16.7	27.2	76.9	15.8	62.7
	Hybrid									
	UniAD You et al. (2022)	67.6	68.6	64.4	94.6	9.3	22.2	63.2	12.5	57.1
	RD++ Tien et al. (2023)	67.6	66.6	65.2	96.2	13.7	25.2	76.9	14.4	59.7
	DesTSeg Zhang et al. (2023c)	62.8	60.6	64.2	66.5	<b>21.1</b>	<u>27.5</u>	27.5	15.9	49.1
mounts	Aug.									
	DRAEM Zavrtanik et al. (2021)	49.8	34.4	52.1	37.5	0.1	0.2	10.3	0.1	28.7
	SimpleNet Liu et al. (2023)	49.9	39.2	52.1	87.2	1.4	4.2	63.0	2.2	43.0
	CFA Lee et al. (2022)	62.8	49.5	53.9	89.9	3.3	9.3	68.6	4.9	49.1
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	82.9	74.5	70.3	96.1	16.9	25.5	86.4	14.6	66.1
	PyramidalFlow Lei et al. (2023)	56.1	41.1	52.1	82.7	1.0	4.0	54.3	2.0	42.6
	Rec.									
	RD Deng & Li (2022)	88.6	<u>79.8</u>	75.0	<u>99.3</u>	<u>30.7</u>	<u>37.5</u>	<u>95.1</u>	<u>23.0</u>	<u>73.4</u>
	DiAD He et al. (2024b)	75.3	74.5	<b>82.5</b>	84.3	0.4	1.1	48.8	0.5	52.4
	ViTAD Zhang et al. (2023a)	84.9	74.8	71.4	98.8	25.1	32.2	91.7	19.2	69.5
	InvAD Zhang et al. (2024a)	<b>88.9</b>	79.3	<u>77.2</u>	<b>99.4</b>	<b>31.2</b>	35.7	<u>94.2</u>	21.7	<b>73.5</b>
	InvAD-lite Zhang et al. (2024a)	87.4	76.6	75.7	<u>99.3</u>	27.4	32.7	<u>94.2</u>	19.5	71.6
	MambaAD He et al. (2024a)	87.4	78.3	74.2	<u>99.1</u>	30.9	35.2	<u>92.6</u>	21.3	72.2
	Hybrid									
	UniAD You et al. (2022)	87.2	75.6	<u>76.2</u>	<b>99.4</b>	28.1	33.6	<b>95.3</b>	20.2	71.9
	RD++ Tien et al. (2023)	88.5	<b>80.6</b>	74.5	<u>99.3</u>	28.8	<u>36.2</u>	<b>95.3</b>	22.1	<u>73.1</u>
	DesTSeg Zhang et al. (2023c)	72.8	53.9	62.6	79.6	27.5	<b>37.6</b>	58.0	<b>23.1</b>	56.9

Table A48: Benchmarked results on Real-IAD dataset Wang et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
pcb	Aug.									
	DRAEM Zavrtanik et al. (2021)	56.8	64.0	76.2	45.3	0.1	0.3	13.9	0.2	40.3
	SimpleNet Liu et al. (2023)	54.2	63.4	75.5	76.8	0.4	1.0	45.8	0.5	47.7
	CFA Lee et al. (2022)	51.5	62.4	75.5	88.6	1.2	3.5	58.6	1.8	50.6
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	74.3	83.2	76.6	95.1	15.0	23.8	75.6	13.5	65.2
	PyramidalFlow Lei et al. (2023)	54.8	64.5	75.7	81.6	0.3	0.7	45.0	0.4	48.5
	RD Deng & Li (2022)	79.2	85.4	79.7	97.5	16.1	24.3	88.6	13.8	69.0
	DiAD He et al. (2024b)	86.0	85.1	85.4	92.0	3.7	7.4	66.5	3.8	60.9
	Rec.									
	ViTAD Zhang et al. (2023a)	83.3	89.2	81.2	98.2	25.7	33.6	88.2	20.2	73.0
phone.battery	InvAD Zhang et al. (2024a)	<b>91.9</b>	<b>95.2</b>	<b>86.9</b>	<b>99.4</b>	<b>50.7</b>	<b>53.2</b>	<b>94.9</b>	<b>36.2</b>	<b>82.9</b>
	InvAD-lite Zhang et al. (2024a)	90.3	94.3	85.4	99.3	49.1	51.9	94.5	35.1	81.8
	MambaAD He et al. (2024a)	90.3	94.3	85.1	99.2	48.4	51.7	93.8	34.9	81.6
	Hybrid									
	UniAD You et al. (2022)	81.0	88.2	78.9	97.2	22.0	32.1	81.7	19.1	70.5
	RD++ Tien et al. (2023)	82.2	88.3	80.6	97.9	22.6	31.0	89.0	18.3	71.9
	DesTSeg Zhang et al. (2023c)	82.0	89.2	79.0	90.0	50.6	52.6	66.1	35.7	74.1
	Aug.									
	DRAEM Zavrtanik et al. (2021)	51.7	46.1	58.0	45.8	0.1	0.2	14.6	0.1	33.6
	SimpleNet Liu et al. (2023)	55.2	48.7	58.1	75.4	1.5	6.0	46.8	3.1	43.2
	CFA Lee et al. (2022)	49.9	43.5	58.0	64.0	0.9	3.1	40.6	1.6	38.8
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	74.9	73.4	64.2	75.2	13.6	22.7	83.9	12.8	59.8
plastic.nut	PyramidalFlow Lei et al. (2023)	45.5	36.1	58.4	71.6	0.4	1.2	27.2	0.6	35.9
	RD Deng & Li (2022)	87.5	82.5	77.4	77.3	22.3	32.1	94.6	19.1	69.5
	DiAD He et al. (2024b)	82.3	77.7	75.9	96.8	5.3	11.4	85.4	6.0	62.1
	Rec.									
	ViTAD Zhang et al. (2023a)	90.7	89.3	79.4	98.8	24.1	32.3	91.0	19.3	74.0
	InvAD Zhang et al. (2024a)	<b>91.2</b>	87.7	80.8	86.2	22.2	30.4	95.1	17.9	72.5
	InvAD-lite Zhang et al. (2024a)	<b>91.2</b>	<b>89.6</b>	<b>81.8</b>	80.3	25.5	33.8	<b>95.7</b>	20.3	73.2
	MambaAD He et al. (2024a)	90.2	88.6	80.6	<b>99.4</b>	<b>35.2</b>	<b>39.9</b>	<b>95.5</b>	<b>24.9</b>	<b>77.0</b>
	Hybrid									
	UniAD You et al. (2022)	84.9	81.2	73.5	89.1	10.5	18.4	88.7	10.1	65.8
	RD++ Tien et al. (2023)	88.6	85.1	78.4	83.4	22.5	31.9	95.1	19.0	71.1
	DesTSeg Zhang et al. (2023c)	83.4	78.5	71.9	75.6	10.5	20.6	62.3	11.5	60.1
plastic.plug	Aug.									
	DRAEM Zavrtanik et al. (2021)	53.7	34.0	51.7	51.4	0.1	0.1	16.7	0.0	31.8
	SimpleNet Liu et al. (2023)	61.9	43.0	52.6	74.0	0.5	2.3	40.9	1.2	41.0
	CFA Lee et al. (2022)	60.2	39.8	52.9	75.3	0.2	0.8	39.1	0.4	39.9
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	69.7	60.5	53.6	95.6	13.4	14.9	79.1	8.0	56.0
	PyramidalFlow Lei et al. (2023)	45.0	29.3	49.7	76.3	0.1	0.4	29.3	0.2	33.9
	RD Deng & Li (2022)	81.3	70.0	64.5	98.8	22.4	30.4	92.6	17.9	66.5
	DiAD He et al. (2024b)	71.9	58.2	65.6	81.1	0.4	3.4	38.6	1.7	45.6
	Rec.									
	ViTAD Zhang et al. (2023a)	82.3	73.8	64.8	97.6	20.8	28.3	87.1	16.5	66.0
plastic.plug	InvAD Zhang et al. (2024a)	<b>89.7</b>	<b>82.7</b>	<b>74.6</b>	<b>99.5</b>	29.0	32.7	<b>96.9</b>	19.6	<b>73.4</b>
	InvAD-lite Zhang et al. (2024a)	88.7	81.6	73.3	<b>99.5</b>	30.3	34.6	<b>97.0</b>	20.9	<b>73.3</b>
	MambaAD He et al. (2024a)	87.8	82.0	71.9	<b>99.5</b>	34.3	38.0	96.8	23.4	<b>73.9</b>
	Hybrid									
	UniAD You et al. (2022)	80.1	70.5	63.0	98.4	23.0	28.4	89.9	16.5	65.6
	RD++ Tien et al. (2023)	79.8	69.1	63.7	98.9	21.9	28.8	92.5	16.8	65.7
	DesTSeg Zhang et al. (2023c)	84.8	78.4	68.9	85.2	<b>49.2</b>	<b>49.5</b>	62.7	<b>32.9</b>	69.5
	Aug.									
	DRAEM Zavrtanik et al. (2021)	64.1	52.9	54.8	41.6	0.0	0.1	9.4	0.0	35.0
	SimpleNet Liu et al. (2023)	51.3	40.0	54.6	75.9	0.2	0.8	38.6	0.4	38.8
	CFA Lee et al. (2022)	42.0	33.4	54.6	85.6	0.2	0.9	53.7	0.5	39.2
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	78.8	75.2	64.9	97.2	11.8	20.7	85.7	11.5	63.4
plastic.plug	PyramidalFlow Lei et al. (2023)	46.2	35.2	54.6	79.7	0.1	0.3	40.5	0.2	37.7
	RD Deng & Li (2022)	82.6	75.5	68.8	99.1	21.3	30.2	<b>95.5</b>	17.8	68.6
	DiAD He et al. (2024b)	88.7	<b>89.2</b>	<b>90.9</b>	92.9	8.7	15.0	66.1	8.1	64.5
	Rec.									
	ViTAD Zhang et al. (2023a)	80.8	74.7	66.7	97.5	13.3	22.6	84.6	12.7	64.3
	InvAD Zhang et al. (2024a)	<b>89.0</b>	82.9	76.2	99.0	22.9	30.7	94.3	18.1	72.2
	InvAD-lite Zhang et al. (2024a)	88.0	83.9	74.6	99.1	<b>26.2</b>	<b>33.7</b>	94.3	<b>20.2</b>	<b>72.7</b>
	MambaAD He et al. (2024a)	86.5	83.4	72.8	99.0	25.2	32.3	93.0	19.3	71.6
	Hybrid									
	UniAD You et al. (2022)	80.9	76.6	66.8	98.6	18.4	27.1	89.9	15.7	66.6
	RD++ Tien et al. (2023)	85.5	77.9	73.2	<b>99.2</b>	21.3	28.8	<b>95.8</b>	16.8	70.1
	DesTSeg Zhang et al. (2023c)	73.6	64.7	61.6	71.9	4.4	8.7	41.7	4.6	49.2



Table A49: Benchmarked results on Real-IAD dataset Wang et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
porcelain_doll	Aug.									
	DRAEM Zavrtanik et al. (2021)	45.1	29.1	49.8	46.6	0.1	0.1	14.6	0.1	28.3
	SimpleNet Liu et al. (2023)	63.5	50.7	51.2	81.4	2.4	7.4	48.9	3.8	45.1
	CFA Lee et al. (2022)	69.4	55.1	55.2	80.1	0.1	0.3	41.7	0.2	45.2
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	83.6	78.1	68.2	97.1	14.0	20.9	86.6	11.7	65.6
	PyramidalFlow Lei et al. (2023)	48.7	34.0	49.8	84.5	0.2	0.3	48.7	0.2	38.8
	Rec.									
	RD Deng & Li (2022)	87.3	78.2	72.3	99.2	25.1	33.8	96.1	20.3	71.4
	DiAD He et al. (2024b)	72.6	66.8	65.2	93.1	1.4	4.8	70.4	2.5	53.5
	ViTAD Zhang et al. (2023a)	86.4	77.5	70.8	99.0	21.6	29.7	94.7	17.4	69.7
	InvAD Zhang et al. (2024a)	87.1	78.2	70.5	98.5	23.3	33.0	92.7	19.7	70.2
	InvAD-lite Zhang et al. (2024a)	<b>88.6</b>	<b>82.8</b>	<b>74.4</b>	<b>99.3</b>	<u>32.0</u>	<u>36.6</u>	<u>96.4</u>	<u>22.4</u>	<b>74.0</b>
	MambaAD He et al. (2024a)	88.4	82.7	<b>74.4</b>	99.2	<u>32.2</u>	<u>36.9</u>	95.9	<u>22.6</u>	73.9
	Hybrid									
	UniAD You et al. (2022)	84.9	76.0	70.3	98.6	14.9	24.8	93.3	14.1	67.5
	RD++ Tien et al. (2023)	88.4	<u>80.7</u>	72.6	<b>99.3</b>	26.3	34.7	<b>96.7</b>	21.0	<u>72.4</u>
	DesTSeg Zhang et al. (2023c)	75.0	61.4	59.4	76.3	<b>35.4</b>	<b>38.7</b>	44.5	<b>24.0</b>	57.0
regulator	Aug.									
	DRAEM Zavrtanik et al. (2021)	46.1	26.1	43.8	38.8	0.0	0.1	11.4	0.0	25.6
	SimpleNet Liu et al. (2023)	47.5	26.2	43.8	79.9	0.1	0.7	40.8	0.4	34.8
	CFA Lee et al. (2022)	55.7	32.2	45.1	81.4	0.4	1.4	41.5	0.7	37.8
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	50.5	29.5	43.9	88.2	1.2	2.1	58.0	1.0	39.3
	PyramidalFlow Lei et al. (2023)	55.1	31.3	44.9	76.9	0.1	0.3	42.9	0.1	36.9
	Rec.									
	RD Deng & Li (2022)	67.9	49.9	48.9	98.1	9.0	17.7	89.6	9.7	54.6
	DiAD He et al. (2024b)	72.1	71.4	<b>78.2</b>	84.2	0.4	1.5	44.4	0.7	50.3
	ViTAD Zhang et al. (2023a)	61.3	45.6	44.7	95.6	7.6	17.8	78.3	9.8	50.2
	InvAD Zhang et al. (2024a)	<b>84.5</b>	<b>78.6</b>	68.8	<b>99.5</b>	25.9	<b>33.7</b>	<b>96.6</b>	<b>20.3</b>	<b>70.6</b>
	InvAD-lite Zhang et al. (2024a)	75.7	<u>67.1</u>	<u>57.3</u>	98.7	18.1	29.2	92.6	17.1	63.2
	MambaAD He et al. (2024a)	72.1	62.7	53.4	97.9	<u>21.7</u>	<u>30.1</u>	88.5	<u>17.7</u>	<u>61.1</u>
	Hybrid									
	UniAD You et al. (2022)	51.9	34.4	44.3	94.2	7.3	14.9	72.1	8.1	45.3
	RD++ Tien et al. (2023)	70.3	54.4	51.2	98.3	11.1	20.1	90.8	11.2	56.9
	DesTSeg Zhang et al. (2023c)	68.9	56.3	48.6	67.9	<b>29.1</b>	<u>32.6</u>	35.5	<u>19.5</u>	49.6
rolled_strip_base	Aug.									
	DRAEM Zavrtanik et al. (2021)	53.3	68.5	79.8	37.1	0.1	0.3	9.4	0.1	39.5
	SimpleNet Liu et al. (2023)	66.7	80.1	79.9	77.7	1.5	4.9	50.3	2.5	54.6
	CFA Lee et al. (2022)	54.9	68.8	80.1	85.0	0.7	1.6	51.5	0.8	51.3
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	92.6	96.6	88.9	97.8	10.6	15.0	93.2	8.1	73.4
	PyramidalFlow Lei et al. (2023)	59.9	74.9	79.8	88.1	1.3	3.5	69.1	1.8	56.0
	Rec.									
	RD Deng & Li (2022)	97.8	98.8	95.1	99.7	30.5	39.3	98.7	24.4	82.1
	DiAD He et al. (2024b)	68.4	55.9	56.8	87.7	0.6	3.2	63.4	1.6	48.0
	ViTAD Zhang et al. (2023a)	98.3	99.1	95.5	99.5	27.1	35.5	97.8	21.6	81.3
	InvAD Zhang et al. (2024a)	<b>99.3</b>	<b>99.6</b>	<b>97.7</b>	<b>99.8</b>	<u>32.8</u>	<u>42.5</u>	<b>99.0</b>	<u>27.0</u>	<b>83.7</b>
	InvAD-lite Zhang et al. (2024a)	98.0	99.0	95.3	<b>99.8</b>	<u>31.6</u>	<u>41.1</u>	<b>99.0</b>	<u>25.9</u>	<u>82.7</u>
	MambaAD He et al. (2024a)	98.3	99.2	95.6	99.6	27.4	32.3	98.2	19.2	81.0
	Hybrid									
	UniAD You et al. (2022)	98.7	<u>99.3</u>	<u>96.1</u>	99.5	21.6	32.9	98.2	19.7	80.5
	RD++ Tien et al. (2023)	96.3	97.9	93.5	99.7	26.8	36.4	98.5	22.2	80.6
	DesTSeg Zhang et al. (2023c)	96.5	98.4	93.2	91.2	<b>55.9</b>	<b>55.5</b>	81.4	<b>38.5</b>	<u>83.5</u>
sim_card_set	Aug.									
	DRAEM Zavrtanik et al. (2021)	56.7	62.2	70.7	47.5	0.2	0.3	18.6	0.1	39.9
	SimpleNet Liu et al. (2023)	50.3	57.9	70.7	73.9	2.8	7.1	30.3	3.7	44.1
	CFA Lee et al. (2022)	50.0	57.1	70.7	79.5	0.9	3.0	39.3	1.5	45.0
	Emb.									
	CFLOW-AD Gudovskiy et al. (2022)	91.5	92.9	85.3	98.2	30.3	35.2	87.9	21.3	76.4
	PyramidalFlow Lei et al. (2023)	77.9	75.3	77.1	66.0	1.0	0.6	31.0	0.3	50.7
	Rec.									
	RD Deng & Li (2022)	91.7	92.0	85.2	98.4	39.3	43.6	<u>89.0</u>	27.9	78.6
	DiAD He et al. (2024b)	72.6	53.7	61.5	89.9	1.7	5.8	60.4	3.0	49.4
	ViTAD Zhang et al. (2023a)	92.9	92.4	<b>89.5</b>	96.2	23.3	31.1	75.4	18.4	74.1
	InvAD Zhang et al. (2024a)	94.1	94.2	87.6	98.0	37.7	43.0	84.7	27.4	78.9
	InvAD-lite Zhang et al. (2024a)	<u>94.5</u>	<u>95.0</u>	<u>88.2</u>	<u>98.6</u>	<u>46.7</u>	<u>46.9</u>	88.9	30.6	81.4
	MambaAD He et al. (2024a)	<b>94.7</b>	<b>95.4</b>	<u>87.9</u>	<b>98.7</b>	<u>51.0</u>	<u>50.4</u>	89.1	<u>33.7</u>	<u>82.5</u>
	Hybrid									
	UniAD You et al. (2022)	91.4	91.9	84.3	97.8	34.7	41.2	85.8	25.9	77.0
	RD++ Tien et al. (2023)	93.7	94.1	87.2	98.6	40.4	43.2	<b>89.9</b>	27.6	79.8
	DesTSeg Zhang et al. (2023c)	92.9	<u>94.4</u>	86.3	95.7	<b>69.4</b>	<b>65.7</b>	81.0	<b>49.0</b>	<b>84.6</b>

Table A50: Benchmarked results on Real-IAD dataset Wang et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
switch	Aug. DRAEM Zavrtanik et al. (2021)	46.5	52.1	68.6	44.5	0.3	0.6	12.9	0.3	35.2
	SimpleNet Liu et al. (2023)	47.8	53.1	68.6	69.9	1.2	3.1	49.3	1.6	43.7
	Emb. CFA Lee et al. (2022)	52.2	56.1	68.6	76.0	1.1	2.9	44.1	1.5	45.0
	CFLOW-AD Gudovskiy et al. (2022)	75.3	79.9	72.5	90.9	13.9	17.7	78.8	9.7	63.1
	PyramidalFlow Lei et al. (2023)	60.8	62.0	69.9	50.0	0.3	0.6	15.0	0.3	40.4
	Rec. RD Deng & Li (2022)	84.6	87.5	78.2	94.4	19.4	26.6	91.0	15.3	70.6
	DiAD He et al. (2024b)	73.4	49.4	61.2	90.5	1.4	5.3	64.2	2.7	49.3
	ViTAD Zhang et al. (2023a)	87.8	90.0	80.6	96.4	28.8	39.2	88.5	24.4	74.7
	InvAD Zhang et al. (2024a)	<b>95.8</b>	<b>96.8</b>	<b>91.1</b>	<b>98.9</b>	43.9	<b>51.5</b>	<b>96.0</b>	34.7	<b>83.6</b>
	InvAD-lite Zhang et al. (2024a)	92.8	94.5	86.7	<b>99.0</b>	<b>44.3</b>	48.6	<b>95.1</b>	32.1	<b>81.5</b>
	MambaAD He et al. (2024a)	92.4	94.3	86.3	98.4	34.9	42.2	93.8	26.7	79.2
	Hybrid UniAD You et al. (2022)	85.0	88.4	77.8	98.8	51.4	55.4	91.1	38.3	79.0
tape	RD++ Tien et al. (2023)	82.4	86.1	75.8	95.9	22.0	29.7	90.9	17.5	70.5
	DesTSeg Zhang et al. (2023c)	89.4	92.4	82.1	87.9	<b>61.3</b>	<b>57.9</b>	68.3	<b>40.8</b>	78.4
	Aug. DRAEM Zavrtanik et al. (2021)	50.0	35.4	54.6	38.0	0.1	0.2	11.4	0.1	29.5
	SimpleNet Liu et al. (2023)	46.3	37.4	54.6	82.8	1.3	4.0	42.8	2.0	39.4
	Emb. CFA Lee et al. (2022)	54.5	42.1	55.1	80.2	0.5	1.9	51.1	1.0	42.0
	CFLOW-AD Gudovskiy et al. (2022)	93.5	92.6	84.3	99.2	24.6	24.8	95.6	14.2	75.6
	PyramidalFlow Lei et al. (2023)	60.4	43.3	58.3	66.9	0.2	0.4	10.6	0.2	36.8
	Rec. RD Deng & Li (2022)	96.2	95.4	88.4	99.7	<b>42.0</b>	<b>47.4</b>	98.4	31.1	82.6
	DiAD He et al. (2024b)	73.9	57.8	66.1	81.7	0.4	2.7	47.3	1.3	47.1
	ViTAD Zhang et al. (2023a)	93.6	92.6	84.6	99.4	30.7	38.7	95.9	24.0	78.2
	InvAD Zhang et al. (2024a)	<b>97.8</b>	<b>96.9</b>	<b>91.9</b>	99.7	38.9	44.0	98.3	28.2	82.9
	InvAD-lite Zhang et al. (2024a)	97.3	96.4	90.1	99.7	41.1	45.8	98.4	29.7	82.9
terminalblock	MambaAD He et al. (2024a)	97.1	96.2	89.6	<b>99.8</b>	<b>45.9</b>	<b>48.4</b>	98.4	31.9	<b>83.7</b>
	Hybrid UniAD You et al. (2022)	96.9	95.9	88.7	99.6	31.6	38.4	97.5	23.8	80.3
	RD++ Tien et al. (2023)	96.8	95.8	89.8	<b>99.8</b>	40.7	46.1	<b>98.5</b>	30.0	<b>82.7</b>
	DesTSeg Zhang et al. (2023c)	90.1	88.7	79.2	87.1	<b>58.3</b>	<b>55.9</b>	67.7	<b>38.8</b>	76.6
	Aug. DRAEM Zavrtanik et al. (2021)	44.5	49.0	68.7	46.6	0.1	0.1	13.6	0.1	34.6
	SimpleNet Liu et al. (2023)	53.6	56.1	68.7	85.0	0.7	2.0	57.7	1.0	47.9
	Emb. CFA Lee et al. (2022)	55.9	59.9	68.7	89.9	0.7	2.8	64.0	1.4	50.4
	CFLOW-AD Gudovskiy et al. (2022)	81.1	84.3	76.0	97.0	12.1	17.7	86.5	9.7	66.9
	PyramidalFlow Lei et al. (2023)	57.8	57.5	70.0	91.0	0.5	1.7	67.3	0.8	50.9
	Rec. RD Deng & Li (2022)	89.5	90.0	83.2	99.5	<b>27.9</b>	<b>35.6</b>	98.0	21.7	76.4
	DiAD He et al. (2024b)	62.1	36.4	47.8	75.5	0.1	1.1	38.5	0.5	37.4
	ViTAD Zhang et al. (2023a)	89.6	89.3	85.1	98.9	20.1	30.1	94.8	17.7	74.5
toothbrush	InvAD Zhang et al. (2024a)	<b>97.4</b>	<b>98.0</b>	<b>92.5</b>	<b>99.8</b>	<b>35.5</b>	<b>39.1</b>	<b>98.8</b>	<b>24.3</b>	<b>82.1</b>
	InvAD-lite Zhang et al. (2024a)	96.9	97.6	91.4	<b>99.8</b>	<b>34.6</b>	<b>38.2</b>	<b>98.8</b>	23.6	<b>81.6</b>
	MambaAD He et al. (2024a)	95.3	95.5	89.8	99.6	26.8	32.8	97.6	19.6	78.9
	Hybrid UniAD You et al. (2022)	87.0	88.6	80.6	99.1	22.7	30.8	94.6	18.2	73.6
	RD++ Tien et al. (2023)	89.3	90.2	82.3	99.5	27.7	35.0	97.8	21.2	76.1
	DesTSeg Zhang et al. (2023c)	68.4	73.3	69.4	69.3	22.2	27.2	40.3	15.7	55.1
	Aug. DRAEM Zavrtanik et al. (2021)	47.1	50.4	69.8	39.4	0.6	1.6	14.2	0.8	34.9
	SimpleNet Liu et al. (2023)	61.7	63.5	70.2	79.1	3.0	7.3	46.3	3.8	49.5
	Emb. CFA Lee et al. (2022)	58.4	60.3	70.4	84.6	3.8	6.7	48.3	3.5	49.4
	CFLOW-AD Gudovskiy et al. (2022)	70.3	74.9	71.7	94.7	18.8	14.0	78.0	7.6	61.8
	PyramidalFlow Lei et al. (2023)	48.1	50.9	70.1	50.8	8.4	2.6	15.6	1.3	37.9
	Rec. RD Deng & Li (2022)	81.8	83.9	77.4	96.9	26.3	33.6	89.0	20.2	71.2
toothbrush	DiAD He et al. (2024b)	<b>91.2</b>	<b>93.7</b>	<b>90.9</b>	82.0	1.9	6.6	54.5	3.4	60.1
	ViTAD Zhang et al. (2023a)	81.8	84.8	76.5	96.7	25.3	34.9	87.1	21.1	71.0
	InvAD Zhang et al. (2024a)	88.2	90.0	81.6	<b>97.6</b>	<b>29.5</b>	<b>37.8</b>	91.0	23.3	<b>75.3</b>
	InvAD-lite Zhang et al. (2024a)	87.0	88.5	80.9	97.4	<b>29.3</b>	<b>37.0</b>	90.8	22.7	74.5
	MambaAD He et al. (2024a)	86.2	87.5	80.7	<b>97.6</b>	<b>30.1</b>	<b>37.9</b>	<b>91.9</b>	<b>23.4</b>	74.6
	Hybrid UniAD You et al. (2022)	81.9	83.9	77.9	96.1	20.5	30.2	85.9	17.8	69.7
	RD++ Tien et al. (2023)	83.6	85.5	78.7	97.2	27.5	35.8	90.0	21.8	72.6
	DesTSeg Zhang et al. (2023c)	72.4	76.2	71.5	67.3	21.8	27.9	42.0	16.2	56.6

