Angelic Patches for Improving Third-Party Object Detector Performance Supplementary Material

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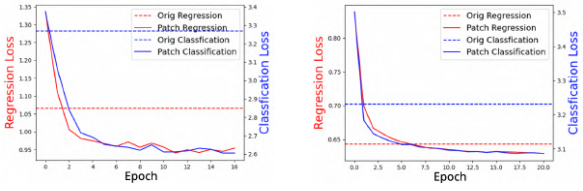
1. Implementation Details.

Experimental Setup. We consider patches applied to the center of each object in an image of category i. Note that there may be multiple objects of category i in the image, so we apply a shared patch for all object instances; in particular, we consider a square patch with an initial size 16×16, which is less than 1% of the image area. Then, for each ground truth bounding box, we rescale the patch to 0.5 of the shorter length of the two dimensions of the bounding box and apply the patch at the center of each bounding box.

One challenge is that downsizing the patch to tiny bounding boxes can be difficult. Thus, we filter out very small bounding boxes—in particular, those with side lengths less than 12 pixels. This preprocessing step is applied uniformly to the entire dataset to make the comparison across different approaches remains fair. Furthermore, in most practical settings (e.g., robot navigation), larger bounding boxes tend to be significantly more important than smaller ones since they correspond to objects that are more close.

2. SSD Patch Training Curves



(a) SSD aware. (b) SSD agnostic.

Figure 1. Sampled training curves for classification loss and regression loss on the person category.

3. More Results on Transferability

3.1. More Results on Faster R-CNN and SSD

We provide more transferability results for Faster R-CNN and SSD below. We can see the double patch achieved by double-model training achieves consistent and impressive improvements on both SSD and Faster R-CNN. However, the single Faster R-CNN patch does not work well on SSD and vice versa. This means the single model Faster R-CNN and SSD patch do not transfer between each other.

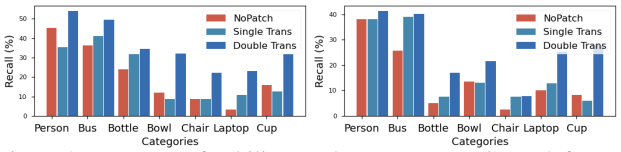
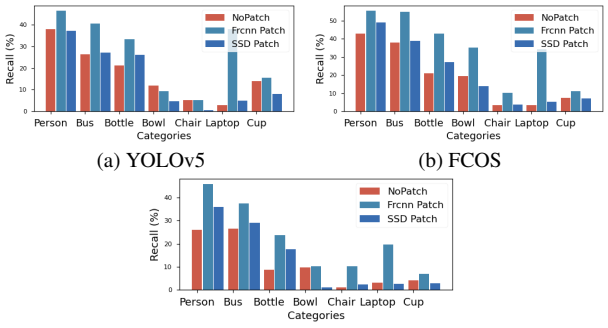


Figure 2. More transferability results on Faster R-CNN (left) and SSD (right) on single/interative (double) patches.

Considering our transferability results in the main paper, we can conclude that the double model (Faster R-CNN and SSD) trained patches transfer between both the training models and unseen pretrained models.

3.2. Single-model Transferability on More Models

We also provide high-confidence recall results for applying single Faster R-CNN and SSD patches on the three unseen models: Yolov5, RetinaNet, and FCOS in Figure 3. Across all the results we see that the Faster R-CNN patches consistently improve the corrupted recall on all three detectors. Even the margins are not very large. In comparison, the SSD patches transfer much worse. However, consider the Faster R-CNN patch does not transfer well on SSD in Figure 2. We conclude that single-model transferability is difficult to achieve in our setting.



(a) YOLOv5 (b) FCOS

(c) RetinaNet

Figure 3. Single-model patch transferability on three pretrained models. We show the high confidence recall in each category.

4. More Results on Corruption-aware Patches

4.1. Category-wise mAP and mAR Results

Category	Avg. Precision, IoU: 0.5:0.95	0.5	0.75	Avg. Precision, Area S	M	L	Avg. Recall, #Dets: 1	10	100	Avg. Recall, Area: S	M	L
Cup	3.9	8.0	6.1	0.2	5.4	5.0	3.8	16.2	25.6	5.3	23.0	43.4
	4.3	**9.1**	**6.6**	**2.9**	**5.7**	4.8	2.8	**21.9**	**31.9**	**5.8**	**30.2**	**50.1**
Person	28.3	53.1	55.4	4.2	19.0	38.0	20.7	38.3	46.4	18.5	35.9	59.4
	36.2	**67.6**	**63.8**	**7.5**	**24.5**	**46.2**	**25.0**	**44.8**	**49.0**	**19.5**	**39.6**	**61.4**
Bus	34.5	48.4	52.0	0.0	3.6	59.2	27.9	40.6	45.2	8.0	29.4	53.1
	37.3	**52.4**	**54.3**	**0.2**	**4.7**	55.8	**35.3**	**49.2**	**55.3**	**14.0**	**38.0**	**64.0**
Bottle	4.0	9.0	6.3	1.3	6.7	3.8	2.5	17.4	27.1	14.4	25.5	42.2
	7.4	**16.7**	**12.6**	**2.1**	**11.0**	**6.7**	**7.3**	**30.5**	**39.5**	**19.1**	**40.5**	**53.0**
Bowl	12.8	19.8	18.1	0.1	3.5	19.6	10.1	25.4	35.0	1.6	22.8	56.1
	18.7	**28.3**	**29.0**	**1.0**	**8.5**	**26.1**	**11.9**	**30.4**	**35.9**	**2.9**	**25.6**	**56.2**
Laptop	16.5	30.1	26.7	0.0	4.2	25.6	7.5	17.8	21.7	0.0	11.6	29.2
	20.4	**30.3**	**35.4**	0.0	**6.9**	22.6	**13.7**	**30.0**	**38.0**	**2.6**	**20.6**	**50.6**
Chair	2.2	5.3	2.4	1.6	1.7	3.2	2.5	78.1	19.7	5.5	17.0	30.6
	4.4	**10.5**	**6.2**	0.1	**2.7**	**8.5**	**6.0**	**16.9**	**25.1**	3.5	**19.8**	**43.9**

Table 1. AP and AR results for corruption-aware SSD patches on COCO dataset. For each category, the first rows are the results of corrupted original images, the second rows are the results of corrupted patched images.

