

APPENDIX

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A DATASET

MVTec AD is the most popular dataset for industrial image anomaly detection (Bergmann et al. (2019)), which consists of 15 categories of items, including a total of 3629 normal images as a training set, and a collection of 1725 normal images and abnormal images as a test set. All images have a resolution between 700×700 and 1024×1024 pixels.

MPDD is a more challenging AD dataset containing 6 classes of metal parts (Jezek et al. (2021)). The images are taken in different spatial directions, and distances, and under the condition of non-uniform background, so it is more challenging. The training set contains 888 normal images, and the test set contains 176 normal images and 282 abnormal images. The resolution of all images is 1024×1024 pixels.

MVTEC LOCO AD adds logical abnormal images outside the structural class abnormal image (Bergmann et al. (2022)). The dataset contains 1,772 normal images as a training set and 304 normal images are used as a validation set. The test set contains 575 normal images, 432 structural abnormal images, and 561 logic abnormal images. Due to the different calculation methods of logic abnormal detection metric, we abandon the logical abnormal image of the test concentration, retaining the remaining 575 normal images and 432 structural abnormal images as a test set for experiments. Each image is 850 to 1600 pixels in height and 800 to 1700 pixels wide.

B EXPERIMENT RESULTS

Table 1: Results of anomaly detection. Setting: New Fewshot Setting, K (number of shot)=1, Dataset: MVTec, Sampling Ratio: 0.01, Metrics: Image AUROC. The number of shot for RegAD is 2. The data for PaDiM and PatchCore-10, PatchCore-25 are from Roth et al. (2022).

Category	Aug.(R)	GraphCore	CFA	SPADE	PaDiM	STPM	RD4AD	PatchCore-1	PatchCore-10	PatchCore-25	RegAD
Bottle	99.7	99.8	96.7	95.2	-	93.2	91.2	96.5	-	-	-
Cable	90.1	91.1	65.4	60.1	-	59.8	58.3	65.5	-	-	-
Capsule	64.7	72.1	50.2	45.6	-	43.2	44.7	49.8	-	-	-
Carpet	99.3	99.3	97.1	93.2	-	90.5	92.5	97.2	-	-	-
Grid	70.8	80.9	79.2	75.1	-	71.2	74.3	78.9	-	-	-
Hazelnut	97.4	98.5	98.1	95.0	-	90.3	93.2	98.0	-	-	-
Leather	100	100	100	97.2	-	95.1	96.5	100	-	-	-
Meta Nut	77.0	92.5	66.1	60.2	-	58.2	63.4	65.6	-	-	-
Pill	81.0	81.2	66.3	59.7	-	57.3	62.4	65.1	-	-	-
Screw	57.4	57.9	55.9	49.6	-	51.2	53.5	54.8	-	-	-
Tile	99.9	99.2	99.8	89.5	-	90.2	88.7	99.5	-	-	-
Toothbrush	84.4	85.2	86.7	78.5	-	75.2	77.8	85.8	-	-	-
Transistor	94.5	96.2	71.5	50.5	-	83.2	77.5	70.5	-	-	-
Wood	97.0	97.3	98.1	49.5	-	95.4	93.5	98.9	-	-	-
Zipper	97.4	97.5	50.3	48.5	-	45.2	48.6	51.2	-	-	-
Average	87.4	89.9	78.75	69.83	76.1	69.70	74.4	78.5	83.40	84.10	82.4

C ABLATION STADIES

REFERENCES

Paul Bergmann, Michael Fauser, David Sattlegger, and Carsten Steger. Mvtec ad — a comprehensive real-world dataset for unsupervised anomaly detection. *2019 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 9584–9592, 2019.

Table 2: Setting: Ours Fewshot Setting, K (number of shot)=1, Dataset: MVTec, Sampling Ratio: 0.01, Metrics: Pixel AUROC. The number of shot for RegAD is 2. The data for PaDiM and PatchCore-10, PatchCore-25 are from Roth et al. (2022).