Table A51: Benchmarked results on Real-IAD dataset Wang et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
toy	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	55.3	60.6	73.6	41.6	0.1	0.2	10.6	0.1	38.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	53.7	61.8	73.4	75.2	0.2	0.9	36.9	0.5	45.6
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	47.8	56.6	73.4	78.3	0.3	1.0	40.6	0.5	44.7
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	60.6	68.8	73.7	87.5	2.1	8.2	56.9	4.3	53.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	56.2	65.2	73.4	79.8	0.4	1.6	47.4	0.8	48.6
		RD <a href="#">Deng &amp; Li (2022)</a>	70.4	74.8	75.7	95.1	5.1	13.0	82.6	7.0	61.3
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	66.2	57.3	59.8	82.1	1.1	4.2	50.3	2.1	45.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	76.5	82.9	76.0	92.8	9.2	19.8	79.2	11.0	64.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>86.8</b>	<b>89.8</b>	<b>83.5</b>	<b>98.0</b>	16.6	25.7	<b>91.8</b>	14.8	<b>72.4</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	84.4	88.9	80.3	<b>96.6</b>	<b>18.1</b>	<b>29.0</b>	89.2	<b>17.0</b>	<b>71.4</b>
	Hybrid	MambaAD <a href="#">He et al. (2024a)</a>	83.7	88.4	79.7	96.2	16.8	26.1	88.0	15.0	70.4
		UniAD <a href="#">You et al. (2022)</a>	68.5	75.1	74.4	93.6	4.8	11.8	73.0	6.3	59.2
RD++ <a href="#">Tien et al. (2023)</a>		73.4	78.1	76.4	96.0	7.8	17.7	85.6	9.7	63.9	
DesTSeg <a href="#">Zhang et al. (2023c)</a>		71.5	77.5	75.8	67.5	12.9	19.6	47.5	10.8	55.9	
toy_brick	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.5	42.9	57.9	48.5	0.1	0.3	11.3	0.1	32.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	57.4	48.8	57.9	85.9	4.5	10.6	47.0	5.6	45.8
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	56.7	45.9	58.3	78.7	1.3	3.9	40.6	2.0	42.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	74.2	69.7	64.0	96.1	24.2	26.7	79.2	15.4	62.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	54.6	43.4	58.2	50.1	0.1	0.3	15.3	0.2	34.3
		RD <a href="#">Deng &amp; Li (2022)</a>	63.4	56.2	58.9	96.2	16.6	24.4	75.8	13.9	56.4
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	68.4	45.3	55.9	93.5	3.1	8.1	66.4	4.2	48.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	69.1	64.3	60.2	94.6	20.6	29.4	72.9	17.2	59.5
		InvAD <a href="#">Zhang et al. (2024a)</a>	74.1	67.4	64.4	97.6	25.4	31.4	82.4	18.6	63.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	69.1	62.4	61.1	96.4	17.5	24.2	78.0	13.8	59.1
	Hybrid	MambaAD <a href="#">He et al. (2024a)</a>	70.6	64.0	61.8	96.6	18.9	26.8	75.9	15.5	60.0
		UniAD <a href="#">You et al. (2022)</a>	<b>78.9</b>	<b>74.6</b>	<b>68.1</b>	<b>97.7</b>	21.8	30.4	<b>82.7</b>	17.9	<b>66.0</b>
RD++ <a href="#">Tien et al. (2023)</a>		66.7	58.3	60.6	96.7	17.1	25.3	77.3	14.5	58.0	
DesTSeg <a href="#">Zhang et al. (2023c)</a>		72.7	68.5	62.8	82.5	<b>30.1</b>	<b>35.7</b>	55.5	<b>21.8</b>	59.5	
transistor1	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	57.2	59.6	72.2	43.3	0.2	0.6	13.0	0.3	38.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	61.7	66.8	72.6	84.5	5.4	10.1	58.5	5.3	53.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	53.9	63.0	72.1	87.7	3.5	8.7	56.8	4.5	51.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.8	94.7	86.2	98.1	26.2	28.3	90.7	16.5	75.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	49.1	56.2	72.4	77.1	0.4	0.9	35.3	0.4	43.8
		RD <a href="#">Deng &amp; Li (2022)</a>	90.9	93.7	85.2	99.1	30.5	36.5	95.5	22.3	77.7
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	73.1	63.1	62.7	88.6	7.2	15.3	58.1	8.3	52.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	91.7	93.9	86.3	98.8	32.0	36.4	93.5	22.2	77.9
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>97.6</b>	<b>98.2</b>	<b>94.2</b>	<b>99.5</b>	38.7	39.9	<b>97.5</b>	24.9	<b>82.8</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.4	97.5	92.1	<b>99.5</b>	40.5	42.4	97.4	26.9	82.6
	Hybrid	MambaAD <a href="#">He et al. (2024a)</a>	94.9	96.4	89.2	99.4	38.1	39.4	96.8	24.5	81.0
		UniAD <a href="#">You et al. (2022)</a>	93.7	95.9	88.8	98.9	27.3	33.0	94.2	19.8	78.1
RD++ <a href="#">Tien et al. (2023)</a>		93.4	95.5	89.0	99.3	34.6	38.5	96.2	23.8	79.9	
DesTSeg <a href="#">Zhang et al. (2023c)</a>		88.0	91.6	82.5	87.9	<b>44.0</b>	<b>44.1</b>	67.0	<b>28.3</b>	74.1	
u_block	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	55.2	35.2	49.4	43.5	0.1	0.2	10.0	0.1	30.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	58.4	40.0	51.2	72.8	0.6	2.5	40.2	1.3	39.4
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	54.9	38.6	48.9	74.7	0.3	1.8	36.4	0.9	37.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	80.3	73.0	63.8	98.4	19.9	24.7	89.3	14.1	65.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	44.9	28.6	48.8	81.9	0.5	1.2	39.5	0.6	35.8
		RD <a href="#">Deng &amp; Li (2022)</a>	90.1	85.5	75.4	<b>99.6</b>	40.3	45.8	97.2	29.7	77.2
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	75.2	68.4	67.9	88.8	1.6	5.4	54.2	2.8	51.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	84.3	78.2	67.8	99.0	30.3	38.4	90.8	23.8	70.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>92.9</b>	<b>89.5</b>	<b>80.5</b>	<b>99.6</b>	33.4	41.3	96.7	26.0	<b>77.7</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	90.4	86.4	76.2	<b>99.6</b>	34.5	43.0	96.8	27.4	76.4
	Hybrid	MambaAD <a href="#">He et al. (2024a)</a>	90.0	85.8	74.8	99.5	33.2	42.8	96.1	27.2	75.7
		UniAD <a href="#">You et al. (2022)</a>	88.2	83.7	74.4	99.3	24.2	32.7	94.9	19.6	72.4
RD++ <a href="#">Tien et al. (2023)</a>		90.2	85.9	75.7	<b>99.6</b>	34.1	41.2	<b>97.3</b>	26.0	76.0	
DesTSeg <a href="#">Zhang et al. (2023c)</a>		76.7	70.4	61.0	83.6	<b>57.6</b>	<b>55.0</b>	53.3	<b>37.9</b>	65.9	

Table A52: Benchmarked results on Real-IAD dataset Wang et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max				
usb	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	45.8	43.8	63.0	48.2	0.1	0.5	19.9	0.3	34.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	52.2	49.0	63.0	80.4	0.8	2.8	50.8	1.4	44.2
		CFA <a href="#">Lee et al. (2022)</a>	56.6	48.6	63.2	85.9	0.7	2.4	51.6	1.2	45.6
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	68.0	69.8	63.4	94.8	13.0	15.8	75.0	8.6	58.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	48.3	44.5	63.0	79.2	0.2	0.2	39.8	0.1	40.9
		RD <a href="#">Deng &amp; Li (2022)</a>	85.2	84.6	75.6	98.1	26.8	35.2	91.2	21.3	72.3
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	58.9	37.4	45.7	78.0	1.0	3.1	28.0	1.6	36.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	86.9	87.3	77.7	98.3	26.1	34.8	90.6	21.1	73.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>94.1</b>	<b>93.3</b>	<b>86.8</b>	<b>99.5</b>	38.5	44.0	<b>97.2</b>	28.2	<b>80.6</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.1	92.7	85.8	<b>99.5</b>	37.0	43.7	96.8	27.9	79.9
		MambaAD <a href="#">He et al. (2024a)</a>	92.7	92.7	85.3	99.3	39.7	44.8	96.0	28.9	80.1
		UniAD <a href="#">You et al. (2022)</a>	80.8	81.8	70.9	98.0	21.0	30.9	85.8	18.3	68.4
usb_adaptor	Aug.	RD++ <a href="#">Tien et al. (2023)</a>	85.5	85.8	75.6	98.0	27.2	36.3	90.8	22.2	72.7
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	87.6	88.3	78.5	91.5	<b>45.0</b>	<b>50.9</b>	70.5	<b>34.2</b>	74.6
		DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.0	45.6	56.5	49.5	0.1	0.1	20.0	0.0	34.7
	Emb.	SimpleNet <a href="#">Liu et al. (2023)</a>	49.9	40.6	56.7	52.3	0.1	0.4	19.2	0.2	33.5
		CFA <a href="#">Lee et al. (2022)</a>	52.1	41.8	56.6	78.4	0.1	0.8	39.5	0.4	39.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	69.9	64.1	59.5	96.2	8.1	16.6	80.8	9.1	57.5
	Rec.	PyramidalFlow <a href="#">Lei et al. (2023)</a>	53.4	40.5	56.8	84.2	0.2	0.6	48.4	0.3	41.8
		RD <a href="#">Deng &amp; Li (2022)</a>	70.9	61.0	61.9	94.4	9.7	18.7	74.4	10.3	57.0
		DiAD <a href="#">He et al. (2024b)</a>	76.9	60.2	67.2	94.0	2.3	6.6	75.5	3.4	54.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	76.1	66.1	66.2	90.8	5.9	13.9	56.2	7.5	55.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>80.0</b>	74.4	66.8	96.5	15.8	24.3	79.3	13.8	63.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	79.8	74.2	<b>67.3</b>	<b>97.0</b>	16.6	24.8	<b>82.8</b>	14.2	<b>64.5</b>
vepill	Aug.	MambaAD <a href="#">He et al. (2024a)</a>	79.1	<b>75.7</b>	66.0	<b>97.0</b>	15.8	24.9	81.6	14.2	64.2
		UniAD <a href="#">You et al. (2022)</a>	76.9	71.5	64.3	96.5	10.9	19.8	80.1	11.0	61.4
		RD++ <a href="#">Tien et al. (2023)</a>	69.9	62.7	61.1	94.7	10.2	20.1	76.2	11.2	57.4
	Emb.	DesTSeg <a href="#">Zhang et al. (2023c)</a>	78.0	73.3	66.1	80.8	<b>27.6</b>	<b>36.7</b>	51.2	<b>22.4</b>	60.8
		DRAEM <a href="#">Zavrtanik et al. (2021)</a>	47.3	37.7	56.2	31.2	0.3	0.8	7.2	0.4	28.5
		SimpleNet <a href="#">Liu et al. (2023)</a>	62.8	52.2	58.6	82.0	6.5	12.0	47.6	6.4	47.4
	Rec.	CFA <a href="#">Lee et al. (2022)</a>	58.4	47.1	57.3	85.5	4.3	9.3	54.5	4.9	46.3
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	81.4	79.1	67.5	97.3	35.6	41.3	84.6	26.0	70.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.7	43.9	57.8	72.3	0.6	0.8	28.4	0.4	39.0
		RD <a href="#">Deng &amp; Li (2022)</a>	85.1	80.3	72.5	98.3	43.7	48.2	89.1	31.8	74.6
		DiAD <a href="#">He et al. (2024b)</a>	64.1	40.4	56.2	90.2	1.3	5.2	60.8	2.7	45.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	82.2	80.5	70.4	97.6	44.4	50.0	81.3	33.3	73.0
wooden_beads	Aug.	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>90.1</b>	<b>88.0</b>	<b>78.2</b>	98.9	<b>50.4</b>	<b>55.2</b>	91.1	<b>38.1</b>	<b>79.7</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	84.6	82.2	71.3	98.4	41.4	48.1	87.9	31.7	74.2
		MambaAD <a href="#">He et al. (2024a)</a>	88.5	87.6	77.6	98.7	47.9	52.0	89.4	35.1	78.3
	Emb.	UniAD <a href="#">You et al. (2022)</a>	88.6	86.3	75.8	<b>99.2</b>	47.3	47.7	<b>92.7</b>	31.3	77.6
		RD++ <a href="#">Tien et al. (2023)</a>	85.9	82.6	73.0	98.5	46.0	50.7	90.2	34.0	75.9
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	69.5	65.1	58.6	75.3	44.1	45.1	43.5	29.1	58.2
	Rec.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.8	44.9	60.2	43.9	0.1	0.3	12.5	0.1	33.4
		SimpleNet <a href="#">Liu et al. (2023)</a>	56.2	52.2	60.2	75.5	1.2	4.4	36.2	2.2	42.8
		CFA <a href="#">Lee et al. (2022)</a>	55.3	46.2	60.2	83.6	0.8	3.1	48.4	1.6	43.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.7	79.3	68.6	96.5	20.2	27.3	79.5	15.8	65.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	66.4	56.3	64.8	50.1	0.6	0.3	15.1	0.1	39.5
		RD <a href="#">Deng &amp; Li (2022)</a>	81.1	79.1	70.1	97.9	27.2	35.5	85.8	21.6	69.2
wooden_heads	Aug.	DiAD <a href="#">He et al. (2024b)</a>	62.1	56.4	65.9	85.0	1.1	4.7	45.6	2.4	45.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	82.8	82.3	72.9	97.1	31.0	37.4	79.4	23.0	70.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>86.6</b>	<b>85.6</b>	<b>76.2</b>	<b>98.4</b>	<b>35.5</b>	<b>40.3</b>	<b>88.0</b>	<b>25.3</b>	<b>74.2</b>
	Emb.	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	85.6	84.6	75.1	98.2	30.5	37.3	87.9	22.9	72.6
		MambaAD <a href="#">He et al. (2024a)</a>	83.3	82.3	72.7	98.1	32.4	39.7	85.3	24.8	71.7
		UniAD <a href="#">You et al. (2022)</a>	80.9	80.1	70.3	97.7	20.3	27.9	85.0	16.2	67.4
	Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	83.4	81.4	72.5	98.2	28.9	36.5	87.8	22.3	71.0
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	78.2	73.6	69.8	77.9	30.8	34.9	50.5	21.1	61.2

Table A53: Benchmarked results on Real-IAD dataset Wang et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
woodstick	Aug. DRAEM Zavrtanik et al. (2021)	52.9	28.3	45.2	57.3	0.1	0.2	22.9	0.1	31.1
	SimpleNet Liu et al. (2023)	55.7	35.7	44.6	74.0	2.8	9.1	32.1	4.8	37.4
	Emb. CFA Lee et al. (2022)	57.8	33.2	46.5	70.2	0.9	4.1	26.5	2.1	35.6
	CFLOW-AD Gudovskiy et al. (2022)	71.3	60.5	52.8	92.6	32.1	38.3	67.9	23.7	59.6
	PyramidalFlow Lei et al. (2023)	50.1	28.1	44.4	50.0	0.0	0.2	15.0	0.1	28.6
	Rec. RD Deng & Li (2022)	77.5	61.9	58.5	97.8	31.2	38.8	85.0	24.0	64.6
	DiAD He et al. (2024b)	74.1	66.0	62.1	90.9	2.6	8.0	60.7	4.2	52.1
	ViTAD Zhang et al. (2023a)	75.6	64.0	56.3	96.3	38.4	43.7	77.8	28.0	64.7
	InvAD Zhang et al. (2024a)	80.8	67.6	62.7	<b>98.0</b>	39.0	45.1	<b>85.9</b>	29.1	68.7
	InvAD-lite Zhang et al. (2024a)	78.7	65.9	59.3	97.6	36.3	41.0	83.8	25.8	66.3
	MambaAD He et al. (2024a)	<b>81.8</b>	71.0	64.4	97.9	42.8	47.0	85.5	30.7	70.3
	Hybrid UniAD You et al. (2022)	81.1	<b>73.7</b>	<b>64.6</b>	94.8	41.5	46.0	79.2	29.9	69.3
	RD++ Tien et al. (2023)	77.2	61.2	58.2	97.9	30.6	38.0	85.3	23.4	64.2
	DesTSeg Zhang et al. (2023c)	80.2	70.6	60.5	91.9	<b>61.5</b>	<b>60.5</b>	69.9	<b>43.4</b>	<b>70.7</b>
	Aug. DRAEM Zavrtanik et al. (2021)	46.5	61.6	76.7	36.4	0.7	1.5	11.3	0.8	37.0
	SimpleNet Liu et al. (2023)	56.8	67.7	76.7	52.7	1.2	3.8	24.3	1.9	43.8
zipper	Emb. CFA Lee et al. (2022)	80.6	88.0	79.9	92.5	15.6	22.6	78.3	12.7	67.5
	CFLOW-AD Gudovskiy et al. (2022)	94.3	97.1	90.3	98.2	34.9	35.6	91.0	21.6	79.4
	PyramidalFlow Lei et al. (2023)	49.2	61.7	77.5	49.9	0.7	1.4	15.6	0.7	39.9
	Rec. RD Deng & Li (2022)	95.4	97.2	91.6	99.0	43.7	49.9	96.5	33.2	83.5
	DiAD He et al. (2024b)	86.0	87.0	84.0	90.2	12.5	18.8	53.5	10.4	61.7
	ViTAD Zhang et al. (2023a)	98.8	99.3	95.9	99.1	47.8	50.3	96.4	33.6	85.7
	InvAD Zhang et al. (2024a)	98.8	99.2	96.0	99.2	54.3	56.8	97.0	39.7	87.4
	InvAD-lite Zhang et al. (2024a)	98.9	99.4	95.6	99.2	54.0	57.4	97.0	40.3	87.4
	MambaAD He et al. (2024a)	<b>99.4</b>	<b>99.6</b>	<b>97.1</b>	<b>99.3</b>	<b>58.4</b>	<b>60.9</b>	<b>97.6</b>	<b>43.8</b>	<b>88.9</b>
	Hybrid UniAD You et al. (2022)	98.2	98.9	95.3	98.4	33.1	36.9	95.1	22.6	81.7
	RD++ Tien et al. (2023)	97.0	98.3	93.0	99.1	47.1	51.6	96.4	34.7	84.8
	DesTSeg Zhang et al. (2023c)	93.4	96.0	89.6	70.5	18.9	25.2	71.2	14.4	69.7
	Aug. DRAEM Zavrtanik et al. (2021)	50.9	45.9	61.3	44.0	0.2	0.4	13.6	0.2	33.6
	SimpleNet Liu et al. (2023)	54.9	50.6	61.5	76.1	1.9	4.9	42.4	2.5	43.5
	Emb. CFA Lee et al. (2022)	55.7	50.5	61.9	81.3	1.6	3.8	48.8	2.0	45.0
	CFLOW-AD Gudovskiy et al. (2022)	77.0	75.8	69.9	94.8	17.6	21.7	80.4	12.4	63.9
Avg	PyramidalFlow Lei et al. (2023)	54.4	48.0	62.0	71.1	1.2	1.1	34.9	0.5	40.9
	Rec. RD Deng & Li (2022)	82.7	79.3	74.1	97.2	25.2	32.8	90.0	20.0	70.0
	DiAD He et al. (2024b)	75.6	66.4	69.9	88.0	2.9	7.1	58.1	3.7	52.6
	ViTAD Zhang et al. (2023a)	82.7	80.2	73.7	97.2	24.3	32.3	84.8	19.6	69.3
	InvAD Zhang et al. (2024a)	<b>89.4</b>	<b>87.0</b>	<b>80.2</b>	98.4	32.6	38.9	<b>92.7</b>	24.6	<b>75.6</b>
	InvAD-lite Zhang et al. (2024a)	87.2	85.2	77.8	98.0	31.7	37.9	92.0	23.8	74.2
	MambaAD He et al. (2024a)	87.0	85.3	77.6	<b>98.6</b>	32.4	38.1	91.2	23.9	74.2
	Hybrid UniAD You et al. (2022)	83.1	81.2	74.5	97.4	23.3	30.9	87.1	18.6	69.6
	RD++ Tien et al. (2023)	83.6	80.6	74.8	97.7	25.9	33.6	90.7	20.5	70.8
	DesTSeg Zhang et al. (2023c)	79.3	76.7	70.7	80.3	<b>36.9</b>	<b>40.3</b>	56.1	<b>26.2</b>	64.5

## M DETAILED QUANTITATIVE RESULTS ON COCO-AD DATASET UNDER 100 EPOCHS

Table A54: Benchmarked results on COCO-AD dataset [Zhang et al. \(2024a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
0	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	48.8	74.5	85.0	51.9	16.6	27.7	18.1	49.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	63.4	82.1	85.0	78.2	39.1	44.6	44.4	64.2
		CFA <a href="#">Lee et al. (2022)</a>	52.1	76.1	85.0	59.3	22.2	29.6	19.4	51.8
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	80.2	91.2	87.1	81.9	46.4	48.9	51.8	71.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	48.5	73.3	85.0	50.0	8.1	27.7	15.0	47.1
	Emb.	RD <a href="#">Deng &amp; Li (2022)</a>	65.7	82.0	85.0	72.0	30.8	38.3	47.9	62.4
		DiAD <a href="#">He et al. (2024b)</a>	57.5	77.5	85.3	67.0	33.4	26.2	28.8	53.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	<b>84.8</b>	<b>93.9</b>	<b>88.0</b>	<b>83.1</b>	<b>55.3</b>	<b>53.2</b>	51.0	<b>74.8</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	74.3	88.1	85.1	78.0	41.6	44.6	<b>52.3</b>	68.3
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	75.7	89.7	85.3	76.6	40.8	43.0	47.8	67.8
		MambaAD <a href="#">He et al. (2024a)</a>	74.0	88.9	85.2	75.4	38.2	41.5	48.9	66.9
	Rec.	UniAD <a href="#">You et al. (2022)</a>	66.2	84.5	85.1	70.4	29.3	36.7	39.8	61.3
		RD++ <a href="#">Tien et al. (2023)</a>	70.3	85.4	85.1	74.9	34.9	41.1	50.3	65.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	57.1	77.4	85.0	54.2	21.2	27.7	28.2	53.0
	Hybrid	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	47.4	42.7	60.9	48.1	2.4	5.8	13.6	33.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	45.0	39.8	60.9	53.3	3.5	6.5	19.3	34.6
1	Aug.	CFA <a href="#">Lee et al. (2022)</a>	52.4	44.8	61.0	56.6	3.4	6.9	13.1	36.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	<b>59.5</b>	<b>50.0</b>	<b>61.7</b>	76.1	8.2	14.2	<b>46.4</b>	46.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.4	45.7	60.9	50.1	<b>19.5</b>	5.8	15.0	37.8
	Emb.	RD <a href="#">Deng &amp; Li (2022)</a>	54.6	46.3	61.0	70.1	5.9	10.7	40.9	42.9
		DiAD <a href="#">He et al. (2024b)</a>	54.4	49.8	<b>62.2</b>	71.3	11.8	7.8	28.8	6.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	58.5	<b>51.2</b>	61.8	<b>78.9</b>	<b>16.3</b>	<b>23.4</b>	38.1	<b>13.3</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	55.7	47.9	61.0	73.4	7.9	13.4	43.0	7.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	54.0	47.0	61.1	71.9	7.3	12.2	36.6	6.5
		MambaAD <a href="#">He et al. (2024a)</a>	54.9	47.7	61.0	70.8	6.2	11.0	38.4	5.8
	Rec.	UniAD <a href="#">You et al. (2022)</a>	55.9	47.8	61.0	69.1	5.9	10.4	37.3	5.5
		RD++ <a href="#">Tien et al. (2023)</a>	55.8	46.6	61.1	69.2	6.2	8.8	41.1	4.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	54.2	47.0	61.1	59.1	5.3	9.6	29.5	5.0
	Hybrid	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	58.1	37.0	51.0	50.4	5.6	11.9	15.2	6.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	55.3	36.8	49.9	55.7	7.8	12.9	22.7	6.9
	Aug.	CFA <a href="#">Lee et al. (2022)</a>	62.2	42.3	51.6	60.4	9.2	15.1	26.8	8.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	65.5	44.8	53.7	75.8	14.0	22.8	46.1	12.9
2		PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.2	32.4	49.4	50.0	9.4	11.9	15.0	6.3
	Emb.	RD <a href="#">Deng &amp; Li (2022)</a>	58.6	37.3	50.9	67.3	11.3	17.3	40.7	9.5
		DiAD <a href="#">He et al. (2024b)</a>	63.8	43.4	52.5	68.0	19.2	12.2	33.2	10.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	<b>67.5</b>	<b>53.9</b>	52.6	<b>80.5</b>	<b>28.9</b>	<b>35.9</b>	40.2	<b>21.9</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	66.5	45.8	<b>54.4</b>	73.5	15.5	23.5	<b>49.5</b>	13.3
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	67.4	48.9	53.7	72.1	16.2	23.0	43.1	13.0
		MambaAD <a href="#">He et al. (2024a)</a>	65.2	45.3	53.3	70.9	13.9	21.4	45.0	12.0
	Rec.	UniAD <a href="#">You et al. (2022)</a>	48.8	31.6	49.5	60.0	7.6	14.6	27.9	7.9
		RD++ <a href="#">Tien et al. (2023)</a>	51.5	31.0	50.3	70.3	12.7	16.9	43.5	9.2
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	56.6	37.8	50.0	53.8	8.8	11.9	22.3	6.3
	Hybrid	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	59.6	39.8	53.3	49.1	5.8	12.4	14.3	6.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	58.6	38.7	53.4	53.7	7.5	12.9	18.0	6.9
	Aug.	CFA <a href="#">Lee et al. (2022)</a>	60.0	41.5	52.9	48.4	6.4	12.4	12.2	6.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	<b>65.5</b>	<b>45.7</b>	<b>55.5</b>	<b>70.1</b>	<b>12.6</b>	<b>19.7</b>	<b>46.3</b>	<b>10.9</b>
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.2	38.1	51.2	50.0	16.7	12.4	15.0	6.6
3	Emb.	RD <a href="#">Deng &amp; Li (2022)</a>	51.4	34.1	51.3	56.7	7.8	13.7	29.7	7.4
		DiAD <a href="#">He et al. (2024b)</a>	60.1	41.4	52.9	65.9	<b>17.5</b>	10.6	32.3	9.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	56.6	38.2	52.3	62.3	10.0	16.4	27.1	9.0
		InvAD <a href="#">Zhang et al. (2024a)</a>	60.2	42.0	53.1	59.7	9.0	14.9	38.5	8.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	56.2	38.6	51.6	59.1	8.6	14.3	31.3	7.7
		MambaAD <a href="#">He et al. (2024a)</a>	57.1	38.9	51.5	58.6	8.5	14.2	34.0	7.6
	Rec.	UniAD <a href="#">You et al. (2022)</a>	49.9	33.2	51.3	59.0	8.2	14.4	32.1	7.8
		RD++ <a href="#">Tien et al. (2023)</a>	52.5	34.3	51.6	58.5	8.3	13.5	33.7	7.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	49.8	35.3	51.1	50.8	7.2	12.4	17.6	6.6
	Hybrid									



Table A55: Benchmarked results on COCO-AD dataset [Zhang et al. \(2024a\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.5	48.5	62.5	49.9	7.6	14.4	15.3	38.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	55.6	49.4	62.3	60.2	14.5	19.2	26.1	42.9
		CFA <a href="#">Lee et al. (2022)</a>	56.7	51.2	62.6	56.2	10.3	16.0	17.9	41.0
	Emb.	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	<b>67.7</b>	<b>57.9</b>	<b>64.5</b>	<b>76.0</b>	<b>20.3</b>	<b>26.4</b>	<b>47.7</b>	<b>53.0</b>
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	51.6	47.4	61.6	50.0	13.4	14.4	15.0	38.4
		RD <a href="#">Deng &amp; Li (2022)</a>	57.6	49.9	62.0	66.5	13.9	20.0	39.8	45.8
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	59.0	53.0	63.2	68.1	20.5	14.2	30.8	44.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	66.9	<b>59.3</b>	63.7	<b>76.2</b>	<b>27.6</b>	<b>32.2</b>	39.1	<b>20.1</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	64.2	56.0	63.4	71.2	18.5	24.1	45.8	50.5
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	63.3	56.0	62.9	69.9	18.2	23.1	39.7	49.2
		MambaAD <a href="#">He et al. (2024a)</a>	62.8	55.2	62.8	68.9	16.7	22.0	41.6	48.8
		UniAD <a href="#">You et al. (2022)</a>	55.2	49.3	61.7	64.6	12.8	19.0	34.3	44.0
	Hybrid	RD++ <a href="#">Tien et al. (2023)</a>	57.5	49.3	62.0	68.2	15.5	20.1	42.2	46.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	54.4	49.4	61.8	54.5	10.6	15.4	24.4	40.7