Category	Avg. Precision, IoU: 0.5:0.95	0.5	0.75	Avg. Precision, Area S	M	L	Avg. Recall, #Dets: 1	10	100	Avg. Recall, Area: S	M	L
Cup	12.8	19.3	16.8	0.4	12.8	19.4	8.2	22.7	27.6	3.0	27.4	40.0
	13.8	**25.6**	**19.5**	**1.8**	**15.0**	**20.4**	**9.1**	**27.8**	**34.0**	**5.5**	**32.9**	**50.1**
Person	33.4	58.6	54.5	1.9	29.0	45.8	17.7	38.1	40.9	5.0	30.7	49.6
	39.5	**69.4**	**62.3**	**12.1**	**30.1**	**49.1**	**24.4**	**47.3**	**49.6**	**21.4**	**37.2**	**59.2**
Bus	17.5	27.1	25.7	0.0	3.7	58.0	18.2	42.0	44.9	0.0	20.7	53.9
	26.4	**41.8**	**39.8**	**0.2**	**6.0**	**61.1**	**31.7**	**55.9**	**58.0**	**27.5**	**34.8**	**66.4**
Bottle	10.4	20.8	22.3	2.1	13.1	17.7	7.0	19.6	22.7	4.2	20.7	40.6
	21.1	**37.4**	**36.7**	0.6	**23.1**	**24.8**	**16.2**	**34.7**	**38.1**	**5.6**	**39.1**	**55.7**
Bowl	9.9	15.9	13.5	0.0	8.6	20.3	6.8	24.8	29.7	0.0	22.9	42.5
	14.9	**25.5**	**21.7**	**0.6**	**12.1**	**27.2**	**9.3**	**30.8**	**36.3**	**1.4**	**26.9**	**52.5**
Laptop	9.8	18.7	17.3	0.0	15.1	19.9	2.7	11.3	13.8	0.0	5.7	18.5
	25.3	**48.0**	**38.0**	**0.3**	11.7	**43.0**	**23.0**	**42.6**	**45.5**	**5.6**	**30.5**	**54.8**
Chair	4.3	9.4	4.9	0.1	4.1	6.3	1.7	6.6	9.2	2.2	7.1	15.7
	13.0	**31.6**	**20.5**	0.1	**10.9**	**20.7**	**9.8**	**22.2**	**26.0**	**2.4**	**22.5**	**41.3**

Table 2. AP and AR results for corruption-aware Faster R-CNN patches on COCO dataset. For each category, the first rows are the results of corrupted original images, the second rows are the results of corrupted patched images.

4.2. Visualization

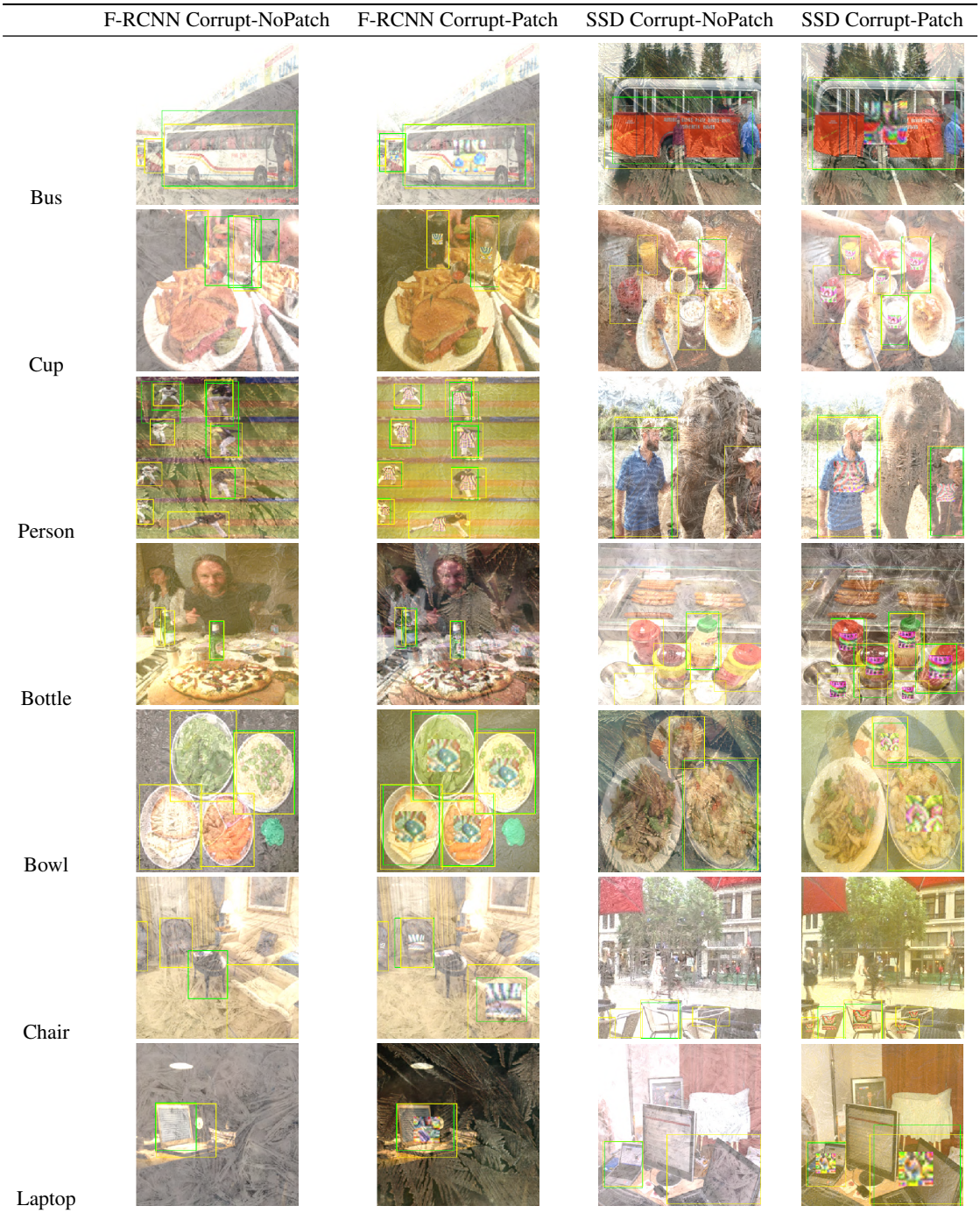


Table 3. Sampled corruption-aware patch performance on COCO dataset. In each image, the yellow boxes are the ground truth boxes, and the green boxes are the detected boxes.