Category	Aug.(R)	GraphCore	CFA	SPADE	PaDiM	STPM	RD4AD	PatchCore-1	PatchCore-10	PatchCore-25	RegAD
Bottle	98.5	99.8	93.2	85.2	-	84.3	81.7	93.0	-	-	-
Cable	95.1	96.2	88.2	78.2	-	50.9	64.8	87.0	-	-	-
Capsule	97.7	98.1	85.6	79.2	-	49.2	77.9	87.7	-	-	-
Carpet	99.1	99.3	97.5	95.2	-	60.5	72.5	98.8	-	-	-
Grid	70.5	76.9	81.3	75.6	-	61.2	74.3	84.1	-	-	-
Hazelnut	97.1	98.5	98.1	88.2	-	73.3	63.2	97.5	-	-	-
Leather	99.3	99.5	99.2	88.3	-	75.1	86.5	99.2	-	-	-
Meta Nut	93.2	92.5	89.5	58.5	-	51.1	68.7	90.1	-	-	-
Pill	95.7	96.2	91.2	54.2	-	49.3	65.6	90.4	-	-	-
Screw	92.0	93.4	96.5	69.6	-	51.2	59.7	95.8	-	-	-
Tile	95.8	96.8	81.5	81.5	-	57.2	88.7	82.7	-	-	-
Toothbrush	97.9	98.5	93.8	75.5	-	65.2	77.8	93.0	-	-	-
Transistor	93.6	96.2	79.5	73.5	-	43.2	77.5	78.8	-	-	-
Wood	93.1	94.3	91.8	89.5	-	45.4	93.5	90.7	-	-	-
Zipper	98.5	97.5	93.2	93.5	-	55.2	48.6	94.0	-	-	-
Average	94.47	95.60	90.67	79.07	88.20	58.15	69.03	90.85	92.00	92.40	-

Table 3: Setting: Ours Fewshot Setting, K (number of shot)=2, Dataset: MVTec, Sampling Ratio: 0.01, Metrics: Image AUROC. The data for PaDiM and PatchCore-10, PatchCore-25 are from Roth et al. (2022).

Category	Aug.(R)	GraphCore	CFA	SPADE	PaDiM	STPM	RD4AD	PatchCore-1	PatchCore-10	PatchCore-25	RegAD
Bottle	99.7	99.8	93.7	95.7	-	93.8	91.2	99.7	-	-	99.4
Cable	94.7	95.2	89.3	60.4	-	60.2	65.3	94.9	-	-	65.1
Capsule	66.5	73.2	53.4	48.7	-	45.2	50.5	67.2	-	-	67.5
Carpet	99.4	99.4	97.6	92.1	-	90.8	92.8	99.1	-	-	96.5
Grid	75.7	81.5	80.4	75.8	-	72.6	75.2	61.7	-	-	84.0
Hazelnut	99.7	99.5	99.4	95.2	-	90.3	93.4	93.5	-	-	96.0
Leather	100	100	100	97.9	-	95.8	96.7	100	-	-	99.4
Meta Nut	95.0	96.3	68.6	61.3	-	59.4	63.4	92.0	-	-	91.4
Pill	87.8	88.6	67.4	60.2	-	58.7	62.8	87.4	-	-	81.3
Screw	63.6	65.7	58.2	51.3	-	51.9	54.3	48.3	-	-	52.5
Tile	100	100	99.8	90.2	-	91.4	88.9	100	-	-	94.3
Toothbrush	83.6	87.3	86.9	80.2	-	76.5	77.1	83.9	-	-	86.6
Transistor	96.3	97.1	72.5	51.6	-	82.4	78.1	96.9	-	-	86.0
Wood	97.1	97.5	98.2	50.3	-	95.8	93.7	97.2	-	-	99.2
Zipper	96.9	97.5	50.5	49.4	-	47.6	49.5	95.3	-	-	86.3
Average	90.40	91.91	81.06	70.69	78.90	74.16	75.53	87.81	86.40	87.20	85.70

Paul Bergmann, Kilian Batzner, Michael Fauser, David Sattlegger, and Carsten Steger. Beyond dents and scratches: Logical constraints in unsupervised anomaly detection and localization. *International Journal of Computer Vision*, 130(4):947–969, 2022.

Stepan Jezek, Martin Jonak, Radim Burget, Pavel Dvorak, and Milos Skotak. Deep learning-based defect detection of metal parts: evaluating current methods in complex conditions. In *2021 13th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT)*, pp. 66–71. IEEE, 2021.

Karsten Roth, Latha Pemula, Joaquin Zepeda, Bernhard Schölkopf, Thomas Brox, and Peter Gehler. Towards total recall in industrial anomaly detection. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pp. 14318–14328, 2022.