## N DETAILED QUANTITATIVE RESULTS ON MVTEC AD DATASET UNDER 300 EPOCHS

Table A56: Benchmarked results on MVTEC AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
bottle	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	42.8	73.8	86.3	55.0	6.2	11.3	15.8	44.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	85.4	95.6	87.6	80.8	21.9	26.6	50.7	67.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	98.7	99.6	96.9	72.5	60.5	53.4	61.5	80.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	36.7	71.5	86.3	23.6	3.5	10.9	2.4	37.5
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>98.9</b>	79.0	<u>77.1</u>	96.1	<u>62.7</u>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.9	<b>100.</b>	99.2	97.3	62.3	63.9	92.1	47.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	75.1	91.3	86.9	54.8	7.4	11.8	17.9	6.3
		RD <a href="#">Deng &amp; Li (2022)</a>	99.6	<u>99.9</u>	<u>98.4</u>	97.8	68.0	67.9	94.6	51.5
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	97.8	99.1	<u>99.2</u>	93.5	45.9	49.4	75.9	32.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<u>98.8</u>	<u>80.0</u>	<u>75.3</u>	94.7	60.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.4	74.8	72.2	95.2	56.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.4	74.8	73.2	95.5	57.7
		MambaAD <a href="#">He et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>98.9</b>	80.3	<u>77.1</u>	<b>96.2</b>	62.7
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.8	<b>100.</b>	99.2	98.0	68.9	69.8	94.5	53.6
		RD++ <a href="#">Tien et al. (2023)</a>	99.8	<b>100.</b>	99.2	98.2	71.0	71.3	94.8	55.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	95.7	<b>88.0</b>	<b>80.8</b>	92.6	<b>67.8</b>
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.6	66.2	76.0	52.4	2.7	5.6	14.7	2.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	71.3	81.6	77.1	76.8	13.0	18.2	51.5	10.0
		RealNet <a href="#">Zhang et al. (2024c)</a>	63.3	80.1	76.0	59.8	29.4	26.6	29.1	15.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	56.4	71.8	76.0	57.1	7.4	8.1	16.3	4.2
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>99.8</b>	<b>99.9</b>	<b>99.5</b>	<b>97.7</b>	51.6	<u>55.2</u>	<b>93.6</b>	38.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	90.3	94.1	88.2	89.9	27.7	33.8	79.4	20.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	59.6	75.3	76.3	74.7	17.9	17.8	37.5	9.8
		RD <a href="#">Deng &amp; Li (2022)</a>	81.9	88.4	80.6	84.9	25.9	33.0	76.8	19.8
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	85.9	92.4	85.7	90.8	27.2	33.0	64.4	19.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.8	99.2	<u>96.3</u>	95.4	41.0	45.0	88.9	29.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	<u>99.2</u>	<u>99.5</u>	<u>96.8</u>	<u>97.3</u>	47.0	<u>51.1</u>	<u>92.1</u>	34.3
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.3	97.7	92.6	90.2	36.9	45.7	86.5	29.6
		MambaAD <a href="#">He et al. (2024a)</a>	98.9	99.3	95.6	95.9	42.6	48.0	90.9	31.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	96.6	98.0	91.8	<u>97.0</u>	<u>49.3</u>	<u>55.2</u>	86.6	<u>38.2</u>
		RD++ <a href="#">Tien et al. (2023)</a>	94.5	96.3	91.6	93.7	37.2	44.5	86.4	28.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	93.0	96.2	88.3	92.2	<b>62.8</b>	<b>62.3</b>	70.9	<b>45.3</b>
capsule	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	41.4	81.7	90.5	47.9	1.1	1.8	17.6	0.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	73.6	92.1	91.1	93.4	19.8	26.6	77.1	15.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	51.0	85.4	90.5	51.8	23.3	5.7	18.8	2.9
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	40.2	79.1	90.5	81.8	4.0	8.4	56.0	4.4
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>99.2</b>	<b>99.8</b>	<b>98.6</b>	<b>99.0</b>	49.0	<u>52.9</u>	95.7	<u>35.9</u>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	87.8	97.2	93.4	89.5	39.9	43.7	93.3	28.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	54.6	87.9	90.5	89.5	9.1	15.1	55.7	8.2
		RD <a href="#">Deng &amp; Li (2022)</a>	<u>98.2</u>	99.6	96.9	98.8	44.2	50.4	<b>96.0</b>	33.7
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	97.9	<u>99.6</u>	<u>97.3</u>	90.3	16.2	23.1	54.2	13.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	95.8	99.1	95.4	98.1	41.6	47.5	92.2	31.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	<u>98.2</u>	<u>99.6</u>	<u>96.9</u>	<b>99.0</b>	<u>47.5</u>	51.1	95.8	34.3
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.5	99.2	96.8	98.6	43.9	49.0	95.1	32.5
		MambaAD <a href="#">He et al. (2024a)</a>	94.8	98.9	95.4	98.4	43.8	47.1	93.9	30.8
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	87.5	96.9	93.5	98.7	45.6	48.5	92.5	32.0
		RD++ <a href="#">Tien et al. (2023)</a>	97.6	<u>99.5</u>	96.8	<u>98.8</u>	45.4	<u>51.2</u>	<u>95.7</u>	34.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	91.3	98.2	93.4	86.0	<b>57.5</b>	<b>58.4</b>	59.0	<b>41.3</b>
	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	34.4	72.8	86.4	50.2	1.6	3.2	15.2	1.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	88.8	96.7	89.6	95.4	37.3	44.0	80.9	28.2
		RealNet <a href="#">Zhang et al. (2024c)</a>	97.3	99.2	96.1	87.8	<b>73.0</b>	<b>68.3</b>	82.3	<b>51.8</b>
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	54.3	81.4	86.4	41.0	3.1	8.0	25.7	4.2
		PatchCore <a href="#">Roth et al. (2022)</a>	98.4	99.5	97.8	<u>99.1</u>	<u>66.4</u>	<u>64.6</u>	95.2	<u>47.7</u>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.2	99.8	98.3	98.9	59.0	61.4	94.7	44.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	56.7	80.3	86.4	81.9	7.3	14.9	49.0	8.0
		RD <a href="#">Deng &amp; Li (2022)</a>	98.4	99.5	97.2	99.0	57.7	60.1	95.6	42.9
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	91.3	97.6	90.5	87.7	16.9	26.6	65.5	15.4
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.4	<u>99.8</u>	<b>99.4</b>	98.9	61.1	64.2	94.3	47.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	98.8	<u>99.7</u>	97.2	<u>99.1</u>	60.9	62.2	<u>95.6</u>	45.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.5	99.8	98.9	99.0	55.6	60.1	<u>96.0</u>	42.9
		MambaAD <a href="#">He et al. (2024a)</a>	<b>99.9</b>	<b>100.</b>	<b>99.4</b>	<b>99.2</b>	62.7	63.3	<b>97.2</b>	46.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.8	99.9	<b>99.4</b>	98.5	52.9	52.6	95.2	35.7
		RD++ <a href="#">Tien et al. (2023)</a>	97.4	99.3	96.6	98.8	52.1	56.3	94.5	39.2
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	93.6	97.9	94.4	96.1	<u>72.3</u>	<u>67.5</u>	94.2	<u>50.9</u>
carpet	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	34.4	72.8	86.4	50.2	1.6	3.2	15.2	1.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	88.8	96.7	89.6	95.4	37.3	44.0	80.9	28.2
		RealNet <a href="#">Zhang et al. (2024c)</a>	97.3	99.2	96.1	87.8	<b>73.0</b>	<b>68.3</b>	82.3	<b>51.8</b>
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	54.3	81.4	86.4	41.0	3.1	8.0	25.7	4.2
		PatchCore <a href="#">Roth et al. (2022)</a>	98.4	99.5	97.8	<u>99.1</u>	<u>66.4</u>	<u>64.6</u>	95.2	<u>47.7</u>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.2	99.8	98.3	98.9	59.0	61.4	94.7	44.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	56.7	80.3	86.4	81.9	7.3	14.9	49.0	8.0
		RD <a href="#">Deng &amp; Li (2022)</a>	98.4	99.5	97.2	99.0	57.7	60.1	95.6	42.9
	Rec.	DiAD <a href="#">He et al. (2024b)</a>	91.3	97.6	90.5	87.7	16.9	26.6	65.5	15.4
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.4	<u>99.8</u>	<b>99.4</b>	98.9	61.1	64.2	94.3	47.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	98.8	<u>99.7</u>	97.2	<u>99.1</u>	60.9	62.2	<u>95.6</u>	45.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.5	99.8	98.9	99.0	55.6	60.1	<u>96.0</u>	42.9
		MambaAD <a href="#">He et al. (2024a)</a>	<b>99.9</b>	<b>100.</b>	<b>99.4</b>	<b>99.2</b>	62.7	63.3	<b>97.2</b>	46.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.8	99.9	<b>99.4</b>	98.5	52.9	52.6	95.2	35.7
		RD++ <a href="#">Tien et al. (2023)</a>	97.4	99.3	96.6	98.8	52.1	56.3	94.5	39.2
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	93.6	97.9	94.4	96.1	<u>72.3</u>	<u>67.5</u>	94.2	<u>50.9</u>

Table A57: Benchmarked results on MVTec AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD		
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max					
grid	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	64.2	84.1	85.5	49.3	0.6	1.4	14.3	0.7	47.2	
		SimpleNet <a href="#">Liu et al. (2023)</a>	40.5	69.4	85.7	38.2	0.5	1.4	3.6	0.7	38.1	
		RealNet <a href="#">Zhang et al. (2024c)</a>	97.4	99.3	98.2	81.0	47.8	49.2	70.3	32.6	80.2	
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	51.2	79.2	85.1	27.5	0.4	1.4	1.7	0.7	39.8	
		PatchCore <a href="#">Roth et al. (2022)</a>	99.4	99.8	98.2	98.9	40.8	44.3	94.0	28.4	84.3	
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	89.4	96.5	88.9	93.6	21.3	26.9	82.3	15.5	73.8	
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	78.4	90.2	88.7	90.0	13.9	22.4	75.5	12.6	68.1	
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	97.8	99.3	96.6	99.2	45.9	47.6	97.3	31.2	85.2	
		DiAD <a href="#">He et al. (2024b)</a>	99.7	99.9	98.3	85.7	3.9	9.7	57.4	5.1	65.0	
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.6	99.9	99.1	98.6	30.6	36.6	95.8	22.4	82.5	
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.2	45.5	47.3	97.3	31.0	86.2	
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.3	50.0	50.2	97.7	33.5	87.2	
	MambaAD <a href="#">He et al. (2024a)</a>	100.	100.	100.	99.2	48.6	48.3	97.6	31.8	86.7		
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	98.8	99.6	96.6	97.0	23.8	30.0	92.1	17.6	79.5	
		RD++ <a href="#">Tien et al. (2023)</a>	99.1	99.7	98.2	99.1	43.7	48.1	96.7	31.6	85.5	
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.8	99.9	99.1	99.3	65.9	64.9	97.8	48.0	90.8	
	hazelnut	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.0	69.7	77.8	32.8	2.2	4.2	11.2	2.1	39.4
			SimpleNet <a href="#">Liu et al. (2023)</a>	93.0	96.1	91.5	92.0	24.7	33.0	81.2	19.8	75.6
			RealNet <a href="#">Zhang et al. (2024c)</a>	99.4	99.6	98.6	70.2	47.1	44.9	64.3	29.0	77.9
Emb.		CFA <a href="#">Lee et al. (2022)</a>	66.1	79.8	78.9	38.0	4.7	8.1	26.7	4.2	47.2	
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	100.	99.0	61.2	63.6	96.2	46.6	90.0	
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.9	99.9	99.3	98.5	59.9	56.9	95.7	39.8	88.7	
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	88.5	93.6	87.7	88.1	31.8	39.3	75.5	24.5	74.3	
Rec.		RD <a href="#">Deng &amp; Li (2022)</a>	100.	100.	100.	98.6	58.3	59.3	96.4	42.1	89.1	
		DiAD <a href="#">He et al. (2024b)</a>	96.6	98.5	96.3	95.3	27.9	37.2	81.0	22.9	76.1	
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.8	99.9	98.6	98.9	64.1	62.6	95.2	45.5	89.8	
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	98.9	58.7	60.3	96.6	43.2	89.3	
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	98.8	58.1	60.9	95.6	43.8	89.2	
MambaAD <a href="#">He et al. (2024a)</a>		100.	100.	100.	99.0	64.8	65.6	95.8	48.8	90.7		
Hybrid		UniAD <a href="#">You et al. (2022)</a>	99.9	100.	99.3	98.1	53.5	55.2	94.6	38.1	87.5	
		RD++ <a href="#">Tien et al. (2023)</a>	93.4	94.0	94.6	98.7	57.1	58.0	96.4	40.9	85.8	
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.7	99.8	99.3	97.9	90.2	84.2	90.5	72.7	95.2	
leather		Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	80.3	91.5	87.8	48.8	0.8	1.3	16.7	0.7	51.7
			SimpleNet <a href="#">Liu et al. (2023)</a>	87.3	95.2	90.1	82.2	5.3	11.7	74.6	6.2	67.2
			RealNet <a href="#">Zhang et al. (2024c)</a>	100.	100.	100.	95.8	73.8	70.4	93.9	54.3	91.7
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	58.1	80.3	86.7	23.7	0.4	1.3	1.7	0.6	40.9	
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	100.	99.4	52.1	51.2	97.8	34.5	87.6	
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	100.	100.	100.	99.3	48.8	49.0	98.3	32.4	86.9	
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	39.1	65.1	87.2	47.9	0.3	1.3	11.6	0.6	39.5	
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	100.	100.	100.	99.3	38.2	45.4	97.8	29.4	85.1	
		DiAD <a href="#">He et al. (2024b)</a>	97.4	99.0	96.8	91.5	6.4	13.3	77.9	7.1	68.9	
		ViTAD <a href="#">Zhang et al. (2023a)</a>	100.	100.	100.	99.5	51.3	55.4	98.0	38.3	88.0	
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.4	49.9	52.1	97.9	35.2	87.4	
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	99.2	41.2	46.4	98.4	30.2	85.7	
	MambaAD <a href="#">He et al. (2024a)</a>	100.	100.	100.	99.3	47.7	50.1	98.6	33.4	87.0		
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	100.	100.	100.	98.9	36.3	38.1	97.6	23.5	83.9	
		RD++ <a href="#">Tien et al. (2023)</a>	100.	100.	100.	99.2	39.7	44.4	97.4	28.5	85.1	
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	100.	100.	99.5	99.5	80.6	73.4	98.8	58.0	94.0	
	metal_nut	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	61.2	86.4	89.4	39.8	8.4	21.2	10.8	11.9	49.5
			SimpleNet <a href="#">Liu et al. (2023)</a>	74.3	92.3	90.1	79.9	33.0	36.8	52.7	22.5	68.1
			RealNet <a href="#">Zhang et al. (2024c)</a>	63.4	90.4	89.4	51.6	37.6	21.0	31.2	11.7	58.2
Emb.		CFA <a href="#">Lee et al. (2022)</a>	55.7	87.0	89.4	58.4	16.2	24.9	10.0	14.2	52.4	
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	100.	98.8	88.9	85.8	95.6	75.1	96.1	
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	97.8	99.5	97.3	96.0	71.4	68.3	88.8	51.9	89.7	
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	68.0	91.1	89.9	80.1	32.8	43.5	31.7	27.8	65.0	
Rec.		RD <a href="#">Deng &amp; Li (2022)</a>	59.9	83.6	93.9	92.1	50.0	52.2	87.5	35.3	74.8	
		DiAD <a href="#">He et al. (2024b)</a>	94.6	98.8	94.2	94.4	73.7	72.5	53.9	56.9	83.2	
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.9	100.	99.5	96.1	74.2	75.9	92.9	61.2	92.3	
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	97.7	81.3	82.0	93.7	69.5	94.3	
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.7	99.9	98.9	97.4	79.6	80.4	93.8	67.2	93.7	
MambaAD <a href="#">He et al. (2024a)</a>		99.8	100.	98.9	97.1	77.3	80.2	94.3	66.9	93.4		
Hybrid		UniAD <a href="#">You et al. (2022)</a>	98.3	99.5	98.9	92.6	48.8	63.0	79.4	46.0	84.9	
		RD++ <a href="#">Tien et al. (2023)</a>	100.	100.	99.5	96.6	74.0	77.4	93.4	63.1	92.6	
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	100.	100.	100.	96.9	91.2	86.1	93.2	75.6	95.9	

Table A58: Benchmarked results on MVTec AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
pill	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	68.0	91.5	92.5	46.0	3.3	6.6	18.4	3.4	51.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	71.4	93.5	91.6	94.1	53.0	50.7	77.7	34.0	77.2
		RealNet <a href="#">Zhang et al. (2024c)</a>	63.3	91.6	91.6	51.1	41.1	6.5	28.3	3.4	57.0
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	62.4	89.5	91.6	48.5	4.8	9.5	27.3	5.0	51.8
		PatchCore <a href="#">Roth et al. (2022)</a>	97.0	99.4	96.5	98.1	76.8	74.0	96.1	58.7	91.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	85.0	96.8	92.3	96.5	56.2	55.8	90.9	38.7	83.1
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	68.7	93.0	91.8	77.6	13.9	24.2	61.2	13.8	64.4
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	97.0	99.5	97.2	97.5	63.1	64.5	96.0	47.6	89.1
		DiAD <a href="#">He et al. (2024b)</a>	94.7	99.0	97.2	93.0	50.4	50.6	65.7	33.9	78.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	96.2	99.4	96.4	98.7	77.5	75.4	95.5	60.6	92.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	97.6	99.6	97.2	98.0	69.9	68.3	96.4	51.9	90.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.5	99.4	96.1	98.0	71.7	70.6	96.6	54.6	90.8
		MambaAD <a href="#">He et al. (2024a)</a>	95.5	99.2	96.5	97.1	61.3	64.1	95.6	47.2	88.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	94.1	98.9	95.1	95.1	40.7	45.9	94.7	29.8	82.6
		RD++ <a href="#">Tien et al. (2023)</a>	97.6	99.5	97.9	98.2	73.4	70.9	96.3	54.9	91.5
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	88.9	97.8	93.0	89.5	83.5	77.4	48.9	63.1	84.0
screw	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.0	75.7	85.6	51.6	0.4	0.5	17.5	0.3	44.5
		SimpleNet <a href="#">Liu et al. (2023)</a>	63.0	84.6	85.3	91.3	1.7	3.8	70.5	1.9	59.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	72.7	89.0	85.6	50.6	9.2	1.9	17.0	1.0	51.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	64.2	82.6	85.9	32.2	0.2	0.8	13.1	0.4	44.6
		PatchCore <a href="#">Roth et al. (2022)</a>	98.3	99.4	97.1	99.5	41.5	44.6	97.2	28.7	84.5
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	71.4	88.4	85.8	97.0	17.2	24.2	89.3	13.7	69.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	46.7	72.0	85.3	58.5	0.3	1.3	10.7	0.6	42.9
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	98.3	99.5	96.1	99.4	41.3	44.9	97.1	29.0	84.3
		DiAD <a href="#">He et al. (2024b)</a>	72.4	87.1	87.5	86.4	3.1	8.2	55.4	4.3	57.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	91.2	97.0	92.0	98.9	33.2	39.8	93.6	24.9	79.9
		InvAD <a href="#">Zhang et al. (2024a)</a>	97.2	99.0	95.9	99.6	49.5	51.6	97.5	34.8	86.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.9	97.8	93.5	99.5	46.9	50.4	97.7	33.7	84.3
		MambaAD <a href="#">He et al. (2024a)</a>	93.9	97.6	94.0	99.4	50.1	50.2	97.4	33.5	84.7
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	92.4	96.6	93.3	98.9	31.5	37.8	94.2	23.3	79.8
		RD++ <a href="#">Tien et al. (2023)</a>	98.7	99.6	96.7	99.5	41.7	47.5	97.7	31.1	85.0
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	86.4	95.3	89.8	74.4	49.2	46.7	50.1	30.5	72.8
tile	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	63.4	83.5	83.8	48.8	6.4	13.2	14.2	7.0	48.8
		SimpleNet <a href="#">Liu et al. (2023)</a>	86.5	94.9	88.1	75.0	27.3	35.7	49.0	21.7	68.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	98.7	99.6	98.2	91.9	84.8	78.4	87.3	64.5	92.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	52.5	76.5	83.6	22.5	4.2	13.2	5.3	7.0	41.1
		PatchCore <a href="#">Roth et al. (2022)</a>	100.	100.	99.4	96.4	58.7	67.1	86.6	50.5	88.5
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.7	99.9	99.4	95.9	55.9	62.1	86.7	45.0	87.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	82.9	93.8	85.4	79.5	46.6	41.2	49.2	25.9	70.7
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	97.9	99.2	95.2	95.2	48.4	60.4	85.7	43.2	84.9
		DiAD <a href="#">He et al. (2024b)</a>	93.0	96.6	96.3	76.2	25.0	33.8	50.5	20.3	67.4
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.9	100.	98.8	96.5	56.5	68.7	88.0	52.3	88.5
		InvAD <a href="#">Zhang et al. (2024a)</a>	100.	100.	100.	95.5	50.0	61.3	87.6	44.2	86.8
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	98.2	99.3	96.5	94.4	47.9	55.8	82.4	38.7	84.1
		MambaAD <a href="#">He et al. (2024a)</a>	98.2	99.3	96.0	93.7	44.7	54.0	80.8	37.0	83.1
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	100.	100.	100.	92.6	43.2	51.4	81.5	34.6	83.6
		RD++ <a href="#">Tien et al. (2023)</a>	99.9	100.	99.4	96.3	52.8	64.3	88.7	47.4	87.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	100.	100.	100.	98.9	95.9	89.5	98.0	81.0	97.8
toothbrush	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	43.6	68.4	83.3	49.9	1.7	3.8	16.1	2.0	41.5
		SimpleNet <a href="#">Liu et al. (2023)</a>	91.4	96.5	90.9	94.4	36.7	40.9	72.1	25.7	77.0
		RealNet <a href="#">Zhang et al. (2024c)</a>	85.0	94.6	86.6	72.3	41.5	43.2	25.6	27.6	67.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	43.6	72.2	83.3	52.5	5.6	9.5	39.9	5.0	46.6
		PatchCore <a href="#">Roth et al. (2022)</a>	91.9	96.2	95.2	99.0	54.8	58.5	91.0	41.3	85.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	83.3	94.3	84.6	98.2	46.0	52.3	85.7	35.5	79.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	60.3	82.9	83.3	75.0	17.5	18.1	16.5	10.0	53.6
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	35.8	62.6	85.7	97.3	21.3	40.0	86.1	25.0	61.3
		DiAD <a href="#">He et al. (2024b)</a>	95.0	98.0	95.2	89.7	11.1	18.4	64.9	10.1	67.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	100.	100.	100.	99.1	54.7	62.5	91.0	45.4	88.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	94.2	97.6	95.2	99.0	52.4	59.7	91.5	42.5	85.7
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	98.1	99.2	96.8	99.0	50.3	59.7	91.2	42.6	86.5
		MambaAD <a href="#">He et al. (2024a)</a>	98.9	99.6	96.8	99.0	47.8	60.3	92.5	43.2	86.7
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	90.3	95.6	95.2	98.5	39.1	49.9	87.9	33.2	81.3
		RD++ <a href="#">Tien et al. (2023)</a>	96.7	98.7	95.1	99.1	57.0	61.5	92.2	44.4	87.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	93.9	97.7	92.3	97.5	74.5	70.7	81.1	54.6	87.8

Table A59: Benchmarked results on MVTec AD dataset [Bergmann et al. \(2019\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max				
transistor	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	42.0	36.8	57.6	50.4	4.2	9.2	14.9	4.8	32.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	81.8	81.9	70.1	75.8	31.9	38.0	57.0	23.5	64.3
		RealNet <a href="#">Zhang et al. (2024c)</a>	73.2	76.8	68.8	57.5	48.6	22.7	31.6	12.8	56.5
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	70.0	59.8	66.0	53.8	8.0	12.0	24.0	6.4	44.9
		PatchCore <a href="#">Roth et al. (2022)</a>	99.8	99.7	97.5	96.0	62.3	59.2	90.8	42.0	88.0
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	92.4	93.4	88.9	84.6	38.8	40.3	74.1	25.3	75.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	66.9	64.9	59.8	73.4	17.9	20.4	25.2	11.3	49.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	93.7	94.4	90.9	85.6	41.7	44.7	74.8	28.8	77.3
		DiAD <a href="#">He et al. (2024b)</a>	99.0	98.7	97.5	98.1	72.8	68.5	85.3	52.1	88.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.5	97.9	92.1	93.7	57.6	54.5	77.0	37.5	83.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.7	99.6	96.4	97.1	69.4	66.3	93.1	49.6	90.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.6	95.6	87.8	95.0	62.4	59.7	85.7	42.5	84.5
		MambaAD <a href="#">He et al. (2024a)</a>	100.	99.9	98.8	95.7	64.4	63.5	86.4	46.5	88.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	100.	100.	100.	97.6	65.2	65.8	94.4	49.0	90.4
		RD++ <a href="#">Tien et al. (2023)</a>	95.4	95.0	92.3	89.5	48.8	50.2	78.3	33.5	80.5
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.5	99.3	96.3	76.6	60.4	56.6	78.2	39.5	83.2
wood	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.4	82.0	86.3	47.8	3.7	7.5	13.7	3.9	45.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	84.4	93.4	91.5	74.6	15.1	23.3	53.6	13.2	65.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	99.6	99.9	99.2	87.4	77.0	73.7	85.4	58.3	90.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	81.7	92.4	90.3	64.8	7.7	12.9	31.0	6.9	58.6
		PatchCore <a href="#">Roth et al. (2022)</a>	98.7	99.6	96.7	95.2	52.1	52.3	91.3	35.4	85.5
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	98.9	99.7	97.5	94.4	47.0	50.4	91.0	33.7	84.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	86.8	95.2	89.9	71.2	35.9	15.2	50.3	8.2	66.9
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	99.4	99.8	98.3	95.5	49.4	51.7	91.6	34.9	85.6
		DiAD <a href="#">He et al. (2024b)</a>	93.5	97.5	94.4	83.1	15.0	22.8	58.0	12.8	66.3
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.9	99.7	96.8	96.1	60.8	57.9	88.6	40.8	87.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	98.9	99.6	98.3	94.8	48.3	50.0	89.9	33.3	84.8
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.3	99.1	95.9	94.9	47.3	48.4	88.7	31.9	83.6
		MambaAD <a href="#">He et al. (2024a)</a>	98.7	99.6	96.8	94.2	46.7	47.7	92.1	31.3	84.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	98.6	99.6	96.7	93.3	38.4	43.5	88.0	27.8	82.0
		RD++ <a href="#">Tien et al. (2023)</a>	99.3	99.8	98.3	95.3	50.2	51.1	90.3	34.3	85.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.2	99.7	98.4	94.1	83.6	76.8	94.8	62.3	93.2
zipper	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	77.0	90.6	89.8	60.1	3.7	4.1	26.4	2.1	54.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	95.0	98.7	93.5	92.6	39.2	44.6	78.3	28.7	79.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	80.6	94.8	88.1	65.5	55.0	40.5	42.0	25.4	69.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	43.4	78.6	88.1	32.7	1.6	4.2	9.1	2.1	41.0
		PatchCore <a href="#">Roth et al. (2022)</a>	99.6	99.9	98.7	98.9	63.4	64.6	96.4	47.8	90.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	96.0	98.7	97.1	98.0	50.1	55.7	92.8	38.6	85.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	60.9	87.5	88.1	70.0	6.0	8.1	32.7	4.2	54.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	99.5	99.9	99.2	98.4	52.4	59.9	95.2	42.8	88.0
		DiAD <a href="#">He et al. (2024b)</a>	71.8	89.5	90.2	84.0	13.5	23.8	55.5	13.5	61.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	97.7	99.3	97.5	95.9	43.6	50.2	89.4	33.6	84.0
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.6	99.9	99.2	98.4	50.8	58.0	95.0	40.9	87.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.3	99.8	97.5	98.5	57.7	61.0	95.5	43.9	88.5
		MambaAD <a href="#">He et al. (2024a)</a>	99.1	99.8	97.4	98.2	58.2	60.5	95.0	43.3	88.4
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	95.3	98.5	96.2	97.0	37.7	46.6	91.4	30.4	82.4
		RD++ <a href="#">Tien et al. (2023)</a>	68.2	89.3	92.2	98.3	50.8	57.9	94.5	40.7	79.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.4	99.8	98.3	94.7	80.8	74.1	90.9	58.8	92.1
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	55.2	77.0	83.9	48.7	3.1	6.3	15.8	3.3	45.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	79.2	90.8	87.6	82.4	24.0	29.0	62.0	17.8	67.6
		RealNet <a href="#">Zhang et al. (2024c)</a>	82.9	93.3	90.9	69.8	50.0	40.4	51.2	28.5	70.9
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	55.8	78.8	84.5	43.9	4.8	8.9	19.3	4.7	46.1
		PatchCore <a href="#">Roth et al. (2022)</a>	98.8	99.5	98.4	98.3	59.9	61.0	94.2	44.9	88.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	92.7	97.2	94.0	95.8	46.8	49.6	89.0	34.0	82.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	66.2	84.3	85.1	74.2	17.2	19.6	40.0	11.4	58.1
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	90.5	95.0	95.1	95.9	47.1	52.1	91.2	35.8	82.6
		DiAD <a href="#">He et al. (2024b)</a>	92.0	96.8	94.4	89.3	27.3	32.7	64.4	21.3	71.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.4	99.4	97.5	97.5	55.2	58.1	91.7	42.0	87.0
		InvAD <a href="#">Zhang et al. (2024a)</a>	98.9	99.6	98.2	98.1	57.1	59.6	94.4	43.1	88.1
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	98.1	99.1	96.8	97.3	55.0	58.1	93.1	41.7	86.9
		MambaAD <a href="#">He et al. (2024a)</a>	98.5	99.5	97.7	97.6	56.1	58.7	93.6	42.3	87.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	96.8	98.9	97.0	96.8	45.0	50.2	91.0	34.2	84.2
		RD++ <a href="#">Tien et al. (2023)</a>	95.8	98.0	96.6	97.3	53.0	57.0	92.9	40.5	85.9
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	96.3	98.8	96.1	92.6	75.8	71.3	82.6	56.6	88.8