5. More Results on Corruption-agnostic Patches

5.1. Category-wise mAP and mAR Results - Faster R-CNN

	Category	Avg. Precision, IoU: 0.5:0.95	0.5	0.75	Avg. Precision, Area S	M	L	Avg. Recall, #Dets: 1	10	100	Avg. Recall, Area: S	M	L
Bottle	Frost	13.0	25.8	19.8	0.0	12.1	22.9	4.6	19.3	19.3	0.0	14.2	36.6
		16.6	**35.9**	**31.9**	**0.0**	21.6	**26.7**	**7.3**	**28.6**	**33.7**	**0.0**	**21.2**	**38.1**
	Fog	24.4	38.7	35.1	10.3	22.4	29.0	10.6	32.7	33.5	3.2	35.3	52.6
		20.1	**44.7**	**40.0**	**1.9**	**27.3**	**38.0**	**14.3**	**37.4**	**38.0**	**1.29**	**40.0**	**61.30**
	Contrast	25.2	36.5	36.2	7.1	26.6	30.2	11.3	30.5	31.2	3.4	33.2	47.1
		25.9	**43.1**	**40.6**	1.7	**27.8**	**32.9**	**14.4**	**37.9**	**38.0**	1.5	**39.8**	**61.56**
	Brightness	20.7	34.4	29.6	5.2	24.6	24.0	12.6	39.2	41.0	3.2	43.8	62.7
		25.2	**39.3**	**31.6**	2.2	**26.7**	**30.2**	**15.9**	**41.8**	**43.0**	1.29	**45.4**	**69.5**
Bus	Frost	19.7	28.5	27.2	0.5	4.3	51.9	17.4	39.6	43.1	10.0	16.1	53.1
		19.8	26.8	25.9	**1.1**	**6.1**	**52.6**	**21.2**	**47.0**	**53.8**	**30.0**	**26.6**	**63.7**
	Fog	29.8	39.3	40.2	0.2	4.3	60.5	30.0	53.8	60.12	18.3	27.2	72.5
		38.6	**51.1**	**51.9**	**0.3**	**6.9**	**65.6**	**38.2**	**64.3**	**67.7**	**31.7**	**41.4**	**77.7**
	Contrast	28.9	40.5	41.1	0.2	3.9	61.4	30.7	54.6	60.7	21.7	26.1	73.6
		38.6	**49.0**	**53.9**	**0.2**	**6.6**	**64.3**	**38.5**	**63.4**	**67.4**	**38.3**	**40.6**	**77.2**
	Brightness	38.0	48.5	48.6	0.2	6.3	67.1	35.9	65.1	69.8	35.0	45.2	79.2
		45.6	**57.2**	**60.0**	**0.4**	**8.5**	**69.6**	**42.6**	**67.9**	**71.9**	**36.7**	**46.9**	**81.4**
Person	Frost	26.2	54.4	44.8	2.2	20.4	40.5	14.0	35.0	39.5	7.0	25.6	49.0
		33.5	**66.6**	**46.7**	**10.4**	**11.8**	**45.4**	**19.5**	**39.4**	**43.8**	7.0	**27.3**	**55.2**
	Fog	36.2	63.1	51.7	2.5	16.5	55.5	22.2	49.4	55.4	2.0	39.8	66.8
		44.1	**90.0**	**65.1**	**2.0**	**18.2**	**61.4**	**26.0**	**53.9**	**58.4**	**13.0**	**40.4**	**70.9**
	Contrast	39.8	66.7	61.2	2.7	18.0	57.0	23.0	4.84	54.9	8.0	38.9	66.2
		46.0	**71.7**	**68.0**	**1.7**	**20.2**	**62.2**	**26.6**	**64.5**	**58.0**	**20.0**	**38.8**	**70.9**
	Brightness	41.8	65.9	60.2	1.1	19.3	61.2	24.4	55.9	60.9	25.0	45.5	71.5
		46.7	**66.3**	**70.6**	**2.0**	**19.6**	**65.1**	**28.7**	**57.7**	**61.5**	**18.0**	**44.5**	**73.3**
Cup	Frost	16.2	24.4	22.8	2.2	16.4	20.5	14.0	25.0	29.5	7.0	25.6	44.0
		17.5	**26.6**	**24.7**	**8.4**	11.8	**25.4**	**19.5**	**29.4**	**33.8**	7.0	**27.3**	**55.2**
	Fog	36.2	63.1	51.7	2.5	16.5	55.5	22.2	49.4	55.4	2.0	39.8	66.8
		44.1	**69.0**	**65.1**	2.0	**18.2**	**61.4**	**26.0**	**53.9**	**58.4**	**13.0**	**40.4**	**70.9**
	Contrast	39.8	66.7	61.2	2.7	18.0	57.0	23.0	48.4	54.9	8.0	38.9	66.2
		46.0	**71.7**	**68.0**	1.7	**20.2**	**62.2**	**26.6**	**54.5**	**58.0**	**20.0**	38.8	**70.9**
	Brightness	41.8	65.9	60.2	1.1	19.3	61.2	24.4	55.9	60.9	25.0	45.5	71.5
		46.7	**66.3**	**70.6**	**2.0**	**19.6**	**65.1**	**28.7**	**57.7**	**61.5**	18.0	44.5	**73.3**
Bowl	Frost	7.9	13.8	11.1	2.1	2.6	19.5	5.5	25.4	31.8	12.9	21.8	42.9
		10.0	**23.6**	**20.3**	**0.3**	**9.7**	**24.8**	**11.9**	**31.6**	**37.0**	**12.1**	**27.3**	**48.6**
	Fog	10.2	16.4	13.6	0.7	7.5	20.2	12.2	48.2	57.6	22.1	47.6	70.5
		16.1	**23.5**	**22.3**	**0.3**	**13.0**	**28.6**	**16.6**	**54.2**	**60.2**	**23.6**	**52.4**	**71.0**
	Contrast	7.8	16.1	12.7	0.3	8.1	22.2	12.2	42.8	51.9	20.0	45.6	60.7
		14.4	**23.1**	**20.7**	**0.5**	**11.9**	**27.9**	**16.8**	**49.9**	**57.1**	**22.1**	**48.3**	**68.8**
	Brightness	9.7	14.5	12.6	0.3	8.1	21.2	11.9	52.4	62.4	32.1	55.5	71.6
		19.6	**29.4**	**25.4**	**0.5**	**15.5**	**33.1**	**20.8**	**56.5**	**63.6**	**32.1**	**57.3**	**72.6**
Laptop	Frost	12.9	15.7	16.1	0.0	12.8	25.5	2.4	9.7	10.8	0.0	6.8	15.3
		14.7	**27.6**	**21.0**	**0.6**	**10.0**	**31.1**	**13.2**	**32.7**	**36.7**	**4.5**	**23.5**	**51.0**
	Fog	20.1	31.1	27.5	0.2	6.0	38.7	16.8	41.1	48.2	13.6	30.8	66.3
		31.2	**49.3**	**44.1**	0.2	**16.0**	**49.6**	**29.3**	**53.5**	**57.8**	**21.8**	**46.1**	**71.1**
	Contrast	20.3	29.6	29.3	0.4	5.9	36.0	15.3	40.0	45.2	12.7	27.4	63.5
		29.7	**47.3**	**43.8**	**0.3**	**13.2**	**49.0**	**27.4**	**54.2**	**58.0**	**16.4**	**46.1**	**71.8**
	Brightness	23.2	33.1	31.4	0.5	9.0	42.3	20.9	51.7	60.6	26.4	49.4	73.3
		31.3	**44.9**	**41.3**	0.5	**16.6**	**52.7**	**30.9**	**61.1**	**65.5**	**29.1**	**55.5**	**77.3**
Chair	Frost	4.0	11.6	4.5	1.4	4.4	5.0	2.9	9.5	12.3	6.3	10.1	18.0
		12.3	**24.3**	**20.2**	**2.6**	**15.2**	**16.8**	**8.2**	**21.2**	**26.4**	**6.3**	**24.1**	**35.7**
	Fog	6.5	12.9	7.9	0.9	5.0	13.4	6.6	32.6	40.3	20.3	34.4	55.7
		15.2	**28.1**	**21.7**	**2.8**	**17.3**	**21.6**	**14.0**	**43.1**	**48.8**	**16.3**	**43.8**	**66.2**
	Contrast	6.7	13.6	8.2	0.9	6.6	13.9	7.5	32.4	39.2	16.0	33.4	55.7
		15.7	**28.7**	**23.9**	**1.6**	**14.1**	**24.0**	**15.0**	**44.5**	**50.5**	**16.3**	**45.7**	**68.2**
	Brightness	7.6	13.5	10.4	0.8	7.3	16.7	6.1	42.5	53.4	27.0	48.9	68.3
		15.5	**26.6**	**22.5**	**1.3**	**16.9**	**23.9**	**14.9**	**47.5**	**53.5**	20.3	**49.3**	**70.11**