Table 4: Setting: Ours Fewshot Setting, K (number of shot)=2, Dataset: MVTec, Sampling Ratio: 0.01, Metrics: Pixel AUROC. The data for PaDiM and PatchCore-10, PatchCore-25 are from Roth et al. (2022).

Category	Aug.(R)	GraphCore	CFA	SPADE	PaDiM	STPM	RD4AD	PatchCore-1	PatchCore-10	PatchCore-25	RegAD
Bottle	98.6	99.8	93.5	86.8	-	84.6	81.7	98.5	-	-	98.0
Cable	96.2	96.3	88.9	78.6	-	51.6	65.4	97.8	-	-	91.7
Capsule	97.7	97.8	85.9	79.8	-	59.2	78.2	97.7	-	-	97.3
Carpet	99.1	99.6	97.9	95.6	-	60.5	74.2	99.0	-	-	98.9
Grid	79.8	80.6	81.4	75.9	-	61.2	76.3	67.5	-	-	77.4
Hazelnut	97.9	98.2	98.2	88.9	-	74.5	64.8	96.4	-	-	98.1
Leather	99.3	99.4	99.3	89.2	-	75.2	86.5	99.3	-	-	98.0
Meta Nut	96.8	98.1	89.7	59.5	-	51.1	68.9	97.1	-	-	96.9
Pill	93.9	94.1	91.5	57.2	-	49.9	70.2	96.8	-	-	93.6
Screw	96.0	96.5	96.7	70.2	-	51.8	60.8	90.8	-	-	94.4
Tile	99.3	96.8	81.8	82.3	-	58.2	59.2	96.0	-	-	94.3
Toothbrush	98.2	98.6	93.9	76.8	-	66.3	78.3	98.2	-	-	98.2
Transistor	94.1	99.2	80.3	73.6	-	47.5	67.8	95.0	-	-	93.4
Wood	98.4	99.5	92.4	89.7	-	48.4	93.8	93.0	-	-	93.5
Zipper	99.0	99.3	94.1	93.7	-	56.3	51.2	98.2	-	-	95.1
Average	96.29	96.92	91.03	79.85	90.50	59.75	71.82	94.75	93.10	93.30	94.59

Table 5: Setting: New Fewshot Setting, K (number of shot)=4, Dataset: MVTec, Sampling Ratio: 0.01, Metrics: Image AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bottle	99.7	99.8	94.2	95.8	93.9	92.1	99.6	99.4
Cable	94.1	95.2	91.2	61.3	61.3	68.4	97.4	76.1
Capsule	66.2	74.5	56.2	48.7	47.4	51.7	66.3	72.4
Carpet	99.6	99.4	97.6	92.5	91.5	93.2	99.0	97.9
Grid	77.9	81.6	81.5	76.2	75.3	76.4	63.0	91.2
Hazelnut	99.9	99.5	99.4	95.6	91.4	93.8	92.8	95.8
Leather	100	100	100	98.2	96.9	96.8	100	100
Meta Nut	95.9	96.2	91.3	62.5	60.8	65.3	94.7	94.6
Pill	89.3	88.2	85.6	61.8	61.3	62.8	89.0	80.8
Screw	63.9	68.9	49.2	52.9	52.8	55.7	54.1	56.6
Tile	100	100	99.8	91.3	90.4	90.8	100	95.5
Toothbrush	94.4	95.2	87.2	81.7	80.4	76.7	95.2	90.9
Transistor	98.5	99.2	95.8	52.5	82.4	79.3	98.4	85.2
Wood	97.4	97.9	98.6	51.4	95.8	94.2	97.4	98.6
Zipper	96.9	98.2	94.3	52.2	47.6	56.7	95.5	88.5
Average	92.22	92.92	84.97	71.64	74.77	76.93	89.49	88.23