## O DETAILED QUANTITATIVE RESULTS ON MVTEC 3D DATASET UNDER 300 EPOCHS

Table A60: Benchmarked results on MVTEC 3D dataset [Bergmann et al. \(2022b\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
bagel	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	59.8	86.3	88.9	53.2	1.5	5.3	28.4	50.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	80.8	94.3	91.3	95.7	19.2	28.0	78.1	72.0
		CFA <a href="#">Lee et al. (2022)</a>	68.2	90.2	88.9	71.5	12.8	23.4	34.8	59.0
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	91.8	98.0	92.9	98.8	43.7	46.8	93.3	82.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.6	94.4	89.8	98.3	31.0	39.1	89.6	76.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	59.9	87.0	88.9	93.9	11.9	17.7	76.8	64.3
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	91.8	97.9	94.3	98.6	39.2	44.8	91.2	81.6
		DiAD <a href="#">He et al. (2024b)</a>	89.6	97.6	91.5	89.6	4.5	10.3	66.2	64.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	89.3	97.1	93.4	98.6	38.6	43.6	91.8	80.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	91.3	97.8	92.5	<b>98.9</b>	44.7	48.5	<b>93.8</b>	82.7
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	81.1	94.8	91.1	98.3	40.1	44.5	89.6	78.6
		MambaAD <a href="#">He et al. (2024a)</a>	91.9	98.0	92.0	98.6	38.3	43.6	93.1	81.2
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	84.9	96.1	89.9	98.0	32.9	37.6	89.2	77.4
		RD++ <a href="#">Tien et al. (2023)</a>	85.6	96.2	91.8	98.7	39.3	45.9	91.8	80.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>96.8</b>	<b>99.3</b>	<b>95.2</b>	96.6	<b>66.6</b>	<b>64.1</b>	89.2	<b>88.1</b>
cable gland	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	26.1	68.5	89.2	56.9	0.4	0.9	26.6	41.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	87.1	96.6	92.9	96.9	13.8	20.3	90.3	73.8
		CFA <a href="#">Lee et al. (2022)</a>	42.9	80.5	89.2	43.1	1.3	5.5	23.3	44.6
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	96.4	99.0	96.1	<b>99.5</b>	37.3	43.6	98.3	83.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	75.4	92.1	89.7	97.2	11.4	16.9	91.5	70.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.4	83.9	89.2	75.4	0.8	2.2	47.2	53.8
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	91.5	97.7	93.6	99.4	36.8	41.9	98.2	81.7
		DiAD <a href="#">He et al. (2024b)</a>	88.1	96.5	94.6	94.5	4.1	10.0	81.3	67.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	85.9	95.0	92.7	98.8	24.2	32.4	96.2	77.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>97.3</b>	<b>99.3</b>	<b>97.7</b>	<b>99.5</b>	40.6	46.9	<b>98.7</b>	<b>84.8</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	95.1	98.8	94.8	99.4	40.9	47.7	98.4	83.9
		MambaAD <a href="#">He et al. (2024a)</a>	94.6	98.7	94.9	99.4	40.5	46.1	98.4	83.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	78.8	91.7	91.6	98.5	23.5	32.4	95.3	74.9
		RD++ <a href="#">Tien et al. (2023)</a>	94.6	98.6	95.6	<b>99.5</b>	41.0	45.3	98.4	83.7
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	88.2	97.1	91.3	86.8	<b>45.8</b>	<b>52.1</b>	80.2	<b>35.2</b>
carrot	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	32.5	76.1	90.7	57.7	0.7	1.4	31.5	44.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	68.2	91.5	91.0	96.5	8.8	15.7	86.3	67.7
		CFA <a href="#">Lee et al. (2022)</a>	48.3	85.8	90.7	56.3	2.6	5.8	32.4	49.6
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	<b>95.2</b>	<b>99.0</b>	95.6	<b>99.4</b>	25.9	30.8	97.7	<b>80.0</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	86.8	97.2	92.6	98.9	18.6	25.6	96.0	76.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	64.8	88.4	91.3	96.0	11.6	18.0	86.4	67.2
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	85.4	96.3	93.1	99.3	25.8	32.3	97.6	77.7
		DiAD <a href="#">He et al. (2024b)</a>	92.7	98.1	<b>98.1</b>	97.6	6.3	12.0	91.0	70.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	79.4	94.0	92.5	98.8	19.5	26.2	95.9	74.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	89.9	97.5	94.9	99.2	24.8	29.6	97.4	78.4
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	89.0	97.4	93.5	99.3	27.1	32.5	<b>98.0</b>	78.8
		MambaAD <a href="#">He et al. (2024a)</a>	90.7	97.6	95.2	<b>99.4</b>	27.1	32.0	<b>98.0</b>	79.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	73.1	93.0	92.0	98.2	13.6	20.5	94.0	71.3
		RD++ <a href="#">Tien et al. (2023)</a>	88.8	97.3	93.5	99.3	24.4	29.8	97.2	77.9
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	77.4	94.0	90.7	66.8	<b>34.7</b>	<b>33.5</b>	42.8	65.9
cookie	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.8	80.7	<b>89.2</b>	44.9	1.2	3.5	14.5	45.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	62.0	85.7	88.0	93.1	21.9	29.6	73.1	66.5
		CFA <a href="#">Lee et al. (2022)</a>	48.2	81.2	88.0	49.8	5.2	11.2	22.9	47.4
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	71.0	91.6	88.0	<b>98.0</b>	<b>52.4</b>	<b>50.2</b>	<b>92.5</b>	<b>78.4</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	46.9	78.7	88.4	96.9	30.8	31.6	89.1	66.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	24.9	69.8	88.0	85.7	6.3	12.3	62.7	51.3
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	49.9	81.2	88.0	96.3	24.4	31.4	86.4	66.3
		DiAD <a href="#">He et al. (2024b)</a>	53.6	79.3	88.0	87.4	6.1	10.8	67.5	56.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	71.9	<b>91.7</b>	88.5	97.5	46.3	47.5	87.1	76.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	62.8	87.8	88.0	<b>98.0</b>	46.3	46.6	91.5	75.1
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	67.1	89.2	88.3	96.2	29.1	34.2	83.9	71.2
		MambaAD <a href="#">He et al. (2024a)</a>	67.2	89.2	88.0	96.5	36.7	39.2	83.4	72.7
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	<b>72.1</b>	90.8	88.5	97.4	42.5	46.8	89.8	76.5
		RD++ <a href="#">Tien et al. (2023)</a>	56.1	83.8	88.0	97.3	36.7	39.6	88.5	70.7
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	70.7	90.5	88.6	81.0	50.2	<b>50.4</b>	51.7	<b>33.7</b>



Table A61: Benchmarked results on MVTec 3D dataset [Bergmann et al. \(2022b\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
dowel	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	41.9	77.5	88.9	34.5	0.5	2.5	17.0	1.2	41.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	86.2	96.5	90.0	96.6	13.7	21.9	85.2	12.3	72.6
	Emb. CFA <a href="#">Lee et al. (2022)</a>	60.1	82.8	90.4	58.5	0.4	0.9	21.1	0.4	49.0
	PatchCore <a href="#">Roth et al. (2022)</a>	98.2	99.6	97.5	99.3	44.5	46.7	96.3	30.5	85.1
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	94.9	98.8	95.2	98.9	29.9	34.1	94.8	20.6	80.4
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	61.3	85.5	89.3	93.5	5.6	10.7	74.2	5.7	62.4
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	99.4	<b>99.9</b>	98.6	<b>99.7</b>	51.6	<b>51.4</b>	<b>98.8</b>	<b>34.5</b>	<b>87.3</b>
	DiAD <a href="#">He et al. (2024b)</a>	69.9	90.8	92.4	78.6	4.5	9.7	48.2	5.1	56.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	94.3	98.6	93.8	99.2	37.0	41.1	95.9	25.9	81.9
	InvAD <a href="#">Zhang et al. (2024a)</a>	99.2	99.8	<b>99.0</b>	<b>99.7</b>	50.5	50.6	98.3	33.8	87.1
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.5	99.2	96.2	99.6	50.0	50.0	97.4	33.3	85.8
	MambaAD <a href="#">He et al. (2024a)</a>	97.6	99.4	96.1	99.5	51.6	50.4	97.4	33.7	86.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	94.0	98.6	93.0	99.1	35.6	41.2	96.1	25.9	81.6
	RD++ <a href="#">Tien et al. (2023)</a>	<b>99.6</b>	<b>99.9</b>	<b>99.0</b>	<b>99.7</b>	<b>52.2</b>	50.6	98.7	33.9	<b>87.4</b>
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	82.3	95.5	89.8	84.4	39.8	45.8	63.0	29.7	73.7
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.1	83.0	88.9	57.0	0.3	0.4	19.2	0.2	46.6
	SimpleNet <a href="#">Liu et al. (2023)</a>	74.3	93.3	88.9	86.4	10.8	21.9	64.2	12.3	65.7
foam	Emb. CFA <a href="#">Lee et al. (2022)</a>	61.7	88.7	88.9	44.4	6.4	16.1	32.5	8.8	52.3
	PatchCore <a href="#">Roth et al. (2022)</a>	78.9	94.4	89.9	94.9	18.8	29.6	83.4	17.4	72.2
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	73.8	93.3	89.3	85.3	16.2	26.4	57.3	15.2	65.9
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	55.5	81.3	89.9	61.2	0.4	0.5	32.7	0.3	49.6
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	74.7	92.9	89.9	93.5	14.1	27.3	79.6	15.8	69.7
	DiAD <a href="#">He et al. (2024b)</a>	79.9	95.3	88.9	88.3	2.0	6.3	62.1	3.2	60.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	79.4	94.4	<b>90.8</b>	94.0	14.2	25.6	80.7	14.7	70.9
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>87.4</b>	<b>96.8</b>	<b>91.6</b>	93.8	18.9	30.1	81.3	17.7	74.0
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	86.4	96.5	90.5	94.9	24.2	32.9	83.6	19.7	75.0
	MambaAD <a href="#">He et al. (2024a)</a>	84.3	95.9	89.9	<b>95.3</b>	25.2	33.6	<b>84.8</b>	20.2	74.9
	Hybrid UniAD <a href="#">You et al. (2022)</a>	75.0	93.2	88.9	83.2	9.8	22.4	57.1	12.6	64.4
	RD++ <a href="#">Tien et al. (2023)</a>	69.2	91.5	89.0	92.4	14.7	26.6	75.8	15.4	67.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	85.0	96.4	89.8	85.5	<b>44.7</b>	<b>49.6</b>	74.4	<b>33.0</b>	<b>77.0</b>
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	48.5	82.0	89.1	47.4	0.6	2.3	19.3	1.2	45.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	65.4	87.9	89.1	94.3	5.8	12.1	80.3	6.5	64.5
	Emb. CFA <a href="#">Lee et al. (2022)</a>	61.2	87.5	89.4	43.3	1.7	7.6	24.4	4.0	49.3
	PatchCore <a href="#">Roth et al. (2022)</a>	75.2	92.7	91.2	98.2	26.4	32.4	93.3	19.3	74.5
peach	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	74.4	91.8	90.5	97.9	16.2	18.4	92.3	10.2	70.9
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	68.7	90.0	89.6	95.2	6.1	11.7	83.8	6.2	66.0
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	64.3	86.3	91.7	98.3	12.9	20.5	93.2	11.4	68.5
	DiAD <a href="#">He et al. (2024b)</a>	<b>92.2</b>	94.1	<b>97.7</b>	95.6	4.3	8.7	84.7	4.5	68.2
	ViTAD <a href="#">Zhang et al. (2023a)</a>	61.2	87.2	89.1	98.0	18.5	24.8	92.0	14.1	68.7
	InvAD <a href="#">Zhang et al. (2024a)</a>	82.5	94.2	93.3	99.2	36.9	39.5	96.8	24.6	79.0
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	85.6	96.1	90.6	99.0	33.2	36.9	95.6	22.6	78.5
	MambaAD <a href="#">He et al. (2024a)</a>	89.5	<b>96.9</b>	94.2	<b>99.4</b>	44.0	44.3	<b>97.2</b>	28.5	<b>82.4</b>
	Hybrid UniAD <a href="#">You et al. (2022)</a>	70.0	89.8	91.2	98.0	18.5	23.5	92.6	13.3	70.9
	RD++ <a href="#">Tien et al. (2023)</a>	73.0	89.2	92.6	98.8	22.4	29.9	94.7	17.6	73.2
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	80.3	94.9	89.8	84.9	<b>46.6</b>	<b>46.6</b>	70.6	<b>30.4</b>	75.3
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	49.0	82.9	89.3	58.8	0.9	3.3	36.1	1.7	49.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	61.1	86.8	89.3	95.4	3.2	8.0	85.0	4.2	63.5
	Emb. CFA <a href="#">Lee et al. (2022)</a>	41.6	75.9	89.3	14.3	0.5	1.4	6.9	0.7	37.4
	PatchCore <a href="#">Roth et al. (2022)</a>	56.8	83.9	90.2	98.9	9.8	17.0	96.0	9.3	66.2
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.9	86.8	89.3	98.5	10.3	13.8	95.0	7.4	67.2
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	62.3	87.3	90.5	97.0	8.2	15.1	90.5	8.2	66.4
potato	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	62.9	87.4	91.1	<b>99.1</b>	14.6	21.7	96.4	12.2	69.2
	DiAD <a href="#">He et al. (2024b)</a>	<b>87.9</b>	<b>97.0</b>	<b>93.0</b>	98.5	8.4	14.1	94.7	7.6	70.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	57.9	86.4	89.8	98.8	13.0	18.2	95.6	10.0	67.2
	InvAD <a href="#">Zhang et al. (2024a)</a>	67.0	90.2	90.6	<b>99.1</b>	15.7	<b>23.6</b>	96.4	<b>13.4</b>	<b>70.7</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	63.3	87.8	90.4	98.9	11.6	17.5	95.2	9.6	68.2
	MambaAD <a href="#">He et al. (2024a)</a>	58.6	85.3	90.2	99.0	<b>16.4</b>	22.8	95.5	12.9	68.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	51.6	82.7	89.3	97.9	7.2	11.9	92.6	6.3	63.5
	RD++ <a href="#">Tien et al. (2023)</a>	62.3	88.0	90.1	<b>99.1</b>	15.2	22.1	<b>96.5</b>	12.4	69.2
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	64.7	89.2	90.2	54.3	12.8	10.9	21.7	5.7	53.1

Table A62: Benchmarked results on MVTec 3D dataset [Bergmann et al. \(2022b\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
rope	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.8	67.5	82.4	41.6	0.8	1.0	18.6	0.5	41.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	95.5	98.2	92.9	98.9	41.7	46.1	90.4	30.0	82.4
	Emb. CFA <a href="#">Lee et al. (2022)</a>	93.0	97.2	92.4	89.8	38.0	45.6	70.3	29.6	77.6
	PatchCore <a href="#">Roth et al. (2022)</a>	96.7	98.7	95.5	<b>99.6</b>	<b>55.6</b>	<b>56.9</b>	97.4	<b>39.7</b>	<b>87.2</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	93.8	97.6	92.2	99.3	43.6	47.2	95.4	30.9	83.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	15.9	51.0	81.2	79.2	1.1	1.9	43.2	1.0	40.4
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	96.0	98.4	93.1	<b>99.6</b>	48.2	53.8	<b>97.7</b>	36.8	85.3
	DiAD <a href="#">He et al. (2024b)</a>	76.9	86.1	85.1	94.5	6.8	13.8	74.5	7.4	62.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	97.0	98.9	95.6	98.5	41.3	42.7	89.0	27.1	82.5
	InvAD <a href="#">Zhang et al. (2024a)</a>	96.0	98.5	95.5	<b>99.6</b>	52.4	56.0	96.5	38.9	86.4
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	95.4	98.2	94.7	99.2	45.1	46.8	95.4	30.5	83.9
	MambaAD <a href="#">He et al. (2024a)</a>	95.4	98.0	93.1	99.3	49.2	48.9	95.8	32.4	84.4
	Hybrid UniAD <a href="#">You et al. (2022)</a>	<b>97.4</b>	<b>99.0</b>	<b>96.2</b>	99.3	39.4	45.5	96.5	29.5	83.9
	RD++ <a href="#">Tien et al. (2023)</a>	95.4	98.2	94.2	<b>99.6</b>	49.2	54.1	97.6	37.1	85.5
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	94.1	97.9	93.3	96.9	<b>55.6</b>	56.8	92.3	39.6	85.2
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	77.4	89.3	<b>93.5</b>	55.1	0.3	0.9	22.9	0.5	53.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	68.4	87.4	89.0	86.0	5.0	10.0	59.0	5.3	60.8
	Emb. CFA <a href="#">Lee et al. (2022)</a>	75.9	92.9	87.4	48.8	0.7	1.7	17.8	0.8	51.3
tire	PatchCore <a href="#">Roth et al. (2022)</a>	80.1	93.6	87.9	99.1	22.6	31.1	95.8	18.4	74.7
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	58.0	83.3	87.9	97.6	7.7	14.8	91.0	8.0	64.6
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	56.6	83.6	88.3	94.7	7.2	13.9	82.5	7.4	62.9
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	76.8	91.6	89.1	99.1	18.9	28.6	96.0	16.7	73.2
	DiAD <a href="#">He et al. (2024b)</a>	57.7	78.0	87.4	93.2	4.9	9.6	80.6	5.0	58.7
	ViTAD <a href="#">Zhang et al. (2023a)</a>	71.0	89.2	88.7	97.6	17.0	28.2	89.1	16.4	70.5
	InvAD <a href="#">Zhang et al. (2024a)</a>	89.7	96.8	91.0	<b>99.5</b>	31.3	39.6	<b>97.7</b>	24.7	79.8
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>91.5</b>	<b>97.6</b>	93.2	99.4	<b>42.9</b>	46.5	97.0	30.3	<b>82.8</b>
	MambaAD <a href="#">He et al. (2024a)</a>	88.2	96.3	92.3	<b>99.5</b>	42.3	<b>47.2</b>	97.1	<b>30.9</b>	81.9
	Hybrid UniAD <a href="#">You et al. (2022)</a>	72.8	91.3	88.8	98.1	14.0	24.6	90.9	14.0	70.6
	RD++ <a href="#">Tien et al. (2023)</a>	76.5	92.1	88.0	99.2	20.3	27.7	96.4	16.1	73.2
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	85.6	95.9	90.1	84.3	40.9	42.5	65.1	27.0	74.4
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	49.2	79.4	89.0	50.7	0.7	2.2	23.4	1.1	45.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	74.9	91.8	90.2	94.0	14.4	21.4	79.2	12.4	68.9
	Emb. CFA <a href="#">Lee et al. (2022)</a>	60.1	86.3	89.5	52.0	7.0	11.9	28.7	6.9	51.8
	PatchCore <a href="#">Roth et al. (2022)</a>	84.1	95.1	92.5	<b>98.6</b>	33.7	38.5	<b>94.4</b>	24.5	78.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	74.8	91.4	90.5	96.9	21.6	26.8	89.2	15.9	72.1
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.5	80.8	88.6	87.2	5.9	10.4	68.0	5.6	58.4
Avg	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	79.3	93.0	92.3	98.3	28.6	35.4	93.5	22.1	76.1
	DiAD <a href="#">He et al. (2024b)</a>	78.8	91.3	91.7	91.8	5.2	10.5	75.1	5.6	63.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	78.7	93.3	91.5	98.0	27.0	33.0	91.3	20.2	75.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>86.3</b>	<b>95.9</b>	<b>93.4</b>	<b>98.7</b>	<b>36.2</b>	<b>41.1</b>	<b>94.9</b>	<b>26.4</b>	<b>79.8</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	85.1	95.6	92.3	98.4	34.4	39.0	93.4	24.6	<u>78.7</u>
	MambaAD <a href="#">He et al. (2024a)</a>	85.8	95.5	92.6	98.6	37.1	40.8	94.1	26.0	79.5
	Hybrid UniAD <a href="#">You et al. (2022)</a>	77.0	92.6	91.0	96.8	23.7	30.6	89.4	18.6	73.5
	RD++ <a href="#">Tien et al. (2023)</a>	80.1	93.5	92.2	98.4	31.5	37.2	93.6	23.4	76.9
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	82.5	95.1	90.9	82.1	<b>43.8</b>	<b>45.2</b>	65.1	<b>30.2</b>	74.3

## P DETAILED QUANTITATIVE RESULTS ON MVTEC LOCO DATASET UNDER 300 EPOCHS

Table A63: Benchmarked results on MVTEC LOCO dataset [Bergmann et al. \(2022a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	$mF_1$ -max	mAU-ROC	mAP	$mF_1$ -max			
breakfast_box	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	48.8	68.9	77.2	50.1	6.5	12.5	14.3	6.7	42.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	<b>89.4</b>	<b>94.5</b>	<b>85.9</b>	<b>89.6</b>	<b>58.6</b>	<b>56.1</b>	<b>75.4</b>	<b>39.0</b>	<b>79.9</b>
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	72.0	83.2	78.7	75.6	34.3	32.6	39.1	19.5	61.7
	PatchCore <a href="#">Roth et al. (2022)</a>	77.1	88.4	78.0	89.4	55.4	49.3	<b>76.1</b>	32.8	74.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	75.8	86.7	77.8	88.8	50.1	48.1	71.7	31.7	72.4
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	61.2	78.0	77.2	70.6	34.9	32.5	34.4	19.4	57.6
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	63.4	79.2	77.2	83.7	26.6	35.6	63.9	21.6	62.9
	DiAD <a href="#">He et al. (2024b)</a>	56.8	74.3	77.2	81.6	22.9	34.2	35.5	20.6	54.6
	ViTAD <a href="#">Zhang et al. (2023a)</a>	75.0	86.2	78.7	88.1	52.4	50.8	65.7	34.1	72.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	78.8	88.5	79.2	<b>89.7</b>	<b>58.9</b>	<b>56.2</b>	<b>75.7</b>	<b>39.1</b>	<b>76.1</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	71.7	83.9	78.0	88.3	47.6	47.7	73.6	31.3	71.1
	MambaAD <a href="#">He et al. (2024a)</a>	69.3	82.9	77.2	87.4	37.0	43.6	70.7	27.9	68.1
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	77.5	88.4	77.4	88.0	51.8	50.1	72.8	33.4	73.4
	RD++ <a href="#">Tien et al. (2023)</a>	68.2	81.7	77.2	86.6	39.7	43.9	67.0	28.2	67.5
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	84.0	91.1	82.2	77.5	<b>64.0</b>	<b>57.9</b>	68.0	<b>40.8</b>	76.3
juice_bottle	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.9	75.6	83.4	40.0	5.3	10.2	14.7	5.4	44.1
	SimpleNet <a href="#">Liu et al. (2023)</a>	96.0	98.6	93.6	86.4	47.5	55.1	84.8	38.0	82.3
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	73.0	88.2	83.4	85.1	26.9	29.1	57.4	17.1	65.6
	PatchCore <a href="#">Roth et al. (2022)</a>	95.2	98.3	94.1	89.9	<b>56.2</b>	57.8	87.1	40.6	<b>84.3</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	<b>96.2</b>	<b>98.6</b>	93.9	<b>91.7</b>	44.7	47.8	85.4	31.4	81.8
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	77.3	91.1	83.7	51.9	36.9	10.1	17.6	5.3	56.6
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	89.5	96.4	90.3	89.4	47.3	48.2	84.2	31.8	79.7
	DiAD <a href="#">He et al. (2024b)</a>	96.0	98.3	94.1	81.1	41.0	45.2	76.0	29.2	76.0
	ViTAD <a href="#">Zhang et al. (2023a)</a>	90.5	96.4	88.6	88.6	48.1	49.2	83.4	32.6	79.6
	InvAD <a href="#">Zhang et al. (2024a)</a>	96.1	98.6	94.8	<b>90.9</b>	<b>56.1</b>	<b>58.7</b>	<b>88.2</b>	<b>41.5</b>	<b>85.0</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	94.7	98.1	93.7	<b>90.8</b>	52.9	56.8	<b>87.6</b>	39.7	83.8
	MambaAD <a href="#">He et al. (2024a)</a>	93.2	97.6	91.7	89.8	53.9	55.8	86.5	38.7	82.8
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	95.4	98.3	93.2	90.7	55.5	<b>58.3</b>	<b>89.3</b>	41.2	<b>84.5</b>
	RD++ <a href="#">Tien et al. (2023)</a>	90.7	96.7	89.6	90.1	49.7	52.4	84.7	35.5	80.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>99.5</b>	<b>99.8</b>	<b>97.9</b>	79.5	<b>59.9</b>	<b>59.1</b>	79.6	<b>41.9</b>	<b>84.3</b>
pushpins	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	62.2	66.8	72.2	53.9	0.8	1.9	11.5	1.0	42.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	76.5	83.6	74.9	55.8	2.7	7.4	59.6	3.8	54.9
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	47.2	57.8	71.4	51.1	0.9	1.7	22.7	0.9	39.0
	PatchCore <a href="#">Roth et al. (2022)</a>	74.3	82.8	72.7	56.1	3.1	7.5	63.6	3.9	54.6
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.3	71.4	71.4	39.5	1.2	3.4	52.8	1.7	46.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	45.7	52.1	71.5	55.2	0.8	1.7	18.8	0.9	37.8
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	71.5	79.6	72.3	51.1	2.2	7.5	68.2	3.9	53.4
	DiAD <a href="#">He et al. (2024b)</a>	69.0	73.8	72.9	61.4	1.6	4.6	49.7	2.4	47.6
	ViTAD <a href="#">Zhang et al. (2023a)</a>	68.3	74.6	73.6	46.5	2.3	5.7	57.4	2.9	50.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>82.6</b>	<b>88.3</b>	<b>77.9</b>	<b>72.2</b>	4.2	<b>9.3</b>	<b>77.4</b>	<b>4.9</b>	<b>61.9</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	78.2	84.1	76.4	<b>64.0</b>	3.2	8.5	70.3	4.5	58.0
	MambaAD <a href="#">He et al. (2024a)</a>	78.8	<b>85.1</b>	76.9	61.1	2.8	8.7	<b>70.5</b>	<b>4.5</b>	<b>58.0</b>
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	71.3	79.9	72.2	46.3	2.3	8.1	62.0	4.2	52.1
	RD++ <a href="#">Tien et al. (2023)</a>	75.7	82.7	73.4	54.1	2.7	7.7	67.4	4.0	<b>55.1</b>
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	72.2	81.3	71.4	55.1	<b>4.3</b>	<b>10.1</b>	64.0	<b>5.3</b>	54.2
screw_bag	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	49.1	66.4	78.4	45.6	6.0	13.8	10.6	7.4	41.8
	SimpleNet <a href="#">Liu et al. (2023)</a>	65.3	78.1	78.3	55.5	9.2	14.8	48.8	8.0	53.0
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	48.9	65.2	78.2	51.1	8.0	13.6	26.4	7.3	44.4
	PatchCore <a href="#">Roth et al. (2022)</a>	70.1	82.8	78.2	72.1	13.1	22.0	62.1	12.4	<b>59.7</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	64.8	78.7	78.4	68.9	11.4	20.6	<b>66.8</b>	11.5	<b>57.9</b>
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	54.2	66.8	78.2	49.9	5.8	13.6	15.9	7.3	43.8
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	63.7	78.1	78.2	71.6	12.6	21.8	52.0	12.3	56.4
	DiAD <a href="#">He et al. (2024b)</a>	<b>81.7</b>	<b>91.1</b>	<b>80.6</b>	71.4	12.0	22.2	58.9	12.5	<b>59.7</b>
	ViTAD <a href="#">Zhang et al. (2023a)</a>	64.1	76.9	79.6	72.4	13.1	21.6	40.9	12.1	55.3
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>70.3</b>	82.4	78.2	<b>73.4</b>	<b>13.7</b>	<b>22.8</b>	52.8	<b>12.9</b>	<b>58.8</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	63.7	77.4	78.5	72.7	<b>13.2</b>	22.4	48.1	12.6	56.2
	MambaAD <a href="#">He et al. (2024a)</a>	62.6	76.4	78.2	<b>73.2</b>	<b>13.4</b>	22.7	49.0	12.8	56.0
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	65.0	77.1	78.5	67.5	11.3	19.3	62.8	10.7	56.9
	RD++ <a href="#">Tien et al. (2023)</a>	64.9	79.3	78.2	69.8	12.2	20.5	51.3	11.4	56.3
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	70.0	81.1	<b>79.0</b>	50.3	8.6	13.6	46.4	7.3	53.2

Table A64: Benchmarked results on MVTec LOCO dataset [Bergmann et al. \(2022a\)](#) by the suggested metrics in Sec. 3.3.