Table 4. Faster R-CNN corruption-agnostic AP and AR results on COCO dataset. For each corruption, the first rows are the results for the corrupted clear images, the second rows are for the corrupted patched images.

5.2. Category-wise mAP and mAR Results - SSD

	Category	Avg. Precision, IoU: 0.5:0.95	0.5	0.75	Avg. Precision, Area S	M	L	Avg. Recall, #Dets: 1	10	100	Avg. Recall, Area: S	M	L
Bottle	Frost	4.1	9.4	8.2	0.1	4.6	5.0	3.4	16.3	25.8	3.8	24.9	40.1
		4.6	**10.7**	**8.3**	**17.2**	**4.8**	**5.7**	**4.0**	**20.3**	**30.4**	**4.9**	**29.8**	**45.3**
	Fog	6.2	12.6	9.7	1.5	6.0	7.0	3.1	32.8	43.7	12.7	43.9	59.4
		6.9	**14.4**	**10.1**	**3.4**	**7.2**	**7.7**	**4.2**	**34.7**	**45.2**	**17.3**	**44.4**	**62.0**
	Contrast	6.6	13.0	9.2	9.3	7.0	7.3	3.6	33.3	44.5	12.4	45.1	59.5
		7.2	**14.4**	**10.8**	**5.4**	**8.2**	**7.6**	**4.3**	**35.4**	**44.8**	**14.7**	**46.0**	**60.0**
	Brightness	7.2	14.0	10.6	8.3	7.9	7.3	4.9	36.1	45.6	13.6	45.8	61.5
		7.3	**14.4**	**10.8**	7.9	**8.2**	**7.6**	**5.9**	**38.4**	**46.5**	**16.2**	**46.9**	**62.8**
Bus	Frost	43.8	55.4	54.8	0.1	7.2	68.1	37.2	60.6	65.4	18.9	47.9	77.4
		44.9	**55.5**	**63.7**	**0.1**	**8.0**	**68.2**	**40.3**	**63.5**	**67.7**	15.6	**53.5**	**78.2**
	Fog	42.8	54.7	59.8	0.0	3.4	62.8	33.6	52.1	58.8	18.9	36.1	73.3
		43.9	53.6	**63.7**	**0.1**	**5.9**	**66.6**	**38.2**	**58.3**	**63.7**	16.7	**47.6**	**75.1**
	Contrast	46.8	55.7	65.0	0.1	3.1	67.0	35.7	52.5	57.7	15.6	30.6	74.7
		47.5	**59.1**	**65.8**	0.1	**6.3**	**68.0**	**38.4**	**59.1**	**64.8**	13.3	**49.1**	**76.0**
	Brightness	43.8	55.4	54.8	0.1	7.2	68.1	37.2	60.6	65.4	18.9	47.9	77.4
		44.9	**55.5**	**63.7**	0.1	**8.0**	**68.2**	**40.3**	**63.5**	**67.7**	15.6	**53.5**	**78.2**
Person	Frost	41.1	63.1	65.0	20.9	20.9	57.5	24.9	56.6	62.2	38.6	53.2	73.7
		43.2	**65.3**	**69.1**	**26.2**	**22.1**	**59.1**	**26.8**	**56.8**	**62.6**	**40.2**	51.9	**73.9**
	Fog	41.8	65.8	63.6	21.5	22.8	55.5	25.1	53.1	58.8	35.7	49.5	70.4
		43.7	64.7	**66.9**	**22.3**	**23.7**	**57.4**	**26.5**	**53.6**	**59.5**	31.6	**50.3**	**72.2**
	Contrast	39.9	67.0	62.5	17.2	24.0	56.4	25.3	53.7	59.5	35.1	51.1	70.9
		44.2	**66.9**	**62.8**	**25.7**	23.8	**58.9**	**26.9**	**64.8**	**60.3**	**33.8**	51.0	**73.0**
	Brightness	41.1	63.1	65.0	20.9	20.9	57.5	24.9	56.6	62.2	38.6	53.2	73.7
		43.2	**65.3**	**69.1**	**26.2**	**22.1**	**59.1**	**26.8**	**57.8**	**63.0**	33.2	**54.9**	**74.9**
Cup	Frost	4.9	8.2	9.2	6.6	4.0	7.3	3.6	17.5	25.8	6.9	21.3	50.3
		8.1	**16.0**	**10.3**	**7.6**	**14.3**	**8.4**	**7.4**	**34.7**	**50.4**	**38.9**	**51.9**	**54.2**
	Fog	8.5	13.9	13.2	1.9	10.2	10.9	7.3	40.7	53.1	30.4	52.0	77.6