Table 6: Setting: New Fewshot Setting, K (number of shot)=4, Dataset: MVTec, Sampling Ratio: 0.01, Metrics: Pixel AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bottle	98.6	99.8	93.6	86.9	84.9	81.8	98.6	98.4
Cable	96.6	96.9	89.1	78.7	52.2	66.2	97.9	92.7
Capsule	97.7	97.9	86.2	80.1	59.3	78.4	97.7	97.6
Carpet	99.1	99.6	98.2	95.0	60.6	74.8	99.0	98.9
Grid	81.9	82.3	82.5	76.1	61.8	76.9	70.6	85.7
Hazelnut	98.3	99.1	98.5	89.1	74.9	65.2	97.0	98.0
Leather	99.3	99.6	99.3	89.3	75.3	86.7	96.9	99.1
Meta Nut	96.8	98.1	89.9	60.2	51.8	69.2	97.0	97.8
Pill	97.0	97.5	91.6	58.2	50.6	70.4	96.9	97.4
Screw	93.8	96.5	96.8	71.3	51.9	60.9	92.1	95.0
Tile	95.7	96.7	82.3	82.4	58.5	59.5	96.0	94.9
Toothbrush	98.8	98.9	94.2	76.9	66.9	78.9	98.8	98.5
Transistor	94.1	99.3	80.5	74.2	57.5	67.9	95.0	93.8
Wood	93.2	99.5	92.6	90.4	48.9	94.2	93.1	94.7
Zipper	98.4	99.3	94.8	93.8	56.4	52.3	98.3	94.0
Average	95.95	97.40	91.34	80.17	60.77	72.22	94.99	95.77

Table 7: Setting: New Fewshot Setting, K (number of shot)=8, Dataset: MVTec, Sampling Ratio: 0.01, Metrics: Image AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bottle	100	99.8	95.1	95.9	94.1	92.8	99.6	99.8
Cable	94.1	95.2	91.8	63.5	62.6	69.2	97.4	80.6
Capsule	89.7	90.5	69.5	58.9	57.8	58.5	85.3	76.3
Carpet	98.5	99.5	97.6	92.7	91.6	93.8	99.0	98.5
Grid	92.7	92.3	85.6	77.3	76.9	77.9	83.1	91.5
Hazelnut	100	100	99.4	96.5	91.8	94.2	99.8	96.5
Leather	100	100	100	98.7	97.2	97.2	100	100
Meta Nut	96.8	97.9	92.3	68.9	61.3	65.6	95.1	98.3
Pill	90.1	91.1	88.9	63.9	64.2	63.6	89.6	80.6
Screw	79.4	80.1	65.4	56.4	55.9	59.3	74.1	63.4
Tile	99.3	100	99.8	91.8	91.2	91.2	100	97.4
Toothbrush	94.6	95.1	88.9	82.9	82.3	77.9	96.8	98.5
Transistor	98.2	99.2	96.2	58.9	84.6	81.2	98.9	93.4
Wood	98.7	98.9	98.9	61.3	95.8	95.6	97.5	99.4
Zipper	99.0	99.2	94.5	62.5	57.2	58.9	98.4	94.0
Average	95.41	95.92	90.93	75.34	77.63	78.46	94.31	91.21

Table 8: Setting: New Fewshot Setting, K (number of shot)=8, Dataset: MVTec, Sampling Ratio: 0.01, Metrics: Pixel AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bottle	98.6	99.8	93.6	87.1	85.2	82.1	98.7	97.5
Cable	97.0	97.2	89.2	78.9	53.3	68.2	98.3	94.9
Capsule	98.3	98.5	86.5	80.2	59.3	78.5	98.4	98.2
Carpet	99.1	99.7	98.4	95.1	60.7	79.2	99.2	98.9
Grid	82.5	83.7	82.8	77.2	61.8	76.9	71.5	88.7
Hazelnut	98.4	99.2	98.6	89.5	74.9	65.5	97.2	98.5
Leather	99.4	99.6	99.4	90.2	75.3	86.9	99.4	98.9
Meta Nut	97.3	98.9	89.9	60.5	54.6	69.5	97.5	96.9
Pill	98.1	98.4	91.7	58.2	55.7	70.5	98.1	97.8
Screw	94.2	96.6	96.9	71.4	52.3	61.9	92.5	97.1
Tile	96.8	97.4	83.4	82.5	58.9	60.8	96.3	95.2
Toothbrush	99.2	99.2	94.5	77.2	66.9	79.1	99.2	98.7
Transistor	95.2	99.4	81.5	74.5	58.2	67.9	95.7	96.8
Wood	93.8	99.7	92.7	90.4	49.2	94.5	93.4	94.6
Zipper	98.6	99.7	94.9	94.2	57.8	52.8	98.6	97.4
Average	96.43	97.80	91.60	80.47	61.61	72.95	95.60	96.67