Method		Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD		
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max					
splicing-connectors	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	44.0	56.7	76.4	50.5	7.4	14.1	17.5	7.6	40.7	
		SimpleNet <a href="#">Liu et al. (2023)</a>	81.7	90.9	80.0	67.0	23.5	27.2	37.6	15.8	61.5	
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	61.6	74.3	76.5	60.3	12.4	16.6	36.1	9.1	51.1	
		PatchCore <a href="#">Roth et al. (2022)</a>	85.6	92.9	84.4	68.1	21.5	22.3	60.8	12.6	65.4	
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	80.0	89.7	78.2	65.4	20.4	21.9	73.5	12.3	64.0	
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	52.3	64.1	76.4	49.8	5.9	14.0	15.1	7.5	42.7		
		Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	80.5	89.6	78.9	58.0	16.4	18.0	69.0	9.9	61.7
			DiAD <a href="#">He et al. (2024b)</a>	82.3	85.5	82.7	65.2	15.6	20.2	51.7	11.2	57.6
	ViTAD <a href="#">Zhang et al. (2023a)</a>		82.8	91.0	79.8	70.6	23.6	25.4	62.5	14.6	65.0	
	InvAD <a href="#">Zhang et al. (2024a)</a>		83.8	91.6	81.7	62.4	21.4	23.7	70.1	13.4	65.0	
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>		81.5	90.3	81.4	69.0	23.1	24.4	67.5	13.9	65.2	
	MambaAD <a href="#">He et al. (2024a)</a>		87.3	93.7	84.8	76.0	32.7	33.7	66.1	20.3	70.4	
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	84.2	91.6	83.0	80.5	42.2	43.2	66.6	27.5	72.2	
		RD++ <a href="#">Tien et al. (2023)</a>	78.7	89.0	78.1	60.0	16.6	18.0	69.3	9.9	61.5	
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	80.1	89.8	78.8	56.3	22.1	18.5	37.9	10.2	58.3	
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	51.4	66.9	77.5	48.0	5.2	10.5	13.7	5.6	42.3	
		SimpleNet <a href="#">Liu et al. (2023)</a>	81.8	89.1	82.5	70.9	28.3	32.1	61.2	20.9	66.3	
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	60.6	73.7	77.6	64.7	16.5	18.8	36.4	10.8	52.4	
		PatchCore <a href="#">Roth et al. (2022)</a>	80.5	89.0	81.5	75.1	29.9	31.8	69.9	20.4	67.7	
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	76.0	85.0	79.9	70.9	25.6	28.4	70.0	17.7	64.5	
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.1	70.4	77.4	55.5	16.8	14.4	20.4	8.1	47.7		
		Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	73.7	84.6	79.4	70.7	21.0	26.2	67.5	15.9	62.8
			DiAD <a href="#">He et al. (2024b)</a>	77.2	84.6	81.5	72.1	18.6	25.3	54.4	15.2	59.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>		76.2	85.0	80.1	73.2	27.9	30.6	62.0	19.3	64.4	
	InvAD <a href="#">Zhang et al. (2024a)</a>		82.3	89.9	82.4	77.7	30.9	34.1	72.8	22.4	69.4	
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>		78.0	86.8	81.6	77.0	28.0	32.0	69.4	20.4	66.9	
	MambaAD <a href="#">He et al. (2024a)</a>		78.2	87.1	81.8	77.5	28.0	32.9	68.6	20.8	67.1	
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	78.7	87.1	80.9	74.6	32.6	35.8	70.7	23.4	67.8	
		RD++ <a href="#">Tien et al. (2023)</a>	75.7	85.9	79.3	72.1	24.2	28.5	67.9	17.8	64.2	
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	81.2	88.6	81.8	63.7	31.8	31.9	59.2	21.1	65.3	

## Q DETAILED QUANTITATIVE RESULTS ON VISA DATASET UNDER 300 EPOCHS

Table A65: Benchmarked results on VisA dataset [Zou et al. \(2022\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
candle	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	58.1	59.6	67.6	45.7	0.1	0.6	16.7	0.3	38.8
		SimpleNet <a href="#">Liu et al. (2023)</a>	83.3	85.8	77.7	91.3	7.6	17.6	80.4	9.7	65.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	53.6	63.1	66.7	53.5	8.8	9.0	53.6	4.7	46.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	86.6	85.0	80.0	79.4	2.6	9.0	58.0	4.7	60.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	92.4	93.2	85.4	98.8	14.7	24.0	93.7	13.6	74.1
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	80.6	75.9	77.0	84.5	2.2	7.7	79.7	4.0	60.7
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	91.8	92.7	83.9	99.0	19.1	30.5	95.2	18.0	75.2
		DiAD <a href="#">He et al. (2024b)</a>	<b>99.3</b>	<b>99.3</b>	<b>96.0</b>	80.1	1.0	2.6	41.4	1.3	60.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	90.0	91.5	82.4	96.1	17.1	27.6	86.5	16.0	72.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	95.2	94.9	92.2	<b>99.3</b>	23.3	33.5	95.7	20.1	78.5
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.2	97.5	92.9	99.1	20.5	30.9	<b>96.2</b>	18.3	78.8
		MambaAD <a href="#">He et al. (2024a)</a>	95.5	95.8	89.6	99.1	22.4	32.4	96.1	19.3	78.1
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	97.3	97.4	91.6	<b>99.3</b>	24.4	33.9	94.8	20.4	<b>79.3</b>
		RD++ <a href="#">Tien et al. (2023)</a>	92.7	92.8	87.6	<b>99.3</b>	25.5	36.3	95.4	22.2	77.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	89.8	89.8	83.0	74.5	<b>39.5</b>	<b>41.4</b>	49.9	<b>26.1</b>	69.4
capsules	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	71.9	80.7	77.5	39.1	0.3	1.0	10.7	0.5	44.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	66.9	79.4	77.2	90.0	21.2	28.3	57.5	16.5	61.9
		RealNet <a href="#">Zhang et al. (2024c)</a>	81.6	90.5	79.8	74.6	34.2	41.1	39.6	25.9	65.7
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	59.6	70.8	78.7	60.6	0.5	1.0	24.3	0.5	45.7
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	57.5	73.8	77.5	94.5	27.9	27.8	65.9	16.1	61.8
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	60.5	72.8	77.8	81.9	2.3	6.5	61.3	3.3	54.2
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	81.0	89.7	81.6	99.3	57.3	59.4	91.9	42.3	<u>80.5</u>
		DiAD <a href="#">He et al. (2024b)</a>	66.7	80.5	79.7	94.3	8.0	16.4	55.3	8.9	57.3
		ViTAD <a href="#">Zhang et al. (2023a)</a>	80.2	88.2	80.2	98.3	31.1	41.3	76.0	26.0	72.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	87.2	92.8	84.5	<b>99.6</b>	<b>67.1</b>	<b>61.9</b>	<b>94.9</b>	<b>44.8</b>	<b>84.5</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>88.8</b>	92.5	<b>87.4</b>	99.3	60.7	59.1	<b>94.9</b>	42.0	84.0
		MambaAD <a href="#">He et al. (2024a)</a>	83.4	88.4	83.8	98.8	32.8	41.6	87.6	26.2	75.2
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	73.5	85.6	79.1	98.4	52.1	53.6	80.8	36.6	75.3
		RD++ <a href="#">Tien et al. (2023)</a>	79.5	88.6	79.8	99.1	56.8	59.7	91.4	42.6	79.7
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	86.5	<b>92.9</b>	85.6	95.7	38.7	42.8	77.8	27.2	76.0
cashew	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	19.8	54.8	80.0	53.0	1.5	3.4	40.8	1.7	38.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	87.1	93.3	87.2	98.5	<b>68.0</b>	<u>65.2</u>	85.0	<u>48.3</u>	<u>84.2</u>
		RealNet <a href="#">Zhang et al. (2024c)</a>	89.5	95.4	86.8	53.5	25.4	10.1	29.0	5.3	60.0
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	78.3	87.5	83.8	82.3	23.2	29.5	28.8	17.3	62.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	95.6	98.1	92.7	<b>99.0</b>	52.5	54.4	<b>94.6</b>	37.4	85.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	89.0	93.8	90.6	49.8	0.6	2.2	15.2	1.1	54.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	93.3	96.5	91.5	92.3	44.9	50.1	84.5	33.4	80.9
		DiAD <a href="#">He et al. (2024b)</a>	<b>99.8</b>	<b>99.9</b>	<b>99.0</b>	89.1	45.6	50.1	21.5	33.4	72.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	87.6	94.0	87.5	98.3	62.6	61.4	79.3	44.3	82.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	96.0	98.3	93.9	97.6	<u>65.5</u>	<b>65.5</b>	89.7	<b>48.7</b>	<b>87.8</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	92.7	96.4	88.8	94.6	55.4	57.9	88.9	40.7	83.4
		MambaAD <a href="#">He et al. (2024a)</a>	92.5	96.3	90.3	94.7	50.8	55.0	86.2	37.9	82.4
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	90.4	95.2	87.7	97.9	44.5	48.9	89.0	32.4	80.6
		RD++ <a href="#">Tien et al. (2023)</a>	93.5	96.4	92.7	95.9	56.3	56.7	85.1	39.6	83.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	86.6	93.1	86.5	84.4	48.2	52.0	55.8	35.2	74.4
chewinggum	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	33.5	58.0	79.0	32.3	0.3	1.1	4.2	0.6	33.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	94.6	97.6	91.3	97.9	39.7	45.3	74.7	29.3	79.5
		RealNet <a href="#">Zhang et al. (2024c)</a>	89.0	95.3	87.0	82.2	63.8	61.5	42.3	44.5	76.4
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	75.9	87.8	82.7	84.4	16.6	26.5	43.1	15.3	62.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	97.2	98.8	95.2	99.2	61.9	60.3	87.8	43.1	<u>87.2</u>
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	74.5	84.3	83.3	50.1	0.7	1.1	15.1	0.6	48.7
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	95.5	98.0	93.8	98.7	58.4	61.0	78.1	43.9	84.9
		DiAD <a href="#">He et al. (2024b)</a>	97.6	98.4	<u>96.6</u>	68.5	15.6	30.6	18.6	18.0	60.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	95.2	97.8	92.3	97.7	60.7	58.5	71.4	41.3	83.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	<u>97.7</u>	<u>99.0</u>	<u>95.8</u>	98.6	57.2	59.0	80.0	41.9	85.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.6	99.0	95.3	98.3	56.7	56.4	78.8	39.3	84.9
		MambaAD <a href="#">He et al. (2024a)</a>	97.3	98.8	94.7	97.3	27.4	38.0	78.2	23.4	78.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	<b>99.1</b>	<b>99.5</b>	<b>96.8</b>	<b>99.3</b>	62.4	59.6	<b>88.2</b>	42.5	<b>87.9</b>
		RD++ <a href="#">Tien et al. (2023)</a>	96.2	98.3	93.0	98.8	58.8	61.8	80.1	44.7	85.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	96.8	98.7	95.3	97.5	<b>78.3</b>	<b>70.2</b>	68.4	<b>54.1</b>	87.8

Table A66: Benchmarked results on VisA dataset [Zou et al. \(2022\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
fryum	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	46.2	65.7	80.0	51.2	3.5	8.7	25.5	4.6	43.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	82.0	91.5	84.0	93.4	40.6	41.7	78.5	26.4	74.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	80.1	90.6	81.0	57.0	32.4	17.8	22.8	9.8	58.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	65.4	81.3	80.6	76.7	16.2	22.1	41.3	12.4	57.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.2	96.0	90.3	<b>97.6</b>	<b>53.8</b>	<b>55.8</b>	87.4	38.7	83.1
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	80.2	90.0	82.2	89.3	19.2	18.3	74.5	10.1	67.2
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	95.8	98.1	92.4	97.0	48.1	51.8	<b>93.1</b>	35.0	84.0
		DiAD <a href="#">He et al. (2024b)</a>	<b>97.0</b>	<b>98.3</b>	<b>95.6</b>	97.5	<b>59.0</b>	<b>61.8</b>	68.9	<b>44.7</b>	82.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	94.3	97.5	91.1	97.5	47.2	52.0	88.9	35.1	82.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>97.0</b>	<b>98.6</b>	<b>93.1</b>	97.5	52.5	56.2	92.1	<b>39.1</b>	<b>85.4</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.0	98.1	92.8	97.3	50.6	53.2	<b>93.2</b>	36.3	84.6
		MambaAD <a href="#">He et al. (2024a)</a>	96.3	98.2	93.1	97.1	49.7	52.9	92.4	36.0	84.4
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	91.0	96.0	87.9	97.3	45.3	52.4	85.5	35.5	80.9
		RD++ <a href="#">Tien et al. (2023)</a>	95.7	98.1	92.2	97.2	49.9	53.6	92.0	36.6	84.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.3	96.6	88.5	67.0	47.6	41.3	35.4	26.0	70.1
macaroni1	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	89.4	86.6	81.5	38.7	0.0	0.1	6.2	0.0	48.5
		SimpleNet <a href="#">Liu et al. (2023)</a>	65.8	60.9	65.6	91.4	1.5	4.6	66.5	2.4	52.5
		RealNet <a href="#">Zhang et al. (2024c)</a>	69.9	75.2	66.7	54.7	14.6	12.4	19.7	6.6	48.0
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	56.0	57.4	66.9	87.7	0.4	2.4	56.0	1.2	48.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	81.8	78.7	75.7	99.1	7.9	13.2	95.2	7.1	66.3
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	57.6	53.5	70.0	91.0	0.5	2.0	60.0	1.0	49.4
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	95.2	93.7	88.8	<b>99.8</b>	<b>23.6</b>	<b>31.1</b>	97.2	18.4	<b>77.7</b>
		DiAD <a href="#">He et al. (2024b)</a>	<b>96.3</b>	<b>94.9</b>	<b>92.4</b>	55.2	0.0	0.1	3.6	0.0	48.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	85.3	83.5	76.0	98.6	7.1	15.4	90.7	8.3	67.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	95.2	93.4	88.7	99.7	21.8	30.5	97.3	18.0	77.4
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	94.2	92.5	86.2	<b>99.8</b>	19.3	27.7	<b>97.7</b>	16.1	76.0
		MambaAD <a href="#">He et al. (2024a)</a>	91.9	89.4	83.2	99.3	13.4	21.9	95.4	12.3	72.8
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	88.1	86.2	80.0	99.4	10.8	20.1	95.6	11.2	70.6
		RD++ <a href="#">Tien et al. (2023)</a>	92.8	91.2	86.5	99.7	<b>24.0</b>	<b>32.4</b>	96.7	<b>19.3</b>	<b>76.7</b>
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	93.5	89.9	90.6	73.3	15.2	25.7	36.6	14.7	64.5
macaroni2	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	57.7	53.4	63.4	58.9	0.0	0.1	25.1	0.1	39.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	57.9	53.2	63.3	89.8	0.4	1.7	66.4	0.9	48.9
		RealNet <a href="#">Zhang et al. (2024c)</a>	59.0	60.2	67.3	53.5	6.8	8.3	20.1	4.3	42.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	58.6	56.7	66.9	82.1	0.1	0.8	48.5	0.4	46.8
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	67.1	65.5	65.6	97.4	1.9	6.3	89.9	3.3	57.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	62.5	59.1	71.6	83.2	0.1	0.2	35.0	0.1	47.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	85.6	79.3	81.0	99.6	<b>12.3</b>	<b>20.2</b>	97.0	<b>11.3</b>	69.6
		DiAD <a href="#">He et al. (2024b)</a>	56.0	46.8	68.2	56.8	0.0	0.1	15.8	0.0	34.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	77.2	70.3	74.2	98.1	3.5	9.5	88.1	5.0	61.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>88.3</b>	<b>83.9</b>	<b>83.2</b>	99.6	<b>11.4</b>	<b>19.1</b>	97.8	10.6	<b>71.1</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	88.1	<b>84.6</b>	80.4	<b>99.7</b>	<b>11.7</b>	<b>19.8</b>	<b>98.2</b>	<b>11.0</b>	70.9
		MambaAD <a href="#">He et al. (2024a)</a>	80.5	74.3	75.7	96.5	2.0	7.3	87.1	3.8	62.5
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	81.3	81.1	71.9	98.3	5.6	13.2	92.8	7.0	65.3
		RD++ <a href="#">Tien et al. (2023)</a>	82.8	76.9	80.2	99.5	9.6	18.3	96.2	10.1	67.9
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	72.2	70.4	73.1	62.8	10.3	17.2	36.0	9.4	51.7
peb1	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	80.6	78.0	78.2	53.2	0.6	0.9	21.4	0.5	49.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	85.2	87.0	78.1	98.6	73.1	69.7	79.0	53.5	81.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	82.7	83.6	77.5	73.6	40.1	43.6	27.3	27.9	63.7
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	58.0	63.9	66.7	88.4	19.7	29.9	39.1	17.5	53.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	94.9	95.2	88.2	99.1	73.0	68.8	88.3	52.4	87.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	67.7	64.6	71.9	53.4	34.1	11.3	15.3	6.0	48.3
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	96.4	96.4	91.8	99.5	66.8	62.2	96.1	45.1	88.0
		DiAD <a href="#">He et al. (2024b)</a>	91.7	94.1	89.5	95.7	27.7	39.5	56.5	24.6	70.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	95.6	94.1	91.3	99.4	65.6	61.9	89.2	44.8	86.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	96.8	96.2	92.9	<b>99.8</b>	<b>80.3</b>	<b>75.4</b>	<b>96.7</b>	<b>60.5</b>	<b>91.7</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>97.7</b>	<b>97.2</b>	<b>94.2</b>	<b>99.8</b>	79.3	73.5	<b>97.1</b>	58.1	<b>91.9</b>
		MambaAD <a href="#">He et al. (2024a)</a>	96.0	94.7	94.1	<b>99.8</b>	79.8	72.8	94.9	57.2	90.9
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	96.3	95.5	92.8	99.4	68.1	63.3	90.5	46.3	87.6
		RD++ <a href="#">Tien et al. (2023)</a>	96.3	96.0	90.9	99.4	64.9	59.1	95.5	42.0	87.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	78.6	77.3	74.5	96.0	66.5	64.3	68.6	47.3	75.3



Table A67: Benchmarked results on VisA dataset Zou et al. (2022) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
pcb2	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	35.0	44.1	66.7	44.9	0.2	0.4	10.0	0.2	31.2
		SimpleNet <a href="#">Liu et al. (2023)</a>	82.5	83.8	75.6	94.9	7.2	15.1	76.0	8.2	64.5
		RealNet <a href="#">Zhang et al. (2024c)</a>	87.0	89.3	79.2	72.2	13.9	23.0	40.3	13.0	61.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	57.2	65.9	66.7	80.0	2.7	7.5	47.7	3.9	48.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	92.1	93.0	85.6	96.5	12.6	18.9	82.5	10.5	71.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	66.8	71.1	68.7	92.7	7.4	8.6	74.9	4.5	57.4
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	97.3	96.9	94.2	97.7	21.1	30.1	91.7	17.7	78.1
		DiAD <a href="#">He et al. (2024b)</a>	89.9	91.7	82.9	82.2	4.4	12.2	48.1	6.5	58.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	90.0	89.0	84.2	98.0	12.5	20.4	82.6	11.4	70.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	97.0	97.3	93.9	99.1	15.7	23.4	92.8	13.2	76.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.2	96.4	90.1	99.0	11.7	23.4	92.5	13.3	75.4
		MambaAD <a href="#">He et al. (2024a)</a>	96.1	96.3	91.0	99.0	14.2	24.1	91.2	13.7	75.8
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	93.5	94.1	87.2	98.3	13.0	19.5	86.0	10.8	72.9
		RD++ <a href="#">Tien et al. (2023)</a>	97.9	98.3	96.0	98.0	25.5	33.4	91.7	20.0	79.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	82.8	83.2	78.1	94.4	19.1	24.0	69.8	13.6	66.6
pcb3	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	45.6	50.3	66.7	41.2	0.2	0.5	11.0	0.3	33.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	84.2	86.2	76.6	97.3	12.9	22.4	82.7	12.6	68.1
		RealNet <a href="#">Zhang et al. (2024c)</a>	87.0	90.8	82.9	76.9	24.6	32.2	40.9	19.2	65.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	56.3	60.8	67.1	85.6	13.8	22.5	49.6	12.7	52.1
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	80.8	84.1	74.2	96.4	20.6	26.0	81.1	14.9	67.9
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	66.3	68.6	67.6	90.7	5.0	12.3	58.0	6.5	54.5
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	96.8	96.7	90.6	98.0	23.8	34.6	93.6	20.9	78.6
		DiAD <a href="#">He et al. (2024b)</a>	94.0	94.4	88.1	87.2	4.0	10.7	41.8	5.7	60.0
		ViTAD <a href="#">Zhang et al. (2023a)</a>	91.2	91.1	86.1	98.3	22.6	28.7	88.0	16.8	74.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	97.7	97.9	93.3	99.2	15.8	28.0	93.2	16.2	77.7
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.4	96.5	90.6	99.2	17.8	28.0	93.6	16.3	77.1
		MambaAD <a href="#">He et al. (2024a)</a>	95.2	95.5	88.7	99.1	18.9	27.4	92.5	15.8	76.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	89.8	90.6	83.3	98.5	13.4	23.9	86.1	13.5	71.7
		RD++ <a href="#">Tien et al. (2023)</a>	95.7	95.6	90.8	98.0	30.9	34.1	93.3	20.5	79.1
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	95.8	96.3	89.8	90.6	27.5	31.6	61.2	18.7	73.3
pcb4	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	73.1	66.8	77.3	36.1	0.4	1.3	6.1	0.7	41.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	95.4	95.1	91.1	92.2	13.9	23.4	67.1	13.2	71.5
		RealNet <a href="#">Zhang et al. (2024c)</a>	92.1	92.1	84.4	68.6	37.2	38.7	31.4	24.0	66.8
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	89.5	87.4	83.7	91.4	7.6	14.1	70.0	7.6	66.3
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	98.9	98.8	95.7	96.8	22.2	29.7	85.6	17.4	78.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	62.6	64.8	69.5	92.7	6.9	12.4	78.4	6.6	56.6
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	99.9	99.9	98.5	97.7	30.0	35.4	88.4	21.5	81.2
		DiAD <a href="#">He et al. (2024b)</a>	99.8	99.7	99.0	95.4	9.9	18.4	82.4	10.1	72.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	98.9	98.5	97.0	99.0	42.2	47.7	93.5	31.3	84.4
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.9	99.9	98.5	98.5	44.1	43.4	90.6	27.7	84.3
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.7	99.7	97.5	98.8	49.7	48.7	92.0	32.2	85.6
		MambaAD <a href="#">He et al. (2024a)</a>	99.7	99.7	96.4	98.6	44.0	44.9	90.6	28.9	84.1
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.4	99.4	96.2	97.6	34.3	39.0	85.2	24.2	81.2
		RD++ <a href="#">Tien et al. (2023)</a>	99.9	99.9	99.0	97.1	27.4	35.9	85.8	21.9	80.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	98.0	98.0	93.0	94.4	53.8	52.1	74.9	35.3	82.6
pipe.fryum	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	63.2	76.9	80.8	46.0	1.3	3.1	14.3	1.6	44.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	83.7	92.1	84.2	97.9	64.1	61.6	76.6	44.5	80.9
		RealNet <a href="#">Zhang et al. (2024c)</a>	79.1	91.2	80.3	64.1	48.5	37.7	39.6	23.2	65.5
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	63.7	81.4	80.0	96.8	61.0	59.4	77.8	42.3	74.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	97.6	98.8	95.0	99.2	61.6	61.4	94.9	44.3	88.2
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	59.7	76.7	80.0	89.8	15.7	21.5	64.2	12.1	60.0
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	98.2	99.1	96.6	99.1	55.1	58.1	95.9	41.0	87.5
		DiAD <a href="#">He et al. (2024b)</a>	97.7	98.7	98.0	98.6	55.1	58.1	77.9	41.0	83.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	97.6	98.9	94.6	99.5	65.1	66.3	94.9	49.6	89.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.5	99.7	98.0	99.5	69.7	67.1	95.1	50.5	91.0
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	98.3	99.2	95.6	99.2	61.5	60.5	95.1	43.4	88.4
		MambaAD <a href="#">He et al. (2024a)</a>	98.8	99.3	97.6	98.8	52.4	53.0	94.2	36.0	86.6
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	97.0	98.5	95.1	98.9	50.1	55.0	93.9	37.9	85.7
		RD++ <a href="#">Tien et al. (2023)</a>	94.1	96.9	91.9	98.9	54.9	57.0	94.2	39.9	85.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	95.0	97.5	93.1	86.8	74.3	69.7	55.9	53.5	83.4

Table A68: Benchmarked results on VisA dataset Zou et al. (2022) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	56.2	64.6	74.9	45.0	0.7	1.8	16.0	0.9	40.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	80.7	83.8	79.3	94.4	29.2	33.1	74.2	22.1	69.5
		RealNet <a href="#">Zhang et al. (2024c)</a>	79.2	84.8	78.3	65.4	29.2	27.9	33.9	17.4	59.9
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	67.1	73.8	75.3	83.0	13.7	18.7	48.7	11.3	56.5
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	87.2	89.5	85.1	97.8	34.2	37.2	87.3	24.9	75.7
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	69.0	72.9	75.8	79.1	7.9	8.7	52.6	4.7	54.8
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	93.9	94.8	90.4	98.1	38.4	43.7	91.9	29.0	80.5
		DiAD <a href="#">He et al. (2024b)</a>	90.5	91.4	90.4	83.4	19.2	25.0	44.3	16.2	63.5
		ViTAD <a href="#">Zhang et al. (2023a)</a>	90.3	91.2	86.4	98.2	36.4	40.9	85.8	27.5	77.3
		InvAD <a href="#">Zhang et al. (2024a)</a>	95.6	96.0	92.3	99.0	43.7	46.9	93.0	32.6	82.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	95.3	95.8	91.0	98.7	41.2	44.9	93.2	30.6	81.8
		MambaAD <a href="#">He et al. (2024a)</a>	93.6	93.9	89.8	98.2	34.0	39.3	90.5	25.9	79.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	91.4	93.3	87.5	98.5	35.3	40.2	89.0	26.5	78.2
		RD++ <a href="#">Tien et al. (2023)</a>	93.1	94.1	90.0	98.4	40.4	44.8	91.4	29.9	80.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	89.0	90.3	85.9	84.8	43.3	44.4	57.5	30.1	73.0

## R DETAILED QUANTITATIVE RESULTS ON BTAD DATASET UNDER 300 EPOCHS

Table A69: Benchmarked results on BTAD dataset [Mishra et al. \(2021\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
01	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	75.0	88.7	86.7	44.8	2.8	6.3	13.0	3.3	50.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	99.2	99.7	98.0	94.6	38.0	42.6	64.2	27.1	79.4
		RealNet <a href="#">Zhang et al. (2024c)</a>	100.	100.	100.	94.2	63.8	63.6	84.3	46.6	88.2
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	98.2	99.4	99.0	94.6	37.3	43.0	64.5	27.4	79.4
		PatchCore <a href="#">Roth et al. (2022)</a>	99.6	99.8	99.0	97.1	55.5	56.6	75.8	39.5	85.4
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	95.5	98.4	93.6	94.8	36.2	45.6	66.4	29.5	78.3
	Rec.	PyramidalFlow <a href="#">Lei et al. (2023)</a>	90.3	94.1	94.2	51.8	14.7	6.3	17.1	3.3	57.7
		RD <a href="#">Deng &amp; Li (2022)</a>	99.9	100.	99.0	97.6	55.3	57.2	82.6	40.1	86.4
		DiAD <a href="#">He et al. (2024b)</a>	99.5	99.8	99.0	90.1	24.3	30.8	72.6	18.2	73.7
	Hybrid	ViTAD <a href="#">Zhang et al. (2023a)</a>	98.3	99.3	96.9	96.5	55.0	55.2	69.2	38.2	83.6
		InvAD <a href="#">Zhang et al. (2024a)</a>	99.9	100.	99.0	97.5	57.4	58.8	80.7	41.7	86.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	98.2	99.4	96.9	97.1	56.7	59.5	75.4	42.3	85.2
02	Aug.	MambaAD <a href="#">He et al. (2024a)</a>	97.7	99.2	96.0	97.1	55.3	59.0	75.9	41.8	84.7
		UniAD <a href="#">You et al. (2022)</a>	99.8	99.9	99.0	97.4	55.7	57.7	80.1	40.6	86.1
		RD++ <a href="#">Tien et al. (2023)</a>	99.4	99.8	97.9	97.5	53.5	56.9	80.6	39.8	85.6
	Emb.	DesTSeg <a href="#">Zhang et al. (2023c)</a>	98.3	99.4	96.0	91.9	29.9	43.9	69.9	28.1	78.4
		DRAEM <a href="#">Zavrtanik et al. (2021)</a>	63.6	92.6	92.8	47.9	6.6	10.4	16.2	5.5	51.6
		SimpleNet <a href="#">Liu et al. (2023)</a>	83.2	97.1	93.2	94.6	49.2	50.3	47.2	33.6	75.7
	Rec.	RealNet <a href="#">Zhang et al. (2024c)</a>	80.0	96.7	93.0	90.4	31.8	51.8	44.0	35.0	72.2
		CFA <a href="#">Lee et al. (2022)</a>	80.3	96.5	93.2	94.4	47.5	51.2	47.6	34.5	75.1
		PatchCore <a href="#">Roth et al. (2022)</a>	83.8	97.3	92.8	96.0	59.3	59.8	54.1	42.7	79.3
	Hybrid	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.9	96.7	92.8	96.3	59.3	62.8	54.3	45.7	79.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	73.7	95.2	92.8	81.9	63.2	52.9	32.5	35.9	72.4
		RD <a href="#">Deng &amp; Li (2022)</a>	82.9	97.2	92.8	96.7	63.3	64.2	58.3	47.2	80.8
03	Aug.	DiAD <a href="#">He et al. (2024b)</a>	72.9	95.2	92.8	87.8	29.4	37.1	45.1	22.8	65.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	84.0	97.3	93.2	96.7	72.9	67.2	51.2	50.6	81.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	86.4	97.7	93.8	96.4	60.2	61.1	57.1	44.0	80.7
	Emb.	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	84.6	97.5	92.8	96.4	59.8	60.7	58.5	43.5	80.2
		MambaAD <a href="#">He et al. (2024a)</a>	81.6	97.0	92.8	96.1	54.2	59.2	57.6	42.0	78.6
		UniAD <a href="#">You et al. (2022)</a>	84.0	97.3	92.8	95.1	43.5	53.6	57.9	36.6	76.9
	Rec.	RD++ <a href="#">Tien et al. (2023)</a>	84.3	97.4	93.2	96.6	64.1	63.4	57.3	46.4	81.0
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	82.7	97.0	92.8	93.6	58.6	51.0	52.7	34.2	77.4
		DRAEM <a href="#">Zavrtanik et al. (2021)</a>	69.2	49.0	59.1	50.4	0.3	1.7	19.2	0.9	38.5
	Hybrid	SimpleNet <a href="#">Liu et al. (2023)</a>	99.7	96.9	90.6	99.4	35.6	38.1	97.2	23.5	81.7
		RealNet <a href="#">Zhang et al. (2024c)</a>	99.3	92.2	84.5	76.9	48.6	51.1	45.3	34.4	73.7
		CFA <a href="#">Lee et al. (2022)</a>	99.8	97.5	91.5	99.5	55.4	54.9	95.0	37.8	86.2
Avg	Aug.	PatchCore <a href="#">Roth et al. (2022)</a>	99.8	97.3	92.1	99.5	50.1	48.2	98.0	31.8	85.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.3	91.8	82.7	99.4	42.5	38.5	97.5	23.9	80.4
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	92.0	55.9	50.0	94.8	5.2	11.2	79.7	5.9	56.8
	Emb.	RD <a href="#">Deng &amp; Li (2022)</a>	99.6	93.3	89.6	99.7	52.7	52.6	98.9	35.7	85.1
		DiAD <a href="#">He et al. (2024b)</a>	98.3	69.9	86.1	97.9	7.7	13.1	93.3	7.0	66.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	99.6	94.3	90.9	99.6	47.0	47.1	98.1	30.8	83.9
	Rec.	InvAD <a href="#">Zhang et al. (2024a)</a>	99.6	94.1	88.2	99.7	58.6	56.4	98.7	39.3	86.2
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.8	96.8	93.5	99.6	50.7	51.0	98.2	34.2	85.8
		MambaAD <a href="#">He et al. (2024a)</a>	99.5	92.3	90.3	99.6	44.2	47.1	98.3	30.8	83.2
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	99.8	97.8	93.1	99.7	57.8	55.1	98.7	38.0	87.4
		RD++ <a href="#">Tien et al. (2023)</a>	99.7	95.6	91.8	99.8	55.4	54.3	98.8	37.3	86.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	99.6	93.9	92.5	98.9	28.8	20.6	96.1	11.5	78.2
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	69.3	76.8	79.5	47.7	3.2	6.1	16.1	3.2	46.7
		SimpleNet <a href="#">Liu et al. (2023)</a>	94.0	97.9	93.9	96.2	41.0	43.7	69.6	28.1	78.9
		RealNet <a href="#">Zhang et al. (2024c)</a>	93.1	96.3	92.5	87.2	48.0	55.5	57.9	38.7	78.1
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	92.7	97.8	94.6	96.2	46.7	49.7	69.0	33.2	80.2
		PatchCore <a href="#">Roth et al. (2022)</a>	94.4	98.2	94.6	97.5	55.0	54.9	76.0	38.0	83.3
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	91.6	95.6	89.7	96.9	46.0	49.0	72.7	33.0	79.2
	Rec.	PyramidalFlow <a href="#">Lei et al. (2023)</a>	85.3	81.7	79.0	76.1	27.7	23.4	43.1	15.0	62.3
		RD <a href="#">Deng &amp; Li (2022)</a>	94.1	96.8	93.8	98.0	57.1	58.0	79.9	41.0	84.1
		DiAD <a href="#">He et al. (2024b)</a>	90.2	88.3	92.6	91.9	20.5	27.0	70.3	16.0	68.7
	Hybrid	ViTAD <a href="#">Zhang et al. (2023a)</a>	94.0	97.0	93.7	97.6	58.3	56.5	72.8	39.9	83.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	95.3	97.3	93.7	97.9	58.7	58.8	78.8	41.7	84.5
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	94.2	97.9	94.4	97.7	55.7	57.0	77.4	40.0	83.7
Avg	MambaAD <a href="#">He et al. (2024a)</a>	92.9	96.2	93.0	97.6	51.2	55.1	77.3	38.2	82.2	
	UniAD <a href="#">You et al. (2022)</a>	94.5	98.4	94.9	97.4	52.4	55.5	78.9	38.4	83.5	
	RD++ <a href="#">Tien et al. (2023)</a>	94.5	97.6	94.3	98.0	57.7	58.2	78.9	41.2	84.3	
Avg	Aug.	DesTSeg <a href="#">Zhang et al. (2023c)</a>	93.5	96.7	93.8	94.8	39.1	38.5	72.9	24.6	78.0