		11.3	**19.9**	**16.1**	**5.0**	**16.9**	10.6	**7.8**	**51.9**	**62.8**	**50.0**	**62.3**	**78.6**
	Contrast	8.2	13.5	12.5	1.8	9.8	10.6	7.0	39.5	52.5	21.3	52.0	74.6
		11.3	**19.6**	**16.0**	**5.8**	**16.2**	10.6	**7.1**	**51.8**	**62.9**	**48.1**	**63.3**	73.0
	Brightness	9.3	14.2	13.5	3.1	9.3	13.3	8.2	41.4	56.2	24.3	55.6	79.2
		11.6	**20.9**	**18.5**	**6.4**	**16.5**	**14.4**	**11.6**	**50.7**	**62.6**	**49.8**	**62.4**	78.8
Bowl	Frost	7.8	14.1	10.3	7.4	3.3	12.6	6.2	24.7	32.2	8.1	23.0	51.8
		8.2	**14.2**	**11.1**	**8.1**	**6.4**	**13.3**	**7.1**	**28.3**	**42.2**	**19.0**	**43.7**	**50.5**
	Fog	11.2	18.0	17.0	3.5	6.6	17.4	11.3	43.8	56.0	19.5	52.3	75.3
		13.9	**24.4**	**19.1**	**8.2**	**13.6**	16.5	**11.4**	**50.6**	**59.0**	**34.5**	**59.6**	**69.0**
	Contrast	12.0	18.5	18.4	5.9	6.1	18.1	11.2	42.0	54.2	18.8	47.8	75.7
		13.0	**24.1**	17.8	**8.4**	**12.6**	**18.7**	**11.8**	**49.6**	**57.6**	**32.4**	**57.9**	**77.9**
	Brightness	11.2	16.2	16.9	5.2	5.7	18.5	12.0	44.5	57.4	20.3	55.6	75.0
		12.4	**21.5**	**18.1**	**7.7**	**10.9**	**18.2**	11.4	**49.1**	**58.7**	**31.0**	**57.3**	**78.2**
Laptop	Frost	13.7	23.1	22.1	0.0	0.7	20.3	6.4	12.0	16.8	0.0	5.5	24.2
		14.3	23.1	**22.4**	0.0	**4.5**	**22.7**	**10.9**	**26.4**	**33.2**	**5.6**	**21.1**	**41.7**
	Fog	25.5	34.9	37.3	0.0	4.7	35.1	25.0	50.4	55.7	6.7	34.7	70.5
		29.6	**38.3**	**38.5**	**0.6**	**7.0**	**40.2**	**27.9**	**54.2**	**58.0**	**13.3**	**39.1**	**71.3**
	Contrast	27.7	37.8	39.0	0.0	5.0	36.8	26.7	51.7	55.9	8.9	32.1	72.2
		30.0	**41.9**	**43.0**	**0.3**	**7.3**	**40.4**	**27.9**	**54.1**	**57.8**	**13.3**	**38.2**	**72.5**
	Brightness	25.7	33.3	37.6	0.1	6.5	35.7	24.3	55.5	58.0	7.8	36.6	73.2
		28.7	**37.9**	**39.8**	**1.1**	**6.1**	**41.7**	**27.7**	**58.2**	**61.3**	**10.0**	**45.9**	**73.1**
Chair	Frost	2.4	5.0	3.7	0.2	2.1	2.9	2.3	11.1	20.2	4.6	16.5	30.8
		3.7	**9.3**	**6.6**	**0.7**	**3.4**	**5.0**	**6.2**	**17.8**	**28.7**	**6.4**	**25.5**	**39.8**
	Fog	4.5	8.8	7.5	0.7	3.5	8.3	5.5	28.7	40.7	6.4	34.9	59.7
		8.7	**17.3**	**14.6**	0.1	**7.4**	**12.7**	**8.9**	**37.2**	**46.3**	3.9	**42.1**	**64.1**
	Contrast	5.0	10.2	8.8	0.1	3.6	8.9	6.0	31.1	42.4	5.4	36.9	61.3
		9.1	**18.0**	**14.6**	**0.3**	**7.7**	**13.3**	**8.3**	**38.2**	**47.3**	**8.6**	**42.6**	**65.2**
	Brightness	6.5	12.0	10.1	0.1	4.7	11.2	5.2	37.8	48.8	7.5	43.5	68.6
		9.2	**17.9**	**13.2**	0.5	**7.5**	**13.5**	**8.7**	**39.6**	**50.1**	**10.7**	**46.0**	67.2

Table 5. SSD corruption-agnostic AP and AR results on COCO dataset. For each corruption, the first rows are the results for the corrupted clear images, the second rows are for the corrupted patched images.