Table 9: Setting: New Fewshot Setting, K (number of shot)=1, Dataset: MPDD, Sampling Ratio: 0.01, Metrics: Image AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bracket Black	64.8	65.9	64.1	62.1	93.2	91.2	58.2	-
Bracket Brown	75.0	76.8	65.4	59.2	59.8	58.3	70.6	-
Bracket White	88.6	89.2	68.2	68.2	43.2	44.7	69.3	-
Connector	98.3	98.7	58.5	58.5	90.5	92.5	59.0	-
Metal Plate	99.9	99.9	62.1	63.2	71.2	74.3	64.1	-
Tubes	76.6	77.8	34.2	33.8	65.1	44.2	34.1	-
Average	83.87	84.72	58.75	57.50	59.20	67.53	59.22	57.8

Table 10: Setting: New Fewshot Setting, K (number of shot)=1, Dataset: MPDD, Sampling Ratio: 0.01, Metrics: Pixel AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bracket Black	91.7	92.3	75.2	72.4	74.5	72.5	78.8	-
Bracket Brown	91.8	92.2	77.2	71.8	72.9	72.3	76.8	-
Bracket White	97.0	97.3	69.8	65.4	63.1	61.3	67.8	-
Connector	97.0	97.5	88.9	82.4	82.1	81.7	85.0	-
Metal Plate	98.1	98.9	83.1	75.2	83.2	75.4	84.1	-
Tubes	92.4	92.8	71.7	76.2	74.5	76.1	78.2	-
Average	94.67	95.17	77.65	73.90	75.05	73.22	78.45	-

Table 11: Setting: New Fewshot Setting, K (number of shot)=2, Dataset: MPDD, Sampling Ratio: 0.01, Metrics: Image AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bracket Black	66.8	67.0	54.3	62.4	94.5	91.7	58.6	63.3
Bracket Brown	76.1	77.2	66.8	59.5	62.3	58.8	70.7	59.4
Bracket White	87.2	89.4	68.7	67.2	53.8	55.6	70.4	55.6
Connector	98.6	98.9	58.5	59.2	51.6	53.7	59.2	73.0
Metal Plate	99.9	99.9	62.7	64.2	62.4	65.2	64.1	61.7
Tubes	79.2	79.8	40.7	35.6	49.6	45.9	34.3	67.1
Average	84.63	85.37	58.62	58.02	62.37	61.82	59.55	63.35

Table 12: Setting: New Fewshot Setting, K (number of shot)=2, Dataset: MPDD, Sampling Ratio: 0.01, Metrics: Pixel AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bracket Black	92.1	92.5	75.8	72.8	75.1	75.4	78.9	-
Bracket Brown	91.9	92.6	77.5	71.9	73.2	73.4	76.9	-
Bracket White	97.1	97.5	70.8	72.4	64.2	62.4	68.1	-
Connector	97.2	97.7	88.2	82.8	83.4	82.3	85.2	-
Metal Plate	98.4	99.1	84.3	75.9	83.2	76.5	86.3	-
Tubes	92.6	93.1	72.8	76.8	75.6	77.1	79.5	-
Average	94.88	95.42	78.23	75.43	75.78	74.52	79.15	93.2

Table 13: Setting: New Fewshot Setting, K (number of shot)=4, Dataset: MPDD, Sampling Ratio: 0.01, Metrics: Image AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bracket Black	66.9	67.8	54.9	62.4	94.5	91.9	58.9	63.8
Bracket Brown	76.5	77.8	66.8	59.5	62.4	59.0	70.8	66.1
Bracket White	87.5	89.6	71.1	67.5	54.2	55.7	70.7	59.3
Connector	98.9	98.9	58.7	59.5	52.1	54.4	59.4	77.2
Metal Plate	99.9	99.9	62.9	64.9	62.4	65.5	64.4	78.6
Tubes	79.6	80.0	41.1	35.9	50.2	46.2	34.5	67.5
Average	84.88	85.67	59.25	58.28	62.62	62.12	59.78	68.75

Table 14: Setting: New Fewshot Setting, K (number of shot)=4, Dataset: MPDD, Sampling Ratio: 0.01, Metrics: Pixel AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bracket Black	92.7	92.7	75.9	72.9	75.3	75.9	79.1	-
Bracket Brown	92.1	92.9	77.9	72.3	73.5	74.8	77.3	-
Bracket White	97.5	97.8	71.2	72.9	64.7	64.5	69.3	-
Connector	97.5	98.1	88.8	82.9	84.2	82.4	86.4	-
Metal Plate	98.5	99.2	84.8	76.9	83.5	77.2	86.7	-
Tubes	92.7	93.5	73.5	77.2	75.8	78.1	80.1	-
Average	95.17	95.70	78.68	75.85	76.17	75.48	79.82	93.9