## S DETAILED QUANTITATIVE RESULTS ON MPDD DATASET UNDER 300 EPOCHS

Table A70: Benchmarked results on MPDD dataset [Jezek et al. \(2021\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
bracket.black	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	45.3	54.3	77.0	52.8	0.2	0.5	24.9	0.3	39.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	78.7	85.3	80.4	94.9	3.6	9.1	89.3	4.7	65.3
	RealNet <a href="#">Zhang et al. (2024c)</a>	72.0	84.5	76.4	64.4	9.5	16.7	45.9	9.1	55.9
	Emb. CFA <a href="#">Lee et al. (2022)</a>	87.9	92.7	84.1	93.8	2.9	8.8	83.8	4.6	67.8
	PatchCore <a href="#">Roth et al. (2022)</a>	88.4	92.7	83.9	<b>98.5</b>	<b>11.0</b>	<b>21.0</b>	<b>96.7</b>	<b>11.8</b>	<b>72.6</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	64.8	74.6	76.7	95.8	2.5	5.4	86.5	2.8	59.8
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	75.3	81.8	79.3	89.5	0.4	1.0	66.2	0.5	59.0
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	83.7	87.0	85.7	97.6	5.9	12.3	93.3	6.5	68.9
	DiAD <a href="#">He et al. (2024b)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	90.8	0.5	1.4	63.8	0.7	65.2
	VITAD <a href="#">Zhang et al. (2023a)</a>	78.7	86.1	81.5	96.0	2.7	7.8	89.8	4.1	65.6
	InvAD <a href="#">Zhang et al. (2024a)</a>	88.2	93.2	83.8	98.1	8.2	15.0	95.5	8.1	71.3
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	81.2	87.5	81.7	95.8	7.4	16.2	90.6	8.8	68.0
	MambaAD <a href="#">He et al. (2024a)</a>	82.8	88.6	80.7	94.8	4.6	13.1	89.1	7.0	67.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	96.3	96.6	96.9	94.8	0.9	2.2	84.5	1.1	71.1
	RD++ <a href="#">Tien et al. (2023)</a>	82.3	86.2	81.7	97.6	4.4	9.6	93.8	5.0	67.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.9	95.0	91.3	91.9	6.0	14.2	87.6	7.6	71.5
bracket.brown	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.9	69.1	80.3	54.4	0.7	1.3	28.8	0.6	44.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	92.4	95.3	93.5	94.9	8.8	17.0	87.4	9.3	72.9
	RealNet <a href="#">Zhang et al. (2024c)</a>	87.4	90.4	92.6	51.4	10.1	3.5	17.8	1.8	55.4
	Emb. CFA <a href="#">Lee et al. (2022)</a>	93.5	95.8	96.2	91.5	7.4	17.7	69.6	9.7	70.9
	PatchCore <a href="#">Roth et al. (2022)</a>	95.6	97.2	95.3	<b>98.6</b>	26.2	32.0	<b>95.4</b>	19.0	79.5
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	77.8	81.6	87.7	96.4	7.2	14.0	92.5	7.5	67.4
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	70.0	78.6	84.4	93.9	5.5	12.6	75.4	6.8	62.3
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	83.1	87.0	91.7	96.0	14.2	23.2	94.0	13.1	72.1
	DiAD <a href="#">He et al. (2024b)</a>	88.6	94.2	89.5	94.8	22.5	29.9	69.8	17.6	69.9
	VITAD <a href="#">Zhang et al. (2023a)</a>	86.0	87.8	91.9	98.3	16.2	26.2	95.0	15.1	73.7
	InvAD <a href="#">Zhang et al. (2024a)</a>	96.8	98.0	<b>98.1</b>	96.3	18.7	29.4	91.4	17.2	78.3
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.4	96.2	92.7	98.5	21.4	31.6	95.1	18.8	77.9
	MambaAD <a href="#">He et al. (2024a)</a>	<b>97.2</b>	<b>98.5</b>	97.1	97.8	19.6	27.3	92.8	15.8	78.5
	Hybrid UniAD <a href="#">You et al. (2022)</a>	93.1	95.8	93.5	<b>98.6</b>	<b>39.3</b>	<b>47.0</b>	90.7	<b>30.8</b>	<b>81.5</b>
	RD++ <a href="#">Tien et al. (2023)</a>	85.7	90.5	92.7	96.8	19.8	27.7	95.1	16.1	74.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	91.4	92.4	96.2	78.9	5.1	8.8	66.9	4.6	66.6
bracket.white	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	69.4	70.9	74.0	66.1	0.1	0.2	23.6	0.1	47.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	88.4	91.4	83.0	97.8	2.2	5.6	86.4	2.9	67.8
	RealNet <a href="#">Zhang et al. (2024c)</a>	72.0	82.3	78.4	81.4	<b>30.1</b>	<b>39.6</b>	40.1	<b>24.7</b>	62.7
	Emb. CFA <a href="#">Lee et al. (2022)</a>	89.2	91.7	81.5	94.9	0.8	2.9	72.4	1.4	65.1
	PatchCore <a href="#">Roth et al. (2022)</a>	93.3	94.8	88.9	98.8	10.0	19.3	93.9	10.7	73.9
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	75.3	76.4	73.0	98.6	2.1	4.6	93.8	2.4	62.3
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	76.3	78.5	76.9	99.0	6.3	14.2	90.1	7.7	64.8
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	85.0	86.9	80.6	98.9	1.7	5.0	94.4	2.5	67.1
	DiAD <a href="#">He et al. (2024b)</a>	81.0	82.5	75.4	94.2	0.2	0.6	80.0	0.3	59.1
	VITAD <a href="#">Zhang et al. (2023a)</a>	79.4	85.4	77.2	95.4	0.8	2.6	86.6	1.3	63.5
	InvAD <a href="#">Zhang et al. (2024a)</a>	95.8	<b>96.9</b>	93.1	<b>99.3</b>	10.7	20.9	94.7	11.7	<b>75.8</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	93.6	95.1	87.3	<b>99.3</b>	6.8	10.7	94.9	5.6	72.5
	MambaAD <a href="#">He et al. (2024a)</a>	93.6	95.1	89.7	<b>99.3</b>	8.9	18.9	<b>95.0</b>	10.5	74.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	82.4	80.5	79.3	95.9	0.8	2.8	82.0	1.4	63.1
	RD++ <a href="#">Tien et al. (2023)</a>	83.4	86.4	76.2	98.7	1.6	4.3	93.4	2.2	65.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>96.3</b>	93.5	<b>94.9</b>	91.6	0.9	2.2	52.6	1.1	65.9
connector	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	63.3	47.7	53.1	30.3	0.5	1.5	12.2	0.8	32.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	99.3	98.5	96.6	98.9	56.0	55.2	96.5	38.2	87.4
	RealNet <a href="#">Zhang et al. (2024c)</a>	93.3	86.8	85.7	70.7	47.9	42.9	48.0	27.3	70.5
	Emb. CFA <a href="#">Lee et al. (2022)</a>	95.7	86.4	93.3	97.1	31.9	39.9	90.8	25.0	78.4
	PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>99.5</b>	<b>71.2</b>	<b>63.3</b>	<b>98.4</b>	<b>46.3</b>	<b>91.5</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	96.7	92.9	89.7	97.4	33.1	33.2	91.5	19.9	78.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.3	38.3	54.5	91.3	4.4	8.5	73.7	4.4	47.4
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	99.8	99.5	96.6	99.1	58.3	54.5	97.2	37.5	88.0
	DiAD <a href="#">He et al. (2024b)</a>	88.3	81.5	74.3	96.2	11.6	22.0	87.7	12.4	66.0
	VITAD <a href="#">Zhang et al. (2023a)</a>	96.0	91.7	86.7	99.3	39.8	46.9	97.6	30.6	81.2
	InvAD <a href="#">Zhang et al. (2024a)</a>	98.3	95.7	96.6	99.2	62.3	57.6	97.3	40.5	88.0
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	96.7	83.4	96.6	99.4	61.5	57.4	97.9	40.2	85.6
	MambaAD <a href="#">He et al. (2024a)</a>	98.8	97.9	92.9	99.2	55.4	53.4	97.5	36.4	86.5
	Hybrid UniAD <a href="#">You et al. (2022)</a>	82.9	65.0	72.7	97.6	14.0	24.0	92.1	13.7	65.2
	RD++ <a href="#">Tien et al. (2023)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.3	66.3	59.8	97.7	42.7	90.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	90.7	77.3	87.5	89.1	31.4	38.3	81.2	23.7	72.6

Table A71: Benchmarked results on MPDD dataset [Jezek et al. \(2021\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
metal-plate	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	71.7	89.7	84.5	57.5	30.0	21.2	25.7	57.8
		SimpleNet <a href="#">Liu et al. (2023)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.2	88.9	81.3	88.1	94.6
		RealNet <a href="#">Zhang et al. (2024c)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	90.2	84.6	80.4	80.7	92.0
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.8	92.6	85.3	90.8	95.9
		PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.0	93.5	86.1	94.1	96.6
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.6	89.7	83.7	92.9	95.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	78.3	92.4	87.5	68.0	49.7	40.2	29.1	66.4
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.1	92.6	87.4	<b>96.6</b>	97.0
		DiAD <a href="#">He et al. (2024b)</a>	98.3	99.5	98.6	87.2	54.3	55.1	45.0	76.9
		ViTAD <a href="#">Zhang et al. (2023a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>99.3</b>	<b>95.5</b>	<b>88.2</b>	94.8	<b>97.2</b>
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.0	91.6	86.6	95.7	96.6
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	98.6	88.9	84.5	94.5	95.8
		MambaAD <a href="#">He et al. (2024a)</a>	99.8	99.9	99.3	98.5	86.2	84.3	94.7	95.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	58.8	79.6	85.0	93.3	50.4	62.8	80.8	73.1
		RD++ <a href="#">Tien et al. (2023)</a>	99.9	<b>100.</b>	99.3	99.0	91.1	87.0	95.5	96.4
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	96.9	93.8	87.2	91.4	96.2
tubes	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	57.4	73.4	81.7	40.9	1.0	3.5	15.6	43.0
		SimpleNet <a href="#">Liu et al. (2023)</a>	84.6	94.1	84.6	97.9	42.4	46.1	92.6	78.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	91.3	95.9	90.6	90.3	53.0	55.2	81.2	81.3
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	85.6	94.4	85.9	97.8	38.1	43.7	91.7	78.2
		PatchCore <a href="#">Roth et al. (2022)</a>	90.4	96.6	92.4	98.8	64.5	63.8	95.5	86.9
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	68.0	85.0	81.2	96.9	35.7	39.6	88.2	71.6
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	76.8	87.4	83.2	92.5	8.4	18.0	76.8	65.7
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	90.4	96.2	88.5	98.9	64.7	61.2	95.7	85.9
		DiAD <a href="#">He et al. (2024b)</a>	58.7	77.3	81.2	85.6	2.8	5.9	50.3	51.7
		ViTAD <a href="#">Zhang et al. (2023a)</a>	84.3	93.6	84.5	98.5	52.5	55.0	93.6	81.2
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>96.6</b>	<b>98.7</b>	<b>95.5</b>	<b>99.3</b>	73.1	69.0	<b>97.4</b>	<b>90.8</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	91.6	96.8	90.1	98.4	62.6	63.0	94.3	86.2
		MambaAD <a href="#">He et al. (2024a)</a>	62.9	78.6	81.9	96.5	26.7	34.5	87.4	67.9
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	67.3	81.6	83.3	92.1	8.3	14.7	72.7	62.2
		RD++ <a href="#">Tien et al. (2023)</a>	92.1	96.9	90.0	99.2	<b>73.6</b>	<b>69.7</b>	96.6	88.9
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	84.0	92.3	87.2	96.5	46.3	46.7	89.9	78.8
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	60.2	67.5	75.1	50.4	5.4	4.7	21.8	44.1
		SimpleNet <a href="#">Liu et al. (2023)</a>	90.6	94.1	89.7	97.1	33.6	35.7	90.0	77.8
		RealNet <a href="#">Zhang et al. (2024c)</a>	86.0	90.0	87.3	74.7	39.2	39.7	52.3	69.6
	Emb.	CFA <a href="#">Lee et al. (2022)</a>	92.0	93.5	90.2	95.7	29.0	33.0	83.2	76.1
		PatchCore <a href="#">Roth et al. (2022)</a>	94.6	96.9	93.4	<b>98.9</b>	<b>46.1</b>	<b>47.6</b>	<b>95.7</b>	<b>83.5</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	80.4	85.1	84.7	97.3	28.4	30.1	90.9	72.5
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	72.5	76.2	77.6	89.0	12.4	15.8	68.5	60.9
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	90.3	92.8	90.5	98.3	39.6	40.6	95.2	79.8
		DiAD <a href="#">He et al. (2024b)</a>	85.8	89.2	86.5	91.4	15.3	19.2	66.1	64.8
		ViTAD <a href="#">Zhang et al. (2023a)</a>	87.4	90.8	87.0	97.8	34.6	37.8	92.9	77.1
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>96.0</b>	<b>97.1</b>	<b>94.5</b>	98.5	44.1	46.4	95.3	<b>83.5</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	92.8	93.2	91.4	98.3	41.4	43.9	94.6	81.0
		MambaAD <a href="#">He et al. (2024a)</a>	89.2	93.1	90.3	97.7	33.5	38.6	92.8	78.3
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	80.1	83.2	85.1	95.4	19.0	25.6	83.8	69.4
		RD++ <a href="#">Tien et al. (2023)</a>	90.6	93.3	90.0	98.4	42.8	43.0	95.3	80.6
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	92.6	91.8	92.8	90.8	30.6	32.9	78.3	75.3

# T DETAILED QUANTITATIVE RESULTS ON MAD-REAL DATASET UNDER 300 EPOCHS

Table A72: Benchmarked results on MAD-Real dataset [Zhou et al. \(2024\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Bear	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	62.5	91.6	90.6	47.4	0.3	1.8	25.3	0.9	50.1
	SimpleNet <a href="#">Liu et al. (2023)</a>	17.5	69.8	90.6	74.6	1.2	4.9	56.3	2.5	46.8
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	13.3	68.8	90.6	99.0	3.9	9.6	96.2	5.1	54.9
	PatchCore <a href="#">Roth et al. (2022)</a>	84.2	96.8	91.7	<b>99.6</b>	<b>17.6</b>	<b>29.5</b>	<b>98.6</b>	<b>17.3</b>	<b>76.1</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	77.5	94.6	92.3	99.4	6.3	12.2	97.7	6.5	71.0
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	7.5	67.7	90.6	98.5	2.8	5.3	94.9	2.7	52.8
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	<b>86.7</b>	96.4	<b>96.0</b>	97.7	6.9	10.5	92.9	5.5	<u>72.5</u>
	DiAD <a href="#">He et al. (2024b)</a>	<b>85.0</b>	<b>97.0</b>	90.6	97.5	1.8	5.4	92.0	2.8	<u>67.0</u>
	ViTAD <a href="#">Zhang et al. (2023a)</a>	42.5	79.5	90.6	96.3	3.1	4.4	88.0	2.2	59.4
Bird	InvAD <a href="#">Zhang et al. (2024a)</a>	80.8	96.0	92.0	<b>99.6</b>	<b>15.9</b>	<b>25.0</b>	<b>98.5</b>	<b>14.3</b>	<u>74.7</u>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	47.5	82.3	90.6	97.8	4.2	5.7	93.3	2.9	61.9
	MambaAD <a href="#">He et al. (2024a)</a>	58.3	87.2	90.6	99.2	<u>11.2</u>	<u>18.8</u>	97.1	10.4	67.6
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	78.3	95.5	92.3	99.0	5.3	12.8	96.4	6.8	71.0
	RD++ <a href="#">Tien et al. (2023)</a>	74.2	93.9	92.3	99.0	8.1	15.0	96.6	8.1	70.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	22.5	75.9	90.6	91.4	0.5	1.2	71.4	0.6	52.1
	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	23.6	74.8	89.8	58.7	0.7	1.4	20.0	0.7	41.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	60.0	86.9	89.8	58.3	0.6	1.4	20.8	0.7	49.6
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	54.5	83.0	89.8	86.7	4.7	10.9	57.1	5.8	57.8
Elephant	PatchCore <a href="#">Roth et al. (2022)</a>	71.8	92.6	<u>93.6</u>	<b>96.4</b>	<b>32.2</b>	<b>39.7</b>	<b>84.2</b>	<b>24.8</b>	<u>74.6</u>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	38.2	80.2	89.8	89.5	2.9	6.3	64.2	3.2	55.1
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	15.5	68.6	89.8	90.7	2.7	6.4	66.5	3.3	49.8
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	23.6	72.4	89.8	87.0	6.8	16.3	56.7	8.9	51.8
	DiAD <a href="#">He et al. (2024b)</a>	<b>90.9</b>	<b>98.3</b>	95.2	94.5	19.5	28.0	77.3	16.3	72.0
	ViTAD <a href="#">Zhang et al. (2023a)</a>	62.7	87.5	91.7	89.9	8.3	16.9	61.9	9.2	62.4
	InvAD <a href="#">Zhang et al. (2024a)</a>	89.1	97.6	91.7	93.4	<u>25.0</u>	<u>37.3</u>	75.4	<u>22.9</u>	<b>75.3</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	84.5	96.4	91.7	<u>96.2</u>	<u>23.1</u>	<u>29.3</u>	<u>83.5</u>	17.2	<u>74.4</u>
	MambaAD <a href="#">He et al. (2024a)</a>	77.3	93.1	<b>95.7</b>	<u>95.0</u>	<u>11.3</u>	21.4	78.7	12.0	70.1
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	41.8	78.2	89.8	86.9	2.6	6.3	65.7	3.2	55.2
Parrot	RD++ <a href="#">Tien et al. (2023)</a>	50.9	86.6	89.8	90.0	8.2	17.8	64.4	9.8	60.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	72.7	93.3	91.7	86.2	10.5	15.2	59.3	8.2	64.3
	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	<b>62.2</b>	<b>87.9</b>	87.8	47.6	0.3	0.7	13.5	0.4	47.4
	SimpleNet <a href="#">Liu et al. (2023)</a>	5.6	61.1	87.8	64.1	0.8	2.8	24.7	1.4	37.3
	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	33.3	70.9	87.8	87.5	6.0	11.0	59.6	5.8	52.5
	PatchCore <a href="#">Roth et al. (2022)</a>	27.8	69.5	87.8	93.7	<b>11.1</b>	<b>18.3</b>	78.8	<b>10.1</b>	56.1
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	30.0	74.7	87.8	90.9	<u>7.0</u>	<u>11.4</u>	67.3	6.1	54.2
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	60.0	86.0	87.8	92.5	2.7	5.4	75.1	2.8	<b>60.9</b>
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	48.9	84.7	87.8	88.4	2.1	5.2	63.2	2.7	<u>56.8</u>
Elephant	DiAD <a href="#">He et al. (2024b)</a>	20.0	64.3	<b>90.0</b>	91.8	2.0	4.4	73.1	2.2	49.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	43.3	79.9	87.8	<b>95.5</b>	<u>9.8</u>	<u>15.9</u>	<b>83.6</b>	<u>8.7</u>	<u>60.8</u>
	InvAD <a href="#">Zhang et al. (2024a)</a>	35.6	72.2	87.8	92.9	5.0	11.3	76.6	6.0	55.8
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	35.6	78.4	87.8	91.6	4.9	11.3	73.7	6.0	56.3
	MambaAD <a href="#">He et al. (2024a)</a>	24.4	67.4	87.8	89.2	2.3	5.6	70.6	2.9	50.9
	Hybrid									
	UniAD <a href="#">You et al. (2022)</a>	13.3	63.1	87.8	78.4	1.6	5.6	38.8	2.9	42.9
	RD++ <a href="#">Tien et al. (2023)</a>	40.0	77.1	87.8	87.5	2.1	5.0	63.9	2.6	54.0
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	12.2	64.6	87.8	68.7	0.8	2.3	36.5	1.2	41.0
	Aug.									
	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	<b>30.4</b>	<b>76.4</b>	<b>92.0</b>	49.3	0.6	1.3	13.5	0.6	41.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	24.3	73.9	90.2	58.3	0.8	1.8	35.1	0.9	43.4
Parrot	Emb.									
	CFA <a href="#">Lee et al. (2022)</a>	5.2	66.2	90.2	42.0	0.5	1.3	16.9	0.7	34.5
	PatchCore <a href="#">Roth et al. (2022)</a>	5.2	66.2	90.2	<b>81.7</b>	<b>2.1</b>	<b>5.1</b>	<b>64.0</b>	<b>2.6</b>	<b>46.0</b>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	15.7	67.9	90.2	66.7	<u>1.0</u>	<u>2.5</u>	41.7	<u>1.2</u>	<u>43.0</u>
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	9.6	69.4	90.2	67.7	<u>1.0</u>	2.2	32.4	1.1	41.1
	Rec.									
	RD <a href="#">Deng &amp; Li (2022)</a>	5.2	65.5	90.2	64.5	0.9	2.1	37.0	1.1	39.9
	DiAD <a href="#">He et al. (2024b)</a>	0.0	64.3	90.2	56.3	0.7	1.7	37.9	0.9	35.9
	ViTAD <a href="#">Zhang et al. (2023a)</a>	10.4	67.8	90.2	70.3	<u>1.1</u>	<u>2.6</u>	40.7	<u>1.3</u>	42.4
	InvAD <a href="#">Zhang et al. (2024a)</a>	5.2	65.7	90.2	68.7	<u>1.1</u>	2.4	44.6	<u>1.2</u>	41.5
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	3.5	65.1	90.2	71.4	<u>1.1</u>	<u>2.5</u>	42.2	<u>1.3</u>	41.1
	MambaAD <a href="#">He et al. (2024a)</a>	4.3	65.4	90.2	<u>72.5</u>	<u>1.1</u>	<u>2.5</u>	46.1	<u>1.3</u>	41.9
Hybrid	UniAD <a href="#">You et al. (2022)</a>	10.4	67.2	90.2	61.5	0.8	1.9	38.0	0.9	40.7
	RD++ <a href="#">Tien et al. (2023)</a>	2.6	64.8	<u>90.2</u>	64.2	0.9	2.0	35.7	1.0	39.1
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	7.8	67.0	90.2	66.4	<u>1.1</u>	<u>2.5</u>	30.5	<u>1.3</u>	40.1



Table A73: Benchmarked results on MAD\_Real dataset [Zhou et al. \(2024\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
Pig	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	43.5	72.6	<b>89.5</b>	61.9	0.6	0.8	26.9	0.4	45.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	14.1	63.4	87.2	76.6	1.7	6.1	37.0	3.2	42.6
	Emb. CFA <a href="#">Lee et al. (2022)</a>	56.5	78.2	<b>89.5</b>	93.0	5.0	11.3	72.6	6.0	60.1
	PatchCore <a href="#">Roth et al. (2022)</a>	56.5	78.8	<b>89.5</b>	98.5	19.9	28.7	89.7	16.7	67.1
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	57.6	78.4	87.2	96.8	7.1	12.7	86.1	6.8	62.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.6	80.7	<b>89.5</b>	96.4	6.8	13.4	83.4	7.2	61.8
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	60.0	80.1	87.2	98.0	<b>20.0</b>	29.6	90.2	17.4	<b>67.6</b>
	DiAD <a href="#">He et al. (2024b)</a>	57.6	79.8	87.2	96.4	9.0	18.9	81.6	10.4	61.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	44.7	75.3	87.2	97.6	9.2	19.4	88.0	10.7	61.3
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>64.7</b>	<b>81.2</b>	88.9	98.0	11.2	24.2	88.1	13.8	66.8
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	57.6	78.1	88.2	<b>98.6</b>	<u>17.5</u>	<b>31.3</b>	<b>93.2</b>	<b>18.5</b>	67.4
	MambaAD <a href="#">He et al. (2024a)</a>	42.4	74.5	87.2	97.3	8.5	18.6	87.3	10.2	60.5
	Hybrid UniAD <a href="#">You et al. (2022)</a>	48.2	76.9	<b>89.5</b>	89.5	2.1	4.9	61.6	2.5	55.5
	RD++ <a href="#">Tien et al. (2023)</a>	56.5	79.2	<b>89.5</b>	98.0	13.8	23.6	91.2	13.3	65.9
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	45.9	75.2	87.2	84.8	1.4	3.3	50.5	1.7	52.2
Puppy	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	57.0	87.0	88.9	31.2	0.2	0.7	13.7	0.3	44.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	52.0	82.2	88.9	90.8	1.7	4.4	65.1	2.3	57.4
	Emb. CFA <a href="#">Lee et al. (2022)</a>	82.0	94.8	93.0	98.5	6.7	14.0	92.0	7.5	71.4
	PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.2	13.4	25.1	92.1	14.3	78.7
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	70.0	91.3	93.0	99.2	<b>31.8</b>	<u>34.5</u>	93.1	20.9	74.7
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	68.0	91.2	88.9	95.9	11.7	20.7	77.6	11.5	67.1
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	82.0	95.6	88.9	95.7	5.5	8.5	83.8	4.4	68.6
	DiAD <a href="#">He et al. (2024b)</a>	91.0	97.7	<u>95.2</u>	95.8	3.4	9.1	80.8	4.8	67.6
	ViTAD <a href="#">Zhang et al. (2023a)</a>	65.0	90.2	88.9	90.5	1.0	2.6	69.6	1.3	61.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>99.4</b>	28.6	<u>31.3</u>	93.7	18.5	<b>81.6</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	97.0	99.3	97.4	95.9	3.4	9.2	82.8	4.8	72.9
	MambaAD <a href="#">He et al. (2024a)</a>	92.0	97.8	<u>95.2</u>	98.7	<u>26.1</u>	<b>36.1</b>	<b>94.2</b>	<b>22.0</b>	79.4
	Hybrid UniAD <a href="#">You et al. (2022)</a>	78.0	94.7	88.9	98.7	12.0	20.2	92.8	11.2	71.6
	RD++ <a href="#">Tien et al. (2023)</a>	65.0	90.3	90.9	97.3	4.0	7.5	90.5	3.9	65.9
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	54.0	82.7	88.9	93.1	1.5	3.9	66.6	2.0	58.2
Scorpion	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	46.1	83.9	<b>90.2</b>	41.4	1.2	2.9	10.8	1.5	43.7
	SimpleNet <a href="#">Liu et al. (2023)</a>	47.0	84.1	<b>90.2</b>	<u>83.5</u>	<b>9.0</b>	<u>15.8</u>	50.3	<u>8.6</u>	<b>56.7</b>
	Emb. CFA <a href="#">Lee et al. (2022)</a>	27.8	80.3	<b>90.2</b>	61.0	<u>5.4</u>	<u>13.1</u>	26.3	<u>7.0</u>	46.3
	PatchCore <a href="#">Roth et al. (2022)</a>	13.0	70.7	<b>90.2</b>	<b>88.2</b>	<u>8.8</u>	<b>17.0</b>	<b>61.6</b>	<b>9.3</b>	<u>50.9</u>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	54.8	87.2	<b>90.2</b>	77.9	4.2	7.5	34.0	3.9	<u>54.1</u>
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	47.0	84.3	<b>90.2</b>	65.5	2.6	5.8	20.3	3.0	48.7
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	<b>55.7</b>	<b>87.9</b>	<b>90.2</b>	66.3	2.1	4.9	21.8	2.5	<u>50.9</u>
	DiAD <a href="#">He et al. (2024b)</a>	11.3	71.8	<b>90.2</b>	71.9	3.1	6.8	30.7	3.5	40.8
	ViTAD <a href="#">Zhang et al. (2023a)</a>	29.6	79.5	<b>90.2</b>	62.7	1.9	4.2	16.8	2.1	43.9
	InvAD <a href="#">Zhang et al. (2024a)</a>	31.3	80.4	<b>90.2</b>	74.4	3.1	6.5	30.8	3.4	48.0
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	32.2	79.2	<b>90.2</b>	74.6	3.0	6.0	28.1	3.1	47.6
	MambaAD <a href="#">He et al. (2024a)</a>	42.6	80.8	<b>90.2</b>	75.0	2.9	6.3	27.1	3.2	49.5
	Hybrid UniAD <a href="#">You et al. (2022)</a>	27.0	73.9	<b>90.2</b>	78.6	4.2	9.1	41.2	4.8	48.5
	RD++ <a href="#">Tien et al. (2023)</a>	25.2	75.8	<b>90.2</b>	70.7	2.5	5.8	24.6	3.0	44.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	27.8	77.9	<b>90.2</b>	68.1	3.2	8.0	25.3	4.2	45.7
Turtle	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	58.1	85.3	91.3	24.4	0.3	1.5	9.2	0.8	43.5
	SimpleNet <a href="#">Liu et al. (2023)</a>	63.8	87.9	89.4	94.6	7.0	15.1	81.8	8.1	65.0
	Emb. CFA <a href="#">Lee et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.3	<u>41.5</u>	<u>42.7</u>	96.8	27.2	<u>85.0</u>
	PatchCore <a href="#">Roth et al. (2022)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.5	<u>43.1</u>	<u>48.4</u>	97.9	<u>31.9</u>	<u>86.1</u>
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	99.0	99.8	97.7	99.1	28.4	38.0	96.5	23.5	82.2
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	93.3	98.5	93.3	98.4	23.9	33.3	95.3	20.0	78.9
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	95.2	99.0	95.2	98.5	23.2	30.4	94.9	18.0	79.1
	DiAD <a href="#">He et al. (2024b)</a>	74.3	94.2	89.4	93.2	7.5	13.5	83.5	7.2	65.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>	83.8	96.1	93.3	95.6	6.2	13.2	85.6	7.0	70.6
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	<b>99.7</b>	<b>51.9</b>	<b>50.0</b>	<b>98.4</b>	<b>33.3</b>	<b>87.5</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	99.0	99.8	97.7	98.0	15.5	21.6	94.5	12.1	78.1
	MambaAD <a href="#">He et al. (2024a)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.3	32.8	39.2	97.2	24.4	83.6
	Hybrid UniAD <a href="#">You et al. (2022)</a>	98.1	99.6	97.6	98.2	22.8	31.5	91.0	18.7	79.7
	RD++ <a href="#">Tien et al. (2023)</a>	<b>100.</b>	<b>100.</b>	<b>100.</b>	99.2	25.1	35.8	97.0	21.8	82.1
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	54.3	86.7	89.4	95.2	9.8	16.1	77.0	8.8	63.2