5.3. Visualization

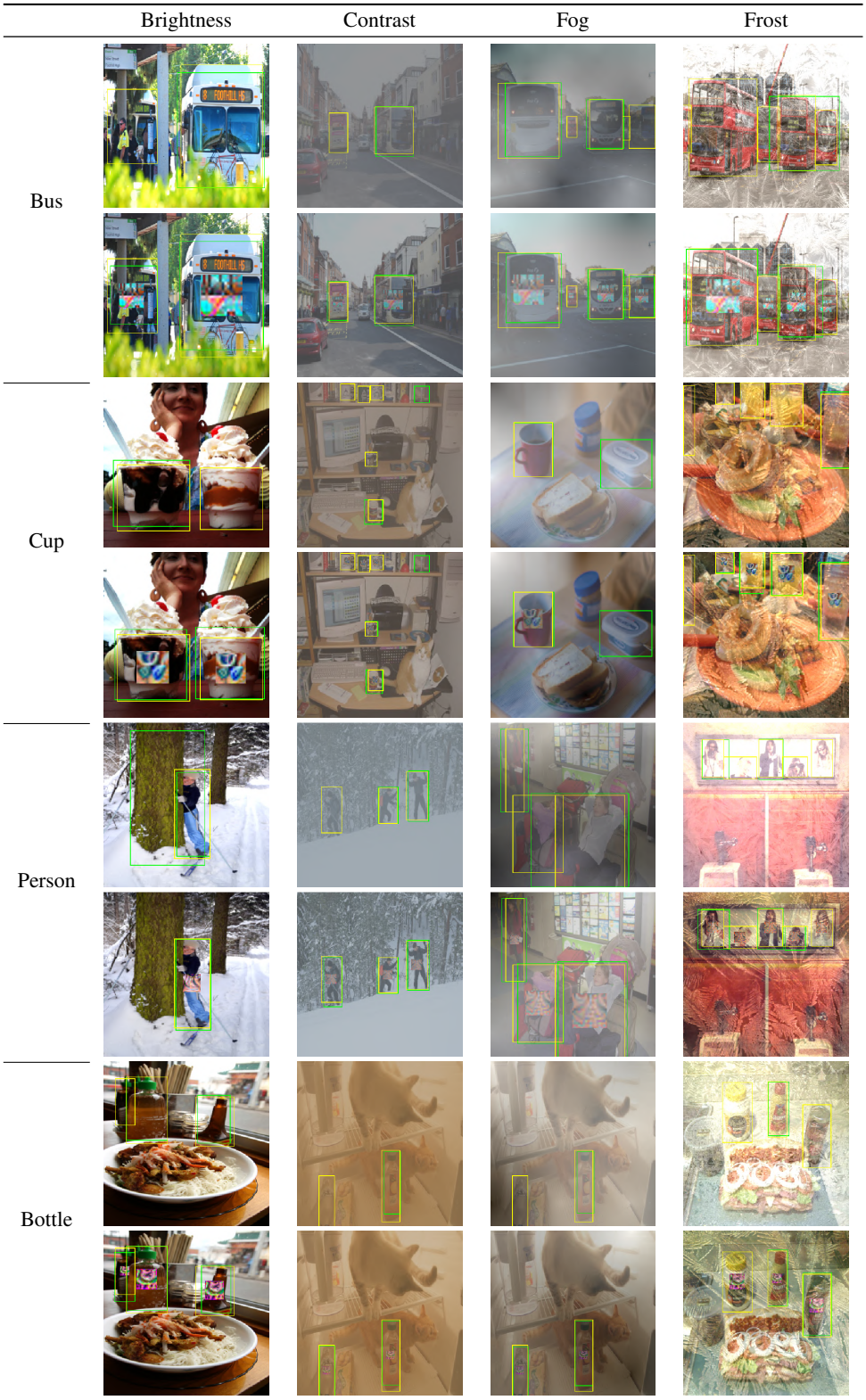


Table 6. Sampled corruption-agnostic patch performance on COCO dataset. In each image, the yellow boxes are the ground truth boxes, and the green boxes are the detected boxes.