Table 15: Setting: New Fewshot Setting, K (number of shot)=8, Dataset: MPDD, Sampling Ratio: 0.01, Metrics: Image AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bracket Black	67.1	68.2	55.2	62.4	94.6	92.2	59.2	67.3
Bracket Brown	76.8	78.5	66.9	59.8	62.7	59.2	70.9	69.5
Bracket White	87.9	89.9	79.4	67.6	54.7	55.9	70.5	61.4
Connector	98.9	99.1	58.9	59.9	52.7	54.6	59.6	84.9
Metal Plate	99.9	99.9	63.1	65.2	63.2	65.8	64.7	80.2
Tubes	79.8	80.3	41.7	36.2	50.8	46.7	34.8	67.9
Average	85.07	85.98	60.87	58.52	63.12	62.40	59.95	71.87

Table 16: Setting: New Fewshot Setting, K (number of shot)=8, Dataset: MPDD, Sampling Ratio: 0.01, Metrics: Pixel AUROC

Category	Aug.(R)	GraphCore	CFA	SPADE	STPM	RD4AD	PatchCore	RegAD
Bracket Black	92.9	92.9	76.2	73.1	76.3	76.2	79.6	-
Bracket Brown	92.3	93.1	77.9	72.6	74.2	75.1	77.5	-
Bracket White	97.9	98.2	71.8	73.1	64.9	64.6	70.2	-
Connector	98.1	98.3	89.1	83.1	84.5	82.6	87.1	-
Metal Plate	98.7	99.3	85.2	77.2	83.7	77.5	86.9	-
Tubes	92.9	93.4	73.9	78.1	76.1	78.3	80.5	-
Average	95.47	95.87	79.02	76.20	76.62	75.72	80.30	95.10

Table 17: The architecture details of GraphCore

Stage	Output Size	GraphCore
Stem	$\frac{H}{4} \times \frac{W}{4}$	Conv $\times 3$
Stage 1	$\frac{H}{4} \times \frac{W}{4}$	$\begin{bmatrix} D = 48 \\ K = 9 \end{bmatrix} \times 2$
Downsample	$\frac{H}{8} \times \frac{W}{8}$	Conv
Stage 2	$\frac{H}{8} \times \frac{W}{8}$	$\begin{bmatrix} D = 96 \\ K = 9 \end{bmatrix} \times 2$
Downsample	$\frac{H}{16} \times \frac{W}{16}$	Conv
Stage 3	$\frac{H}{16} \times \frac{W}{16}$	$\begin{bmatrix} D = 240 \\ K = 9 \end{bmatrix} \times 2$
Downsample	$\frac{H}{32} \times \frac{W}{32}$	Conv
Stage 4	$\frac{H}{32} \times \frac{W}{32}$	$\begin{bmatrix} D = 384 \\ K = 9 \end{bmatrix} \times 2$
Head	1×1	Pooling and MLP

Table 18: Ablation study for memory bank size and inference speed with respect to 1 shot

Method	Memory Bank Size (Average)	Inference speed (Average)
PatchCore	1.6M	0.0316s
Aug.(R) + PatchCore	1.8M	0.0325s
GraphCore	1.2M	0.0299s

Table 19: Ablation study for memory bank size and inference speed with respect to 2 shot

Method	Memory Bank Size (Average)	Inference speed (Average)
PatchCore	3.2M	0.0327s
Aug.(R) + PatchCore	3.2M	0.0327s
GraphCore	1.8M	0.0287s

Table 20: Ablation study with respect to Dataset: MVTec 2D, sampling rate: 0.01, Metrics: image-level AUROC, number of shot is 1.

Augmentation Type	Aug + PatchCore
Flipping	81.4
Translation	83.6
Scaling	82.3
Rotation	87.4

Table 21: Ablation study with respect to Dataset: MVTec 2D, sampling rate: 0.01, Metrics: image-level AUROC, number of shot is 2.

Augmentation Type	Aug + PatchCore
Flipping	83.7
Translation	85.6
Scaling	90.2
Rotation	90.5