Table A74: Benchmarked results on MAD\_Real dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD	
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max				
Unicorn	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	36.2	79.8	89.4	43.0	0.2	0.5	9.9	0.2	40.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	19.0	68.8	89.4	81.8	0.9	2.2	49.5	1.1	46.3
		CFA <a href="#">Lee et al. (2022)</a>	31.4	73.8	89.4	67.8	0.8	3.6	33.2	1.9	45.6
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	43.8	74.1	<b>93.3</b>	<b>97.3</b>	<b>6.8</b>	<b>14.1</b>	<b>90.3</b>	<b>7.6</b>	<b>61.3</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	<b>63.8</b>	<b>90.9</b>	<b>91.3</b>	<b>90.1</b>	<b>1.5</b>	3.3	65.7	1.7	<b>61.1</b>
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	<b>65.7</b>	84.4	89.4	82.2	0.9	2.2	51.8	1.1	57.1
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	21.0	71.0	89.4	73.5	0.5	1.3	33.8	0.6	43.9
		DiAD <a href="#">He et al. (2024b)</a>	62.9	<b>91.4</b>	89.4	86.0	1.0	2.4	60.4	1.2	56.2
		ViTAD <a href="#">Zhang et al. (2023a)</a>	20.0	72.2	89.4	73.9	0.5	1.1	31.7	0.6	43.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	31.4	72.8	89.4	89.9	1.6	4.3	67.3	2.2	52.7
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	32.4	72.3	89.4	84.4	1.4	4.3	57.0	2.2	50.7
		MambaAD <a href="#">He et al. (2024a)</a>	18.1	67.6	89.4	81.7	0.8	2.1	50.0	1.1	46.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	16.2	66.6	89.4	89.3	1.4	3.7	66.1	1.9	48.8
		RD++ <a href="#">Tien et al. (2023)</a>	29.5	75.7	89.4	81.4	0.7	1.5	43.7	0.8	48.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	21.0	69.4	89.4	76.4	0.5	1.3	31.0	0.6	43.6
Whale	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	43.1	85.6	92.8	20.2	0.1	0.4	6.4	0.2	40.3
		SimpleNet <a href="#">Liu et al. (2023)</a>	58.1	91.5	92.8	89.1	2.5	8.2	68.5	4.3	61.4
		CFA <a href="#">Lee et al. (2022)</a>	80.6	96.2	93.5	98.6	29.3	32.2	90.5	19.2	76.4
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	95.0	99.1	<b>98.5</b>	99.7	<b>46.8</b>	47.4	97.8	31.0	85.2
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	67.5	94.4	92.8	99.1	17.5	24.7	95.1	14.1	72.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	89.4	98.2	95.5	98.0	20.2	25.6	90.6	14.7	76.5
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	81.2	96.7	92.8	98.9	19.2	23.5	94.9	13.3	74.7
		DiAD <a href="#">He et al. (2024b)</a>	86.9	98.0	94.1	94.6	2.9	5.4	77.2	2.8	65.6
		ViTAD <a href="#">Zhang et al. (2023a)</a>	42.5	85.4	92.8	96.3	3.6	8.5	83.6	4.5	60.8
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>96.9</b>	<b>99.5</b>	97.0	<b>99.8</b>	45.3	<b>50.1</b>	<b>98.7</b>	<b>33.4</b>	<b>85.6</b>
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	83.8	96.6	95.5	99.5	39.4	41.9	98.2	26.5	80.9
		MambaAD <a href="#">He et al. (2024a)</a>	87.5	97.6	95.5	99.7	33.8	41.7	98.6	26.3	81.0
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	42.5	87.3	92.8	98.1	11.1	19.6	91.1	10.9	64.6
		RD++ <a href="#">Tien et al. (2023)</a>	79.4	95.9	92.8	99.2	27.9	29.8	96.1	17.5	76.3
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	42.5	86.4	92.8	95.1	2.6	6.0	79.3	3.1	59.8
Avg	Aug.	DRAEM <a href="#">Zavrtanik et al. (2021)</a>	46.3	82.5	90.2	42.5	0.5	1.2	14.9	0.6	43.9
		SimpleNet <a href="#">Liu et al. (2023)</a>	36.1	77.0	89.6	77.2	2.6	6.3	48.9	3.3	50.7
		CFA <a href="#">Lee et al. (2022)</a>	48.5	81.2	91.4	83.3	10.4	15.0	64.1	8.6	58.5
	Emb.	PatchCore <a href="#">Roth et al. (2022)</a>	59.7	84.8	<b>93.5</b>	<b>95.4</b>	<b>20.2</b>	<b>27.3</b>	<b>85.5</b>	<b>16.6</b>	<b>68.2</b>
		CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	57.4	85.9	91.2	90.9	10.8	15.3	74.1	8.8	63.0
		PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.6	82.9	90.5	88.6	7.5	12.0	68.8	6.7	59.4
	Rec.	RD <a href="#">Deng &amp; Li (2022)</a>	56.0	84.9	90.7	86.9	8.7	13.2	66.9	7.4	60.6
		DiAD <a href="#">He et al. (2024b)</a>	58.0	85.7	91.1	87.8	5.1	9.6	69.4	5.2	58.1
		ViTAD <a href="#">Zhang et al. (2023a)</a>	44.5	81.3	90.2	86.9	4.5	8.9	65.0	4.8	56.7
		InvAD <a href="#">Zhang et al. (2024a)</a>	<b>63.5</b>	<b>86.5</b>	92.7	91.6	18.9	24.2	77.2	14.9	66.9
		InvAD-lite <a href="#">Zhang et al. (2024a)</a>	57.3	84.8	91.9	90.8	11.4	16.3	74.7	9.5	63.1
		MambaAD <a href="#">He et al. (2024a)</a>	54.7	83.1	92.2	90.8	13.1	19.2	74.7	11.4	63.1
	Hybrid	UniAD <a href="#">You et al. (2022)</a>	45.4	80.3	90.8	87.8	6.4	11.6	68.3	6.4	57.8
		RD++ <a href="#">Tien et al. (2023)</a>	52.3	84.0	91.3	88.7	9.3	14.4	70.4	8.2	60.8
		DesTSeg <a href="#">Zhang et al. (2023c)</a>	36.1	77.9	89.8	82.5	3.2	6.0	52.7	3.2	52.0

## U DETAILED QUANTITATIVE RESULTS ON MAD\_SIM DATASET UNDER 300 EPOCHS

Table A75: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
01Gorilla	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	54.4	91.6	<b>95.1</b>	45.4	0.7	2.0	19.4	1.0	48.6
	SimpleNet <a href="#">Liu et al. (2023)</a>	53.0	91.5	<b>94.9</b>	90.9	2.7	5.7	65.5	2.9	60.5
	Emb. CFA <a href="#">Lee et al. (2022)</a>	55.9	93.6	<b>94.9</b>	79.0	<u>7.2</u>	<u>15.4</u>	55.8	<u>8.3</u>	60.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	54.4	92.8	<b>94.9</b>	90.8	4.8	5.1	65.4	2.6	61.1
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	46.5	90.4	<b>94.9</b>	91.5	3.7	6.0	75.1	3.1	60.7
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	62.7	93.3	<b>95.1</b>	93.1	4.5	9.0	76.4	4.7	64.7
	DiAD <a href="#">He et al. (2024b)</a>	64.4	94.6	<b>94.9</b>	91.6	3.6	8.3	64.6	4.3	60.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	66.1	93.9	<b>95.1</b>	<u>93.7</u>	5.9	10.6	76.3	5.6	<u>65.8</u>
	InvAD <a href="#">Zhang et al. (2024a)</a>	67.4	<b>95.7</b>	<b>94.9</b>	<b>95.2</b>	<b>17.1</b>	<b>24.1</b>	<b>82.0</b>	<b>13.7</b>	<b>70.3</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	<b>70.6</b>	95.5	<b>94.9</b>	<u>94.1</u>	<u>8.0</u>	<u>15.1</u>	78.3	<u>8.2</u>	67.9
	MambaAD <a href="#">He et al. (2024a)</a>	65.2	93.8	<b>94.9</b>	92.8	5.0	10.7	75.6	5.7	65.3
	Hybrid UniAD <a href="#">You et al. (2022)</a>	52.6	92.3	<b>94.9</b>	92.7	6.3	11.0	79.7	5.8	63.7
	RD++ <a href="#">Tien et al. (2023)</a>	53.6	91.1	<b>94.9</b>	92.7	4.0	8.3	74.6	4.3	62.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	46.5	90.3	<b>94.9</b>	58.2	5.0	9.0	34.4	4.7	51.9
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	41.9	90.6	<u>95.2</u>	47.3	0.4	0.8	14.1	0.4	45.8
	SimpleNet <a href="#">Liu et al. (2023)</a>	55.0	91.6	<u>95.2</u>	83.2	1.3	2.6	61.3	1.3	58.9
02Unicorn	Emb. CFA <a href="#">Lee et al. (2022)</a>	63.8	94.8	<b>95.5</b>	67.8	1.4	3.9	32.1	2.0	55.5
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	59.0	93.5	<u>95.2</u>	84.4	2.3	3.4	55.4	1.7	59.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	37.0	87.7	<b>95.5</b>	80.3	1.1	2.3	52.2	1.2	53.7
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	61.4	94.1	<u>95.2</u>	85.3	2.0	4.1	70.7	2.1	62.0
	DiAD <a href="#">He et al. (2024b)</a>	79.3	97.2	<u>95.4</u>	80.0	1.6	4.5	48.0	2.3	58.0
	ViTAD <a href="#">Zhang et al. (2023a)</a>	63.9	94.7	<u>95.2</u>	86.5	2.4	5.8	67.8	3.0	62.6
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>79.7</b>	<b>97.6</b>	<u>95.4</u>	<b>87.3</b>	<u>3.8</u>	<u>9.8</u>	<b>74.6</b>	<u>5.2</u>	<b>67.4</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	71.3	96.0	<u>95.2</u>	86.6	<u>2.9</u>	<u>6.4</u>	<u>73.2</u>	<u>3.3</u>	<u>64.9</u>
	MambaAD <a href="#">He et al. (2024a)</a>	65.7	95.2	<u>95.4</u>	84.3	2.1	4.7	68.7	2.4	62.7
	Hybrid UniAD <a href="#">You et al. (2022)</a>	71.4	96.2	<u>95.4</u>	87.1	2.5	6.3	64.5	<u>3.3</u>	<u>63.9</u>
	RD++ <a href="#">Tien et al. (2023)</a>	60.6	93.8	<u>95.2</u>	85.1	2.3	4.6	69.2	2.3	61.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	72.0	96.1	<b>95.5</b>	55.9	<b>6.4</b>	<b>10.5</b>	40.0	<b>5.6</b>	58.0
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	36.6	88.0	<b>95.4</b>	46.6	1.3	1.5	15.3	0.8	44.8
	SimpleNet <a href="#">Liu et al. (2023)</a>	55.2	91.6	<b>95.4</b>	85.5	2.6	5.6	58.6	2.9	59.4
	Emb. CFA <a href="#">Lee et al. (2022)</a>	31.3	87.1	<b>95.4</b>	63.8	2.9	10.0	36.7	5.3	49.8
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	40.1	90.5	<b>95.4</b>	84.8	3.8	5.1	53.1	2.6	56.0
03Mallard	PyramidalFlow <a href="#">Lei et al. (2023)</a>	44.2	89.9	<b>95.4</b>	83.9	2.5	5.0	56.3	2.6	56.7
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	44.4	89.1	<b>95.4</b>	83.5	3.4	7.9	56.7	4.1	57.1
	DiAD <a href="#">He et al. (2024b)</a>	<b>73.9</b>	<b>96.0</b>	<b>95.4</b>	83.0	2.4	4.6	48.7	2.4	57.7
	ViTAD <a href="#">Zhang et al. (2023a)</a>	46.6	91.4	<b>95.4</b>	85.2	<u>5.3</u>	<u>11.2</u>	60.4	<u>5.9</u>	59.2
	InvAD <a href="#">Zhang et al. (2024a)</a>	46.5	91.3	<b>95.4</b>	85.9	<b>7.8</b>	<b>13.4</b>	<u>61.5</u>	<b>7.2</b>	59.9
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	40.9	90.2	<b>95.4</b>	85.2	<u>6.0</u>	<u>11.1</u>	60.2	<u>5.9</u>	58.1
	MambaAD <a href="#">He et al. (2024a)</a>	55.2	93.6	<b>95.4</b>	84.2	4.9	10.5	57.9	<u>5.6</u>	<b>60.4</b>
	Hybrid UniAD <a href="#">You et al. (2022)</a>	33.9	87.0	<b>95.4</b>	<b>86.1</b>	3.8	8.9	<b>61.8</b>	4.7	56.1
	RD++ <a href="#">Tien et al. (2023)</a>	37.1	87.9	<b>95.4</b>	84.0	3.4	7.8	57.1	4.1	55.8
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	33.2	88.1	<b>95.4</b>	58.7	3.4	8.0	39.0	4.1	49.8
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	45.6	87.8	94.9	47.2	0.6	1.3	12.0	0.7	45.7
	SimpleNet <a href="#">Liu et al. (2023)</a>	48.7	90.2	94.9	85.7	2.3	4.7	60.9	2.4	58.2
	Emb. CFA <a href="#">Lee et al. (2022)</a>	40.8	90.8	94.9	71.1	2.4	3.6	38.6	1.8	52.2
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.1	94.7	94.9	86.3	4.1	6.3	57.1	3.2	61.3
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	16.8	81.8	94.9	76.6	1.2	3.1	39.7	1.6	47.3
04Turtle	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	64.1	94.1	94.9	91.1	<u>9.3</u>	16.8	72.6	9.2	65.9
	DiAD <a href="#">He et al. (2024b)</a>	<b>85.5</b>	<b>98.3</b>	<b>96.3</b>	<u>91.8</u>	<u>7.1</u>	14.3	63.1	7.7	65.2
	ViTAD <a href="#">Zhang et al. (2023a)</a>	59.0	93.5	94.9	91.0	7.9	15.4	70.5	8.3	64.3
	InvAD <a href="#">Zhang et al. (2024a)</a>	83.0	97.7	<u>95.1</u>	<b>93.4</b>	<b>15.5</b>	<b>25.9</b>	<b>78.8</b>	<b>14.9</b>	<b>72.7</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	76.8	96.9	<u>95.6</u>	<u>92.3</u>	<u>12.4</u>	<u>21.3</u>	75.4	<u>11.9</u>	70.1
	MambaAD <a href="#">He et al. (2024a)</a>	66.6	95.2	94.9	91.0	<u>9.3</u>	<u>17.7</u>	70.8	<u>9.7</u>	66.4
	Hybrid UniAD <a href="#">You et al. (2022)</a>	55.7	92.0	94.9	88.9	4.3	7.6	70.9	4.0	61.9
	RD++ <a href="#">Tien et al. (2023)</a>	60.1	94.2	94.9	90.2	7.0	13.2	69.8	7.1	64.1
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	34.1	88.5	94.9	55.0	1.6	3.6	38.8	1.8	48.6

Table A76: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
05Whale	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.5	90.3	<b>94.4</b>	47.6	0.6	1.5	20.6	0.8	48.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	50.4	89.2	<b>94.4</b>	85.1	1.8	3.7	62.4	1.9	58.1
	Emb. CFA <a href="#">Lee et al. (2022)</a>	51.6	91.5	<b>94.4</b>	71.3	2.2	4.1	41.0	2.1	54.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	54.0	91.1	<b>94.4</b>	85.3	2.8	4.4	63.2	2.2	59.4
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	27.7	82.7	<b>94.4</b>	78.9	1.2	2.8	52.5	1.4	51.1
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	52.4	91.0	<b>94.4</b>	86.8	3.3	7.1	74.0	3.7	61.0
	DiAD <a href="#">He et al. (2024b)</a>	51.0	90.8	<b>94.4</b>	81.1	2.6	7.5	51.9	3.9	54.2
	ViTAD <a href="#">Zhang et al. (2023a)</a>	58.5	92.7	<b>94.4</b>	88.3	4.1	8.3	76.5	4.3	63.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	74.0	96.3	<b>94.4</b>	89.9	<b>8.8</b>	<b>16.9</b>	<b>81.1</b>	<b>9.2</b>	<b>68.7</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	68.1	<u>95.2</u>	<b>94.4</b>	<u>89.3</u>	<u>6.2</u>	<u>11.2</u>	<u>78.5</u>	<u>5.9</u>	<u>66.1</u>
	MambaAD <a href="#">He et al. (2024a)</a>	60.4	93.5	<b>94.4</b>	87.3	4.4	8.9	74.1	4.6	63.2
	Hybrid UniAD <a href="#">You et al. (2022)</a>	<b>79.4</b>	<b>97.1</b>	<b>94.4</b>	<b>90.8</b>	<u>5.2</u>	<u>11.6</u>	<u>80.1</u>	<u>6.2</u>	<u>68.6</u>
	RD++ <a href="#">Tien et al. (2023)</a>	54.1	91.8	<b>94.4</b>	86.5	3.5	7.0	73.0	3.6	61.3
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	57.1	92.1	<b>94.4</b>	61.4	3.2	8.3	55.5	4.3	56.6
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	44.1	87.6	<u>94.5</u>	48.6	1.0	2.3	27.2	1.1	47.6
	SimpleNet <a href="#">Liu et al. (2023)</a>	52.9	91.4	<u>94.4</u>	91.8	5.1	9.4	75.9	4.9	62.6
06Bird	Emb. CFA <a href="#">Lee et al. (2022)</a>	65.1	92.8	<u>94.5</u>	73.3	4.0	9.7	47.2	5.1	58.8
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.8	91.8	<u>94.4</u>	90.4	3.8	7.1	70.8	3.7	63.2
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	77.2	96.3	<u>94.4</u>	<u>92.7</u>	<u>5.9</u>	<u>11.1</u>	<u>77.8</u>	<u>5.9</u>	<u>68.1</u>
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	60.4	92.0	<u>94.4</u>	90.6	4.9	8.4	75.2	4.4	63.5
	DiAD <a href="#">He et al. (2024b)</a>	77.3	<u>97.0</u>	<u>94.4</u>	<b>93.6</b>	<b>6.5</b>	<b>12.9</b>	<u>77.3</u>	<b>6.9</b>	65.6
	ViTAD <a href="#">Zhang et al. (2023a)</a>	65.7	93.5	<u>94.5</u>	91.2	4.9	9.8	76.1	5.2	65.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>82.8</b>	<b>97.4</b>	<b>94.9</b>	<u>91.9</u>	<u>6.3</u>	<u>12.8</u>	<b>78.0</b>	<u>6.8</u>	<b>69.5</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	72.0	95.5	<u>94.5</u>	91.6	5.8	10.0	77.0	5.3	66.7
	MambaAD <a href="#">He et al. (2024a)</a>	66.9	94.7	<u>94.7</u>	91.1	4.7	8.6	76.1	4.5	65.3
	Hybrid UniAD <a href="#">You et al. (2022)</a>	67.0	93.2	<u>94.4</u>	90.8	4.8	9.1	74.8	4.8	64.9
	RD++ <a href="#">Tien et al. (2023)</a>	60.0	91.4	<u>94.5</u>	90.8	4.8	8.3	75.4	4.3	63.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	68.2	93.5	<u>94.5</u>	60.3	4.1	8.8	40.5	4.6	56.9
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	56.3	87.8	<u>92.8</u>	45.4	0.5	1.2	16.4	0.6	47.4
	SimpleNet <a href="#">Liu et al. (2023)</a>	55.0	87.5	<u>92.8</u>	87.7	1.9	4.1	64.6	2.1	59.0
	Emb. CFA <a href="#">Lee et al. (2022)</a>	60.8	91.7	<u>93.0</u>	77.1	3.2	7.0	47.4	3.6	57.8
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	66.9	92.8	<u>92.8</u>	89.9	3.8	5.0	66.2	2.6	62.7
07Owl	PyramidalFlow <a href="#">Lei et al. (2023)</a>	48.4	85.1	<u>93.0</u>	90.0	3.5	7.8	71.1	4.1	59.3
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	62.2	91.8	<u>93.0</u>	91.9	5.3	9.4	77.7	4.9	64.2
	DiAD <a href="#">He et al. (2024b)</a>	62.0	91.4	<u>92.8</u>	94.4	6.1	13.1	72.8	7.0	61.8
	ViTAD <a href="#">Zhang et al. (2023a)</a>	65.6	91.9	<u>92.8</u>	92.7	5.2	10.9	77.8	5.7	65.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>72.6</b>	<b>94.3</b>	<u>93.0</u>	<b>94.6</b>	<b>12.5</b>	<b>22.7</b>	<b>83.6</b>	<b>12.8</b>	<b>70.0</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	66.6	<u>93.1</u>	<b>93.2</b>	<u>93.3</u>	<u>7.6</u>	<u>13.7</u>	<u>80.1</u>	<u>7.3</u>	<u>66.5</u>
	MambaAD <a href="#">He et al. (2024a)</a>	67.5	<u>93.5</u>	<u>92.8</u>	91.5	4.8	9.3	76.0	4.9	65.0
	Hybrid UniAD <a href="#">You et al. (2022)</a>	63.7	92.1	<u>93.0</u>	92.5	4.9	9.8	77.6	5.2	64.6
	RD++ <a href="#">Tien et al. (2023)</a>	66.1	92.5	<u>92.8</u>	92.2	5.2	9.0	78.4	4.7	65.0
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	64.8	92.4	<b>93.2</b>	54.3	<u>11.1</u>	10.0	39.1	5.3	56.0
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	58.0	88.3	<u>93.0</u>	47.1	0.5	1.1	18.6	0.6	48.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	55.1	88.3	<u>93.2</u>	87.3	1.9	3.9	65.6	2.0	59.3
	Emb. CFA <a href="#">Lee et al. (2022)</a>	53.8	90.6	<u>93.0</u>	72.0	2.2	3.8	36.8	1.9	53.9
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	60.8	90.8	<u>93.2</u>	86.6	1.7	3.4	58.3	1.7	59.6
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	65.2	93.2	<u>93.0</u>	82.5	1.2	2.6	58.6	1.3	60.0
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	66.0	93.2	<u>93.4</u>	88.0	2.0	3.6	67.2	1.9	62.2
08Sabertooth	DiAD <a href="#">He et al. (2024b)</a>	69.2	94.0	<b>94.5</b>	86.1	1.9	3.4	51.3	1.7	57.2
	ViTAD <a href="#">Zhang et al. (2023a)</a>	61.6	91.3	<u>93.2</u>	89.0	2.2	4.0	68.0	2.0	61.4
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>78.0</b>	<b>95.8</b>	<u>93.4</u>	<b>91.3</b>	<b>3.9</b>	<b>6.2</b>	<b>74.7</b>	<b>3.2</b>	<b>66.5</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	73.7	94.6	<u>93.4</u>	89.4	3.1	4.6	69.4	2.4	64.4
	MambaAD <a href="#">He et al. (2024a)</a>	64.4	92.6	<u>93.4</u>	87.1	2.2	3.5	63.9	1.8	61.3
	Hybrid UniAD <a href="#">You et al. (2022)</a>	62.5	91.0	<u>93.2</u>	<u>89.5</u>	<u>2.5</u>	<u>4.2</u>	<u>74.5</u>	<u>2.1</u>	<u>62.5</u>
	RD++ <a href="#">Tien et al. (2023)</a>	63.2	91.9	<u>93.0</u>	88.1	2.3	3.7	66.6	1.9	61.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	<u>70.0</u>	93.6	<u>93.2</u>	52.0	2.3	4.0	33.9	2.0	54.3

Table A77: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF1-max	mAU-ROC	mAP	mF1-max			
09Swan	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	46.6	86.6	93.1	47.7	0.6	1.4	19.9	0.7	46.4
	SimpleNet <a href="#">Liu et al. (2023)</a>	49.8	85.9	93.1	86.1	1.9	3.9	62.4	2.0	57.4
	Emb. CFA <a href="#">Lee et al. (2022)</a>	54.9	88.2	93.1	72.0	2.0	6.7	37.8	3.5	54.2
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	47.0	86.9	93.1	85.7	2.2	3.9	60.1	2.0	56.8
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	43.7	85.4	93.1	80.2	1.3	2.9	53.9	1.5	54.3
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	55.8	89.3	93.1	87.7	2.4	4.6	71.0	2.3	60.4
	DiAD <a href="#">He et al. (2024b)</a>	<b>78.8</b>	<b>95.5</b>	<b>94.3</b>	87.8	<b>9.2</b>	<b>16.7</b>	57.8	<b>9.1</b>	62.9
	ViTAD <a href="#">Zhang et al. (2023a)</a>	54.1	88.1	93.2	90.1	3.1	6.2	73.7	3.2	60.9
	InvAD <a href="#">Zhang et al. (2024a)</a>	65.8	92.6	93.2	<b>91.8</b>	6.2	11.6	<b>80.0</b>	6.2	<b>65.6</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	60.1	90.5	93.1	90.1	4.1	8.3	76.8	4.3	63.0
	MambaAD <a href="#">He et al. (2024a)</a>	56.3	89.5	93.1	87.3	2.5	4.4	69.4	2.2	60.3
	Hybrid UniAD <a href="#">You et al. (2022)</a>	58.4	89.7	93.1	89.5	3.2	6.8	74.7	3.5	62.0
	RD++ <a href="#">Tien et al. (2023)</a>	53.9	89.4	93.2	87.6	2.4	4.4	69.8	2.3	59.9
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	53.3	89.8	93.1	51.5	2.2	3.2	36.0	1.6	51.0
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	36.8	81.6	92.7	47.2	0.6	1.3	20.8	0.7	43.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	44.9	85.1	92.7	91.3	2.8	5.2	76.4	2.7	59.1
10Sheep	Emb. CFA <a href="#">Lee et al. (2022)</a>	66.4	92.3	92.7	71.9	2.9	7.4	50.2	3.8	58.5
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.0	90.1	92.9	91.9	3.9	6.8	79.2	3.5	63.7
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	58.6	90.6	92.7	90.6	2.2	5.0	75.9	2.6	62.0
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	62.6	91.8	92.7	92.5	5.1	8.8	84.1	4.6	65.0
	DiAD <a href="#">He et al. (2024b)</a>	<b>87.4</b>	<b>97.3</b>	<b>94.3</b>	93.6	4.5	8.8	76.6	4.6	66.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>	65.0	91.1	92.7	93.4	4.4	8.7	84.7	4.5	65.4
	InvAD <a href="#">Zhang et al. (2024a)</a>	84.5	96.8	93.5	<b>94.3</b>	<b>8.1</b>	<b>13.9</b>	<b>87.0</b>	<b>7.5</b>	<b>71.2</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	80.5	96.2	93.9	93.7	7.0	10.7	85.7	5.7	69.7
	MambaAD <a href="#">He et al. (2024a)</a>	66.0	93.0	92.7	92.6	5.2	9.4	83.9	5.0	65.8
	Hybrid UniAD <a href="#">You et al. (2022)</a>	65.9	92.4	92.9	93.6	5.6	9.9	84.2	5.2	66.0
	RD++ <a href="#">Tien et al. (2023)</a>	70.4	94.2	92.7	92.6	6.5	10.6	84.1	5.6	67.1
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	71.1	94.1	92.9	54.8	5.9	8.2	43.4	4.3	57.1
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.4	89.4	94.0	47.2	0.5	1.1	22.2	0.5	48.2
	SimpleNet <a href="#">Liu et al. (2023)</a>	50.2	88.7	94.0	89.8	2.0	4.2	73.3	2.1	60.0
	Emb. CFA <a href="#">Lee et al. (2022)</a>	57.1	91.4	94.0	84.7	9.7	17.7	56.1	9.7	61.4
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	52.6	90.1	94.0	92.4	6.5	5.6	74.5	2.9	61.8
11Pig	PyramidalFlow <a href="#">Lei et al. (2023)</a>	50.9	89.4	94.0	91.3	2.6	5.7	71.5	2.9	60.4
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	59.3	92.0	94.0	94.1	6.0	11.7	83.2	6.2	65.3
	DiAD <a href="#">He et al. (2024b)</a>	53.1	92.4	94.0	93.9	9.2	16.3	71.5	8.9	61.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	58.8	91.6	94.5	95.7	8.1	15.6	83.0	8.5	66.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>72.2</b>	<b>94.9</b>	<b>94.6</b>	<b>96.8</b>	<b>17.6</b>	<b>25.1</b>	<b>87.6</b>	<b>14.3</b>	<b>72.0</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	66.3	93.6	94.2	96.1	13.6	21.2	85.8	11.8	69.4
	MambaAD <a href="#">He et al. (2024a)</a>	63.5	92.9	94.0	95.1	8.8	15.5	83.8	8.4	67.1
	Hybrid UniAD <a href="#">You et al. (2022)</a>	52.6	88.9	94.0	94.5	5.1	9.6	81.2	5.0	63.0
	RD++ <a href="#">Tien et al. (2023)</a>	60.8	92.4	94.0	94.5	6.5	12.7	83.6	6.8	65.9
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	65.5	93.0	94.0	62.3	8.1	13.1	48.0	7.0	58.5
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	50.4	87.0	<b>92.9</b>	40.9	0.9	2.2	17.0	1.1	46.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	50.4	86.8	<b>92.9</b>	84.1	2.5	5.0	57.9	2.5	57.0
	Emb. CFA <a href="#">Lee et al. (2022)</a>	56.2	90.5	<b>92.9</b>	70.8	4.3	8.7	47.5	4.5	56.3
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	53.0	88.4	<b>92.9</b>	86.0	4.4	7.0	55.4	3.6	58.2
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	42.1	85.2	<b>92.9</b>	83.4	2.3	4.7	63.7	2.4	56.0
12Zalika	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	56.8	91.0	<b>92.9</b>	87.3	5.0	8.3	69.2	4.3	61.3
	DiAD <a href="#">He et al. (2024b)</a>	34.5	82.3	<b>92.9</b>	85.4	3.5	6.1	43.2	3.2	49.7
	ViTAD <a href="#">Zhang et al. (2023a)</a>	56.4	91.0	<b>92.9</b>	87.4	4.8	8.6	68.2	4.5	61.2
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>61.2</b>	<b>92.2</b>	<b>92.9</b>	<b>90.2</b>	<b>9.4</b>	<b>15.5</b>	<b>75.4</b>	<b>8.4</b>	<b>64.9</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	58.6	91.2	<b>92.9</b>	88.9	7.1	11.7	72.6	6.2	63.0
	MambaAD <a href="#">He et al. (2024a)</a>	58.6	91.5	<b>92.9</b>	86.8	4.7	8.0	68.0	4.2	61.4
	Hybrid UniAD <a href="#">You et al. (2022)</a>	50.8	88.9	<b>92.9</b>	86.8	3.8	6.7	67.9	3.4	59.4
	RD++ <a href="#">Tien et al. (2023)</a>	52.7	90.3	<b>92.9</b>	87.3	5.5	8.8	69.1	4.6	60.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	50.7	88.9	<b>92.9</b>	52.8	4.7	6.0	38.8	3.1	51.5

Table A78: Benchmarked results on MAD\_Sim dataset [Zhou et al. \(2024\)](#) by the suggested metrics in [Sec. 3.3](#).