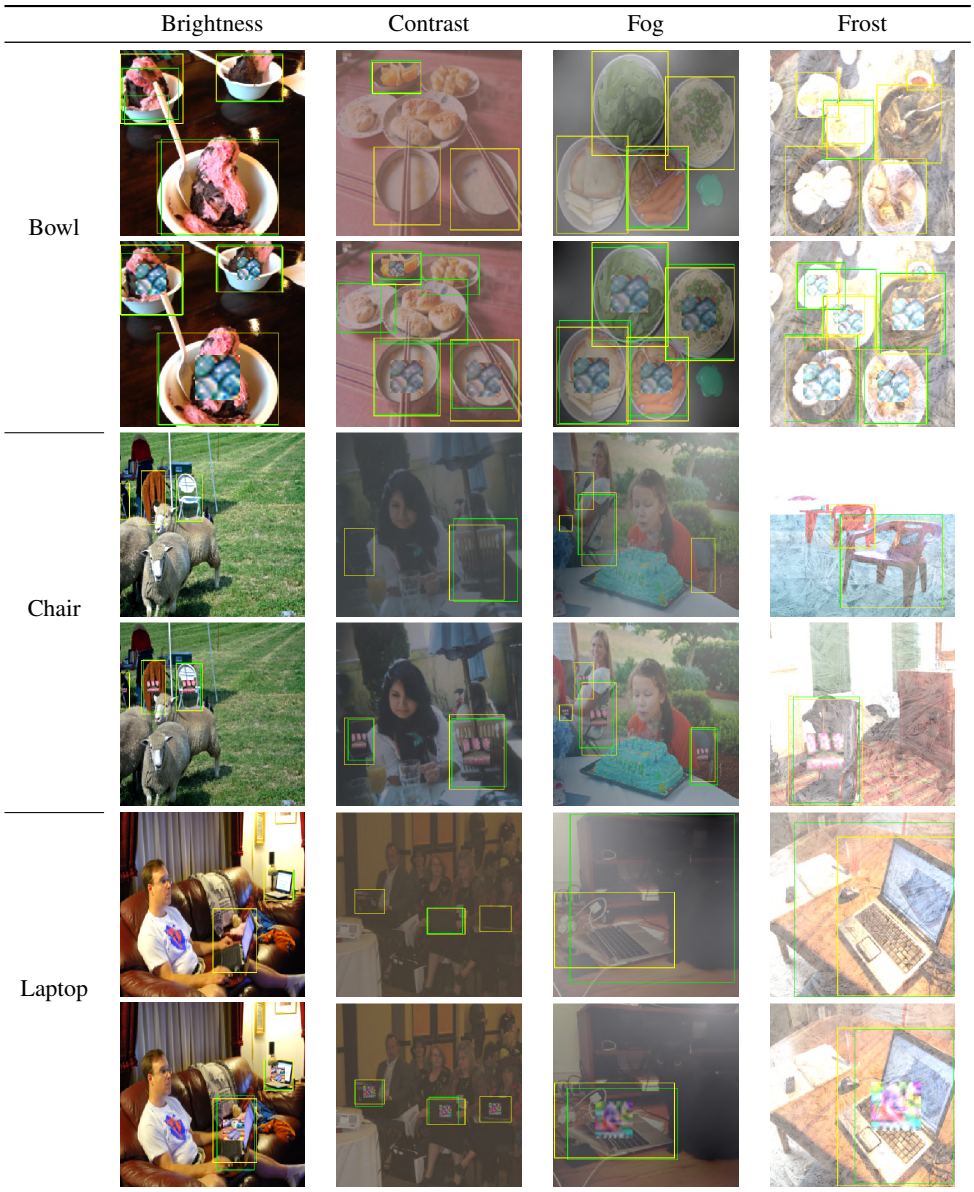


Table 7. Sampled corruption-agnostic patch performance on COCO dataset. In each image, the yellow boxes are the ground truth boxes, and the green boxes are the detected boxes.

6. More Results on Spatial Transformations

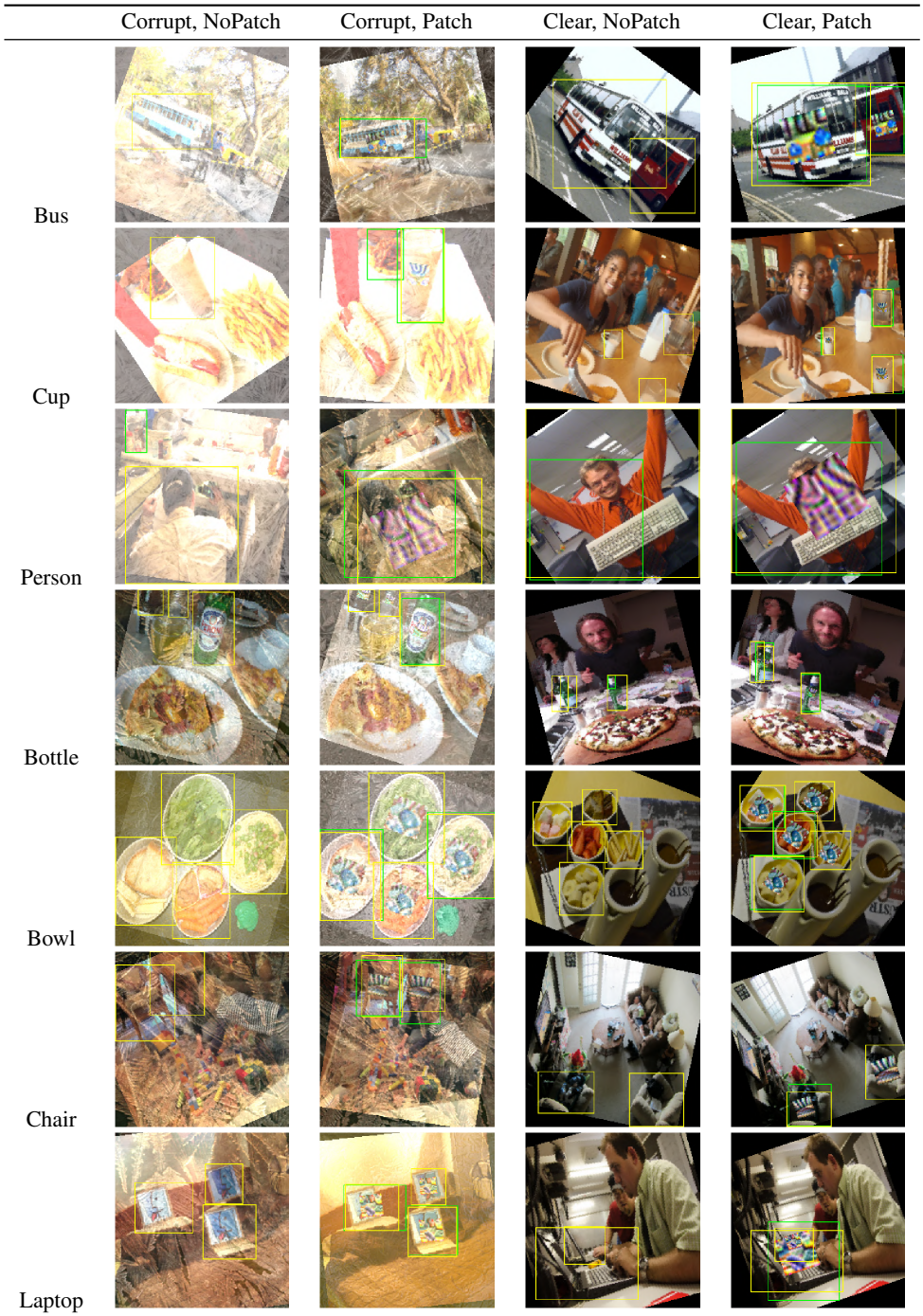


Table 8. Sampled spatial transformed image w/w.o patch tested with corruptions in COCO dataset. In each image, the yellow lines are the ground truth boxes, and the green lines are the detected boxes.