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
13Pheonix	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	48.9	89.6	94.3	51.2	0.6	1.6	27.8	0.8	49.0
	SimpleNet <a href="#">Liu et al. (2023)</a>	49.2	89.3	94.3	82.2	1.3	2.8	52.3	1.4	56.1
	Emb. CFA <a href="#">Lee et al. (2022)</a>	56.9	91.0	94.4	66.2	1.6	4.6	50.0	2.4	55.7
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	52.5	90.2	94.4	82.3	1.5	2.9	57.6	1.5	57.6
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	44.6	86.1	94.3	78.0	1.1	2.5	61.6	1.2	55.4
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	52.1	90.1	94.4	83.5	2.2	3.3	69.3	1.7	59.2
	DiAD <a href="#">He et al. (2024b)</a>	39.7	87.8	94.3	83.6	1.5	3.0	49.9	1.5	51.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	53.3	90.5	94.3	84.6	1.7	3.4	68.0	1.8	59.4
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>64.2</b>	<b>92.8</b>	<b>94.6</b>	<b>87.5</b>	<b>3.7</b>	<b>8.2</b>	<b>77.4</b>	<b>4.3</b>	<b>64.0</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	56.3	91.9	94.5	86.0	3.1	4.6	74.2	2.3	61.4
	MambaAD <a href="#">He et al. (2024a)</a>	57.5	92.1	94.4	83.4	2.7	3.4	69.8	1.7	60.6
	Hybrid UniAD <a href="#">You et al. (2022)</a>	55.3	90.6	94.3	85.2	1.8	3.6	68.1	1.8	59.9
	RD++ <a href="#">Tien et al. (2023)</a>	56.6	91.9	94.4	84.1	1.9	3.7	70.3	1.9	60.5
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	56.9	92.0	94.3	52.9	2.3	4.8	35.7	2.5	52.5
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	44.6	87.2	93.9	50.3	1.0	1.9	19.3	0.9	46.7
	SimpleNet <a href="#">Liu et al. (2023)</a>	48.0	87.8	93.9	71.8	1.8	4.0	49.8	2.0	54.2
	Emb. CFA <a href="#">Lee et al. (2022)</a>	57.4	91.5	93.9	54.1	1.8	4.1	39.0	2.1	52.8
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	55.8	91.3	93.9	68.1	2.2	3.5	49.6	1.8	55.6
14Elephant	PyramidalFlow <a href="#">Lei et al. (2023)</a>	47.0	88.0	93.9	63.8	1.4	3.2	51.1	1.6	53.1
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	58.9	91.7	93.9	69.8	2.8	6.1	64.1	3.2	58.6
	DiAD <a href="#">He et al. (2024b)</a>	65.8	<b>94.4</b>	93.9	<b>74.3</b>	2.0	3.9	45.9	2.0	54.3
	ViTAD <a href="#">Zhang et al. (2023a)</a>	57.0	91.9	93.9	70.7	3.1	7.2	64.2	3.7	58.6
	InvAD <a href="#">Zhang et al. (2024a)</a>	<b>66.7</b>	93.9	<b>94.0</b>	72.5	4.6	<b>11.5</b>	<b>68.5</b>	<b>6.1</b>	<b>62.1</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	65.9	93.9	93.9	70.8	3.6	8.2	65.8	4.3	60.8
	MambaAD <a href="#">He et al. (2024a)</a>	63.3	93.4	93.9	69.6	2.8	6.3	62.8	3.2	59.5
	Hybrid UniAD <a href="#">You et al. (2022)</a>	58.2	91.5	93.9	69.5	2.2	5.1	62.2	2.6	58.0
	RD++ <a href="#">Tien et al. (2023)</a>	58.7	92.3	<b>94.0</b>	70.2	2.9	6.5	63.3	3.3	58.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	63.7	92.9	<b>94.0</b>	54.5	<b>4.9</b>	8.0	50.1	4.2	56.5
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	52.1	86.0	91.8	48.6	0.8	1.8	18.7	0.9	47.1
	SimpleNet <a href="#">Liu et al. (2023)</a>	49.4	82.6	91.8	83.3	2.4	4.8	62.1	2.5	56.4
	Emb. CFA <a href="#">Lee et al. (2022)</a>	57.1	<b>89.2</b>	91.8	65.9	2.3	4.8	48.2	2.4	54.8
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	53.0	87.0	92.0	83.4	3.0	5.3	60.2	2.7	57.7
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	<b>59.2</b>	86.3	<b>92.2</b>	80.0	2.2	4.7	59.7	2.4	57.9
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	50.7	86.7	92.0	84.0	3.2	6.9	67.1	3.6	58.4
	DiAD <a href="#">He et al. (2024b)</a>	53.1	88.9	91.8	83.4	2.5	5.8	63.9	3.0	55.6
	ViTAD <a href="#">Zhang et al. (2023a)</a>	49.8	86.9	91.8	83.4	3.1	6.7	66.4	3.5	58.0
15Parrot	InvAD <a href="#">Zhang et al. (2024a)</a>	53.9	88.6	92.0	<b>86.6</b>	<b>6.6</b>	<b>14.5</b>	<b>74.0</b>	<b>7.8</b>	<b>61.8</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	50.0	87.3	91.8	85.4	4.6	9.6	69.8	5.0	59.4
	MambaAD <a href="#">He et al. (2024a)</a>	49.9	86.8	91.8	83.9	3.2	6.3	65.1	3.3	57.9
	Hybrid UniAD <a href="#">You et al. (2022)</a>	46.9	86.0	91.8	85.5	3.5	6.5	69.9	3.4	58.1
	RD++ <a href="#">Tien et al. (2023)</a>	53.9	88.1	92.0	84.1	3.1	6.7	66.5	3.5	59.0
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	54.4	88.4	91.8	52.7	4.9	6.0	25.8	3.1	50.3
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.8	90.8	94.3	51.5	0.5	1.6	27.3	0.8	49.9
	SimpleNet <a href="#">Liu et al. (2023)</a>	54.2	90.1	94.3	93.2	2.5	5.0	79.3	2.6	62.3
	Emb. CFA <a href="#">Lee et al. (2022)</a>	53.5	90.3	<b>94.4</b>	71.8	1.4	4.9	42.5	2.5	54.8
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	54.5	90.6	94.3	93.1	2.4	4.8	80.3	2.5	62.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	46.7	87.7	<b>94.4</b>	91.7	1.7	4.1	74.2	2.1	59.6
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	49.3	88.8	94.3	93.6	3.0	6.1	84.3	3.1	62.1
	DiAD <a href="#">He et al. (2024b)</a>	<b>63.5</b>	<b>93.3</b>	94.3	93.9	2.9	5.6	82.0	2.9	62.2
	ViTAD <a href="#">Zhang et al. (2023a)</a>	57.2	91.7	94.3	93.9	3.2	6.4	84.6	3.3	64.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	57.8	92.4	94.3	<b>94.4</b>	<b>5.1</b>	<b>10.7</b>	<b>86.2</b>	<b>5.6</b>	<b>65.3</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	56.8	91.4	94.3	94.3	3.9	8.0	85.6	4.2	64.4
	MambaAD <a href="#">He et al. (2024a)</a>	53.7	90.3	94.3	93.9	3.2	6.5	84.5	3.4	63.2
16Cat	Hybrid UniAD <a href="#">You et al. (2022)</a>	52.8	89.8	94.3	94.1	3.0	6.4	83.3	3.3	62.8
	RD++ <a href="#">Tien et al. (2023)</a>	54.2	91.3	94.3	93.5	3.3	6.1	84.6	3.1	63.4
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	54.8	90.7	94.3	57.7	1.6	4.5	45.0	2.3	53.6

Table A79: Benchmarked results on MAD\_Sim dataset Zhou et al. (2024) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
17Scorpion	Aug. DRAEM Zavrtanik et al. (2021)	48.2	86.3	92.9	50.6	0.5	1.2	21.5	0.6	47.1
	SimpleNet Liu et al. (2023)	52.6	88.2	92.9	83.8	1.5	3.0	55.5	1.5	56.9
	Emb. CFA Lee et al. (2022)	63.8	92.1	93.1	76.6	3.2	6.8	46.9	3.5	58.2
	CFLOW-AD Gudovskiy et al. (2022)	62.4	91.7	92.9	89.5	3.3	4.8	67.4	2.5	61.8
	PyramidalFlow Lei et al. (2023)	55.3	86.5	92.9	86.4	2.0	5.1	58.1	2.6	58.1
	Rec. RD Deng & Li (2022)	62.9	91.2	92.9	91.4	4.7	7.4	81.9	3.8	64.3
	DiAD He et al. (2024b)	70.9	94.4	<b>93.9</b>	87.4	2.1	4.1	56.6	2.1	58.5
	ViTAD Zhang et al. (2023a)	59.1	89.8	93.1	91.1	3.3	7.2	77.2	3.8	62.7
	InvAD Zhang et al. (2024a)	<b>80.9</b>	<b>96.6</b>	<b>93.4</b>	<b>93.7</b>	<b>7.2</b>	<b>10.2</b>	<b>85.4</b>	<b>5.4</b>	<b>69.7</b>
	InvAD-lite Zhang et al. (2024a)	<u>74.5</u>	<u>95.0</u>	93.0	<u>93.4</u>	<u>6.1</u>	<u>8.5</u>	<u>84.6</u>	<u>4.4</u>	<u>67.8</u>
	MambaAD He et al. (2024a)	65.1	92.4	92.9	<u>92.7</u>	4.8	7.3	82.3	3.8	65.1
	Hybrid UniAD You et al. (2022)	70.1	93.4	92.9	92.2	<u>5.7</u>	<u>9.1</u>	81.1	<u>4.8</u>	<u>66.2</u>
	RD++ Tien et al. (2023)	64.2	92.4	92.9	91.6	4.8	6.9	81.6	3.6	64.7
	DesTSeg Zhang et al. (2023c)	70.0	93.8	<u>93.1</u>	62.6	4.3	8.0	48.8	4.2	58.3
	Aug. DRAEM Zavrtanik et al. (2021)	50.7	89.7	<u>94.1</u>	51.4	0.9	1.9	24.9	1.0	49.0
	SimpleNet Liu et al. (2023)	49.3	89.8	94.1	90.9	3.5	6.5	72.7	3.3	60.6
18Obesobeso	Emb. CFA Lee et al. (2022)	61.4	92.8	94.1	78.8	12.4	18.1	60.4	10.0	62.6
	CFLOW-AD Gudovskiy et al. (2022)	62.0	91.9	94.1	92.6	6.0	7.8	79.6	4.0	64.6
	PyramidalFlow Lei et al. (2023)	62.9	93.1	94.1	93.5	5.5	10.6	79.8	5.6	65.4
	Rec. RD Deng & Li (2022)	63.0	93.4	94.1	93.4	10.7	19.2	87.0	10.6	68.0
	DiAD He et al. (2024b)	<b>92.2</b>	<b>99.0</b>	<b>95.2</b>	<b>95.8</b>	13.2	21.9	84.5	12.3	71.7
	ViTAD Zhang et al. (2023a)	66.9	94.4	94.1	<u>94.2</u>	<u>16.5</u>	<u>24.1</u>	<u>88.1</u>	<u>13.7</u>	<u>70.4</u>
	InvAD Zhang et al. (2024a)	<u>83.7</u>	<u>97.5</u>	<u>95.1</u>	<u>94.9</u>	<u>16.6</u>	<b>25.8</b>	<b>90.4</b>	<b>14.8</b>	<b>74.5</b>
	InvAD-lite Zhang et al. (2024a)	<u>73.4</u>	<u>95.7</u>	<u>94.2</u>	93.7	12.2	20.2	87.9	11.2	<u>70.6</u>
	MambaAD He et al. (2024a)	69.6	95.1	<u>94.2</u>	93.1	11.2	21.6	86.5	12.1	69.7
	Hybrid UniAD You et al. (2022)	71.7	94.8	<u>94.2</u>	93.1	9.5	15.8	84.8	8.6	68.8
	RD++ Tien et al. (2023)	67.0	93.2	<u>94.2</u>	93.1	7.9	15.6	86.0	8.4	67.7
	DesTSeg Zhang et al. (2023c)	71.3	95.4	94.1	63.7	<b>18.5</b>	<u>23.7</u>	53.0	13.4	63.3
	Aug. DRAEM Zavrtanik et al. (2021)	52.3	88.6	93.3	48.7	0.6	1.3	19.1	0.6	47.7
	SimpleNet Liu et al. (2023)	50.9	87.4	93.3	85.0	2.0	3.9	65.0	2.0	58.1
	Emb. CFA Lee et al. (2022)	56.1	90.7	93.5	78.6	4.2	8.8	50.1	4.6	57.8
	CFLOW-AD Gudovskiy et al. (2022)	61.1	91.7	93.3	88.9	4.0	6.3	64.4	3.3	61.5
19Bear	PyramidalFlow Lei et al. (2023)	53.6	89.5	93.3	87.3	3.1	5.7	61.6	2.9	59.1
	Rec. RD Deng & Li (2022)	61.5	92.1	93.6	90.8	5.6	10.0	76.1	5.3	64.0
	DiAD He et al. (2024b)	64.3	93.7	93.3	90.1	5.1	<u>13.0</u>	65.0	<u>7.0</u>	60.6
	ViTAD Zhang et al. (2023a)	60.1	90.8	93.5	91.1	5.3	11.1	75.0	5.9	63.5
	InvAD Zhang et al. (2024a)	<b>71.0</b>	<b>94.5</b>	<b>93.8</b>	<b>92.5</b>	<b>11.7</b>	<b>18.3</b>	<b>81.2</b>	<b>10.1</b>	<b>68.7</b>
	InvAD-lite Zhang et al. (2024a)	<u>67.9</u>	93.4	93.4	<u>92.2</u>	<u>11.2</u>	<u>17.0</u>	<u>78.8</u>	<u>9.3</u>	<u>67.3</u>
	MambaAD He et al. (2024a)	63.5	92.3	93.5	<u>91.2</u>	<u>7.2</u>	12.7	75.9	6.8	64.9
	Hybrid UniAD You et al. (2022)	61.7	91.9	93.6	90.6	5.0	9.4	79.4	4.9	64.2
	RD++ Tien et al. (2023)	64.9	92.9	93.5	90.9	6.5	11.2	76.6	5.9	<u>65.0</u>
	DesTSeg Zhang et al. (2023c)	<u>68.3</u>	93.5	93.5	60.4	6.8	11.7	52.0	6.2	<u>58.9</u>
	Aug. DRAEM Zavrtanik et al. (2021)	51.7	86.3	<u>92.7</u>	47.5	0.5	1.0	17.2	0.5	46.7
	SimpleNet Liu et al. (2023)	55.6	88.5	<u>92.7</u>	83.1	1.3	2.6	55.6	1.3	57.3
	Emb. CFA Lee et al. (2022)	50.2	88.6	92.9	68.5	1.9	5.0	42.2	2.6	53.3
	CFLOW-AD Gudovskiy et al. (2022)	59.0	90.3	<u>92.7</u>	84.9	2.0	4.4	56.5	2.2	58.8
	PyramidalFlow Lei et al. (2023)	52.4	87.6	92.9	84.8	1.9	4.9	59.9	2.5	57.8
20Puppy	Rec. RD Deng & Li (2022)	50.9	89.0	<u>92.7</u>	87.0	3.5	5.6	66.1	2.9	59.0
	DiAD He et al. (2024b)	46.2	88.9	<u>92.7</u>	83.4	1.4	2.8	52.7	1.4	52.6
	ViTAD Zhang et al. (2023a)	55.4	88.2	<b>93.0</b>	<u>87.5</u>	2.4	4.8	66.3	2.4	59.6
	InvAD Zhang et al. (2024a)	<b>61.9</b>	<b>92.0</b>	92.9	<b>89.7</b>	<u>5.7</u>	<u>9.7</u>	<b>73.8</b>	<u>5.1</u>	<b>63.5</b>
	InvAD-lite Zhang et al. (2024a)	55.2	90.0	<u>92.7</u>	87.9	3.7	5.9	69.1	3.0	60.5
	MambaAD He et al. (2024a)	48.8	87.3	<u>92.7</u>	86.6	2.3	4.9	64.6	2.5	57.9
	Hybrid UniAD You et al. (2022)	56.7	90.2	<u>92.7</u>	87.2	<u>4.5</u>	<u>10.8</u>	<u>70.9</u>	<u>5.7</u>	<u>61.6</u>
	RD++ Tien et al. (2023)	<u>59.3</u>	91.4	<b>93.0</b>	86.9	3.5	6.9	65.4	3.6	<u>61.0</u>
	DesTSeg Zhang et al. (2023c)	57.5	91.4	92.9	55.2	<b>11.9</b>	<b>11.7</b>	37.9	<b>6.2</b>	54.9
	Aug. DRAEM Zavrtanik et al. (2021)	48.8	88.1	93.8	47.9	0.7	1.5	20.0	0.8	47.2
	SimpleNet Liu et al. (2023)	51.5	88.6	93.8	86.1	2.3	4.5	63.9	2.3	58.6
	Emb. CFA Lee et al. (2022)	55.7	91.1	93.8	71.8	3.7	7.7	45.3	4.1	56.2
	CFLOW-AD Gudovskiy et al. (2022)	56.9	90.9	93.8	86.9	3.4	5.1	63.7	2.6	60.2
	PyramidalFlow Lei et al. (2023)	49.0	88.1	93.8	84.4	2.4	5.0	62.7	2.6	57.8
	Rec. RD Deng & Li (2022)	57.9	91.3	93.8	88.3	4.4	8.2	73.7	4.3	62.3
Avg	DiAD He et al. (2024b)	65.6	93.4	<b>94.1</b>	87.7	4.4	8.8	61.4	4.7	59.4
	ViTAD Zhang et al. (2023a)	59.0	91.4	93.8	89.0	4.8	<u>9.3</u>	73.6	<u>4.9</u>	62.8
	InvAD Zhang et al. (2024a)	<b>70.4</b>	<b>94.5</b>	<b>94.0</b>	<b>90.7</b>	<b>8.9</b>	<b>15.3</b>	<b>79.1</b>	<b>8.4</b>	<b>67.4</b>
	InvAD-lite Zhang et al. (2024a)	<u>65.3</u>	<u>93.4</u>	<u>93.9</u>	<u>89.7</u>	<u>6.6</u>	<u>11.4</u>	<u>76.4</u>	<u>6.1</u>	<u>65.1</u>
	MambaAD He et al. (2024a)	61.4	92.4	93.8	88.3	4.8	9.0	73.0	4.8	<u>63.2</u>
	Hybrid UniAD You et al. (2022)	59.4	91.5	93.8	89.0	4.4	8.4	<u>74.6</u>	4.4	62.8
	RD++ Tien et al. (2023)	58.6	91.7	93.8	88.3	4.4	8.1	73.2	4.2	62.4
	DesTSeg Zhang et al. (2023c)	59.2	91.9	93.8	56.8	<u>5.7</u>	8.6	41.8	4.5	54.9



## V DETAILED QUANTITATIVE RESULTS ON UNI-MEDICAL DATASET UNDER 300 EPOCHS

Table A80: Benchmarked results on Uni-Medical dataset [Zhang et al. \(2023a\)](#) by the suggested metrics in Sec. 3.3.

	Method	Image-level			Pixel-level			mAU-PRO	mIoU-max	mAD
		mAU-ROC	mAP	mF <sub>1</sub> -max	mAU-ROC	mAP	mF <sub>1</sub> -max			
brain	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	53.0	84.2	90.6	28.7	2.0	6.2	5.7	3.2	43.3
	SimpleNet <a href="#">Liu et al. (2023)</a>	77.7	94.1	90.7	93.7	36.4	39.3	71.1	24.4	73.8
	Emb. CFA <a href="#">Lee et al. (2022)</a>	67.0	90.8	90.6	45.2	6.2	7.4	7.5	3.8	49.7
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	85.8	96.2	92.1	94.5	55.8	17.8	73.6	9.8	75.9
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	66.6	89.6	90.6	87.0	12.4	18.9	54.6	10.4	62.7
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	85.0	95.4	92.1	96.4	45.6	49.0	82.3	32.5	79.6
	DiAD <a href="#">He et al. (2024b)</a>	<b>93.6</b>	<b>98.2</b>	<b>95.2</b>	95.3	37.3	42.3	80.4	26.9	77.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	89.0	97.3	92.9	<b>97.6</b>	<b>60.2</b>	<b>58.0</b>	83.6	<b>40.9</b>	84.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	89.5	97.2	92.5	<b>97.6</b>	56.5	57.4	85.6	40.3	83.7
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	84.4	95.5	91.7	96.3	44.8	48.1	81.9	31.7	79.2
	MambaAD <a href="#">He et al. (2024a)</a>	91.9	98.0	93.5	<b>97.6</b>	56.6	<b>58.0</b>	<b>86.4</b>	40.8	<b>84.6</b>
	Hybrid UniAD <a href="#">You et al. (2022)</a>	90.2	97.6	92.9	<b>97.6</b>	58.8	57.2	83.3	40.0	83.9
	RD++ <a href="#">Tien et al. (2023)</a>	85.8	96.0	91.6	96.9	48.3	52.2	83.8	35.3	80.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	80.4	93.8	91.2	82.1	49.3	51.0	55.4	34.2	74.0
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	56.2	47.3	64.0	26.2	0.5	2.4	9.8	1.2	32.8
	SimpleNet <a href="#">Liu et al. (2023)</a>	52.5	44.7	62.3	96.8	8.5	13.7	86.9	7.4	52.3
	Emb. CFA <a href="#">Lee et al. (2022)</a>	37.1	35.0	61.2	14.0	0.2	0.8	0.7	0.4	24.2
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	63.8	54.0	63.5	96.0	2.9	5.7	87.8	2.9	54.3
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	65.7	56.1	65.7	82.0	1.7	2.3	41.4	1.2	47.2
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	55.4	45.4	64.1	96.5	5.3	10.0	90.6	5.3	52.8
	DiAD <a href="#">He et al. (2024b)</a>	65.8	60.1	63.9	96.9	7.6	13.9	91.5	7.5	57.1
	ViTAD <a href="#">Zhang et al. (2023a)</a>	63.5	54.5	65.4	<b>97.8</b>	11.1	18.9	92.5	10.4	58.1
	InvAD <a href="#">Zhang et al. (2024a)</a>	62.5	52.1	65.2	96.8	6.8	12.6	92.3	6.7	56.0
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	56.4	46.1	63.5	96.1	4.8	9.3	89.7	4.9	52.7
	MambaAD <a href="#">He et al. (2024a)</a>	61.1	50.9	63.8	96.8	8.3	15.5	91.7	8.4	55.8
liver	Hybrid UniAD <a href="#">You et al. (2022)</a>	64.7	51.5	64.9	97.1	7.9	14.1	<b>92.8</b>	7.6	56.7
	RD++ <a href="#">Tien et al. (2023)</a>	55.5	44.6	64.1	96.4	5.3	9.9	90.9	5.2	52.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	<b>74.8</b>	<b>72.4</b>	<b>66.0</b>	87.6	<b>38.6</b>	<b>41.8</b>	84.5	<b>26.4</b>	<b>67.1</b>
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	66.1	57.9	60.4	42.5	3.3	9.6	11.9	5.1	39.1
	SimpleNet <a href="#">Liu et al. (2023)</a>	87.3	87.1	77.1	94.2	62.8	58.0	79.6	40.9	78.7
	Emb. CFA <a href="#">Lee et al. (2022)</a>	64.6	62.6	59.5	55.2	8.1	11.5	18.6	6.1	42.8
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	87.4	85.5	76.3	95.6	60.0	55.5	83.7	38.4	78.4
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	47.7	42.8	59.5	77.7	12.2	23.4	44.7	13.3	44.8
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	88.8	86.7	77.7	96.4	65.7	60.6	86.6	43.4	80.9
	DiAD <a href="#">He et al. (2024b)</a>	89.2	87.5	79.0	95.7	62.7	58.3	84.3	41.2	79.5
	ViTAD <a href="#">Zhang et al. (2023a)</a>	92.0	90.0	82.0	95.5	69.3	63.8	83.3	46.8	83.0
	InvAD <a href="#">Zhang et al. (2024a)</a>	92.1	<b>90.6</b>	82.1	<b>97.2</b>	<b>72.9</b>	<b>66.5</b>	<b>89.0</b>	<b>49.8</b>	<b>84.8</b>
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	92.1	90.2	82.8	96.1	66.5	61.8	85.7	44.7	82.9
	MambaAD <a href="#">He et al. (2024a)</a>	<b>93.8</b>	87.9	<b>86.6</b>	95.9	64.2	64.7	85.5	47.8	83.5
	Hybrid UniAD <a href="#">You et al. (2022)</a>	86.2	80.7	74.8	94.9	50.4	52.7	81.2	35.8	75.2
	RD++ <a href="#">Tien et al. (2023)</a>	90.3	87.7	79.9	96.7	69.5	63.8	87.5	46.9	82.7
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	90.9	88.9	81.9	80.0	64.0	58.7	58.5	41.6	76.3
	Aug. DRAEM <a href="#">Zavrtanik et al. (2021)</a>	58.5	63.2	71.7	32.5	2.0	6.1	9.1	3.2	38.4
	SimpleNet <a href="#">Liu et al. (2023)</a>	72.5	75.3	76.7	94.9	35.9	37.0	79.2	24.2	68.3
	Emb. CFA <a href="#">Lee et al. (2022)</a>	56.3	62.8	70.4	38.1	4.8	6.6	8.9	3.4	38.9
	CFLOW-AD <a href="#">Gudovskiy et al. (2022)</a>	79.0	78.5	77.3	95.4	39.6	26.3	81.7	17.0	69.5
	PyramidalFlow <a href="#">Lei et al. (2023)</a>	60.0	62.8	71.9	82.2	8.8	14.9	46.9	8.3	51.5
	Rec. RD <a href="#">Deng &amp; Li (2022)</a>	76.4	75.8	77.9	96.4	38.9	39.8	86.5	27.0	71.1
	DiAD <a href="#">He et al. (2024b)</a>	<b>82.9</b>	81.9	79.4	96.0	35.9	38.2	85.4	25.2	71.4
	ViTAD <a href="#">Zhang et al. (2023a)</a>	81.5	80.6	80.1	97.0	46.8	46.9	86.5	32.7	<b>75.0</b>
	InvAD <a href="#">Zhang et al. (2024a)</a>	81.3	80.0	79.9	<b>97.2</b>	45.4	45.5	<b>89.0</b>	32.3	74.8
	InvAD-lite <a href="#">Zhang et al. (2024a)</a>	77.6	77.2	79.3	96.2	38.7	39.7	85.7	27.1	71.6
	MambaAD <a href="#">He et al. (2024a)</a>	82.3	78.9	<b>81.3</b>	96.7	43.0	46.1	87.9	32.4	74.6
Avg	Hybrid UniAD <a href="#">You et al. (2022)</a>	80.4	76.6	77.5	96.5	39.0	41.3	85.8	27.8	71.9
	RD++ <a href="#">Tien et al. (2023)</a>	77.2	76.1	78.5	96.7	41.0	41.9	87.4	29.1	72.0
	DesTSeg <a href="#">Zhang et al. (2023c)</a>	82.0	<b>85.0</b>	79.7	83.2	<b>50.6</b>	<b>50.5</b>	66.1	<b>34.1</b>	72.4