7. More Real-world Results

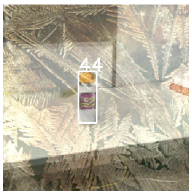
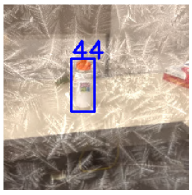
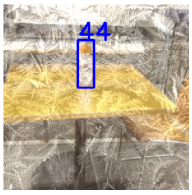
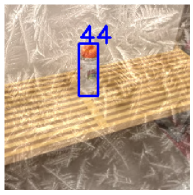
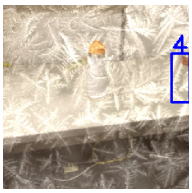
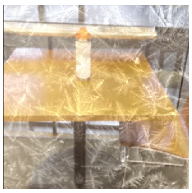
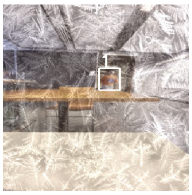
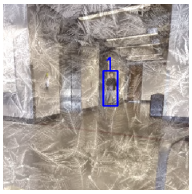
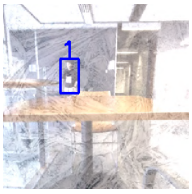
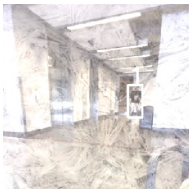
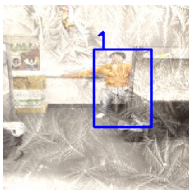
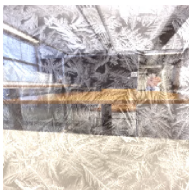
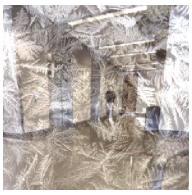
	Patch	Env01	Env02	Env03	Env04
Bottle	Faster R-CNN				
	SSD				
	No Patch				
Person	Faster R-CNN				
	SSD				
	No-Patch				

Table 9. Real-world results for corruption-aware patches under/without corruption.

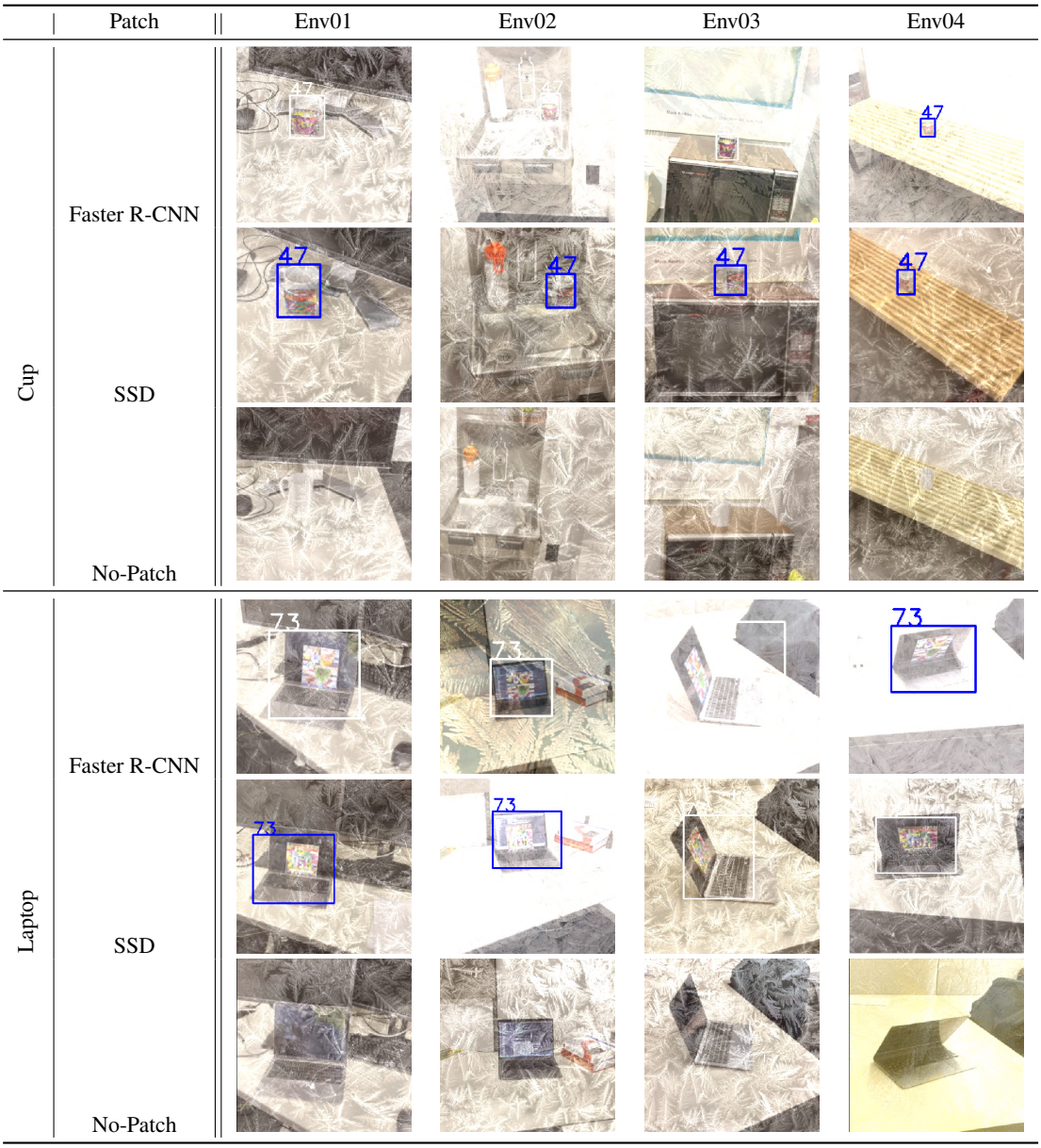


Table 10. Real-world results for corruption-aware patches under/without corruption.