[RE-Supplementary] CNN-generated images are surprisingly easy to spot... for now

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1 Training on different subsets of ProGAN without augmentations.

We report the average precision over 11 different CNN generators for both training configurations. Chance is 50% and the best possible results is 100%. Note that the classifiers are trained on ProGAN and thus we display the results in gray. The mean Average Precision (mAP) is obtained by taking the mean of the individual APs.

Setting	Result	ProGAN	StyleGAN	BigGAN	CycleGAN	StarGAN	GauGAN	CRN	IMLE	SITD	SAN	DeepFake	**mAP**
2-class	Blur + JPEG (0.5)	99.3	81.0	71.8	88.4	83.5	89.7	98.8	99.5	82.0	72.3	61.5	84.3
	No Aug.	99.9	94.4	78.9	82.1	99.9	76.7	94.9	92.2	96.0	83.9	95.5	90.4
4-class	Blur + JPEG (0.5)	99.8	90.6	79.7	92.5	91.2	93.5	98.1	98.7	95.0	74.6	75.7	90.0
	No Aug.	100.0	97.0	77.0	81.9	100.0	73.5	98.0	95.4	96.8	84.9	97.6	91.2
8-class	Blur + JPEG (0.5)	100.0	96.7	81.8	92.7	92.6	95.0	98.2	99.3	85.7	69.8	77.9	90.0
	No Aug.	99.99	96.3	75.7	89.2	100.0	75.2	96.2	94.8	96.4	91.61	97.4	92.1
16-class	Blur + JPEG (0.5)	100.0	98.5	87.0	94.5	95.0	96.8	99.2	99.3	84.5	77.9	76.8	91.8
	No Aug.	100.0	97.6	74.7	81.1	100.0	67.8	96.4	93.6	98.3	89.9	97.9	90.7
20-class	Blur + JPEG (0.5)	100.0	99.4	88.8	94.1	96.7	96.2	98.5	99.1	92.9	72.3	93.7	93.8
	No Aug.	100.0	96.8	73.5	81.9	100.0	68.2	95.1	88.8	97.1	87.2	98.4	89.7

2 Using StyleGAN2 to generate the training data set.

We compare the AP and mAP of multiple ResNet50 classifier when trained on data generated from both ProGAN and StyleGAN. We include a new test data set based on multiple StyleGAN2 instances. When the score is computed over samples from generators on which the classifier was trained on, we highlight them in gray. Chance is 50%, best possible result is 100%.

Augmentations	Training Set	ProGAN	StyleGAN	StyleGAN2	BigGAN	CycleGAN	StarGAN	GauGAN	CRN	IMLE	SITD	SAN	DeepFake	**mAP**
No Aug.	ProGAN	99.1	93.4	87.6	75.3	82.8	99.8	81.8	93.7	88.2	91.2	70.3	84.6	86.4
	StyleGAN2	98.5	97.1	100.0	64.9	61.8	100.0	68.5	86.8	87.9	52.4	40.9	59.1	76.2
Blur	ProGAN	99.9	94.5	97.1	76.6	80.6	100.0	68.3	84.2	75.0	95.6	67.0	97.5	85.8
	StyleGAN2	99.2	93.9	99.9	65.7	60.4	100.0	65.4	83.6	79.1	84.2	48.9	92.0	80.6
JPEG	ProGAN	99.2	92.3	86.3	80.0	89.2	92.3	94.7	95.2	95.3	89.0	62.6	72.2	87.4
	StyleGAN2	92.3	96.3	99.4	67.5	55.3	67.7	77.1	91.3	91.7	74.0	41.7	38.9	74.5
Blur + JPEG (0.5)	ProGAN	99.1	92.8	87.1	79.3	89.1	91.1	93.1	95.7	97.6	87.0	60.9	78.7	87.6
	StyleGAN2	91.9	95.7	99.1	67.6	57.0	64.8	77.7	84.8	81.7	88.5	46.3	40.2	74.2
Blur + JPEG (0.1)	ProGAN	99.6	93.7	89.2	79.0	88.1	92.7	91.8	95.8	94.6	93.0	67.7	76.2	88.3
	StyleGAN2	96.1	97.8	99.6	65.7	57.0	73.3	70.0	92.3	92.8	68.8	42.6	44.1	74.6

3 Multiple runs for the corrected version of the Blur + JPEG augmentation

Comparison of multiple runs when training a classifier from scratch with the corrected Blur + JPEG augmentation. We observe a high fluctuation in the SITD, SAN, and, DeepFake data set.

Augmentations	ProGAN	StyleGAN2	BigGAN	CycleGAN	StarGAN	GauGAN	CRN	IMLE	SITD	SAN	DeepFake	**mAP**
Run 1	100.0	99.1	88.8	94.8	94.5	97.5	99.3	99.4	84.8	74.1	73.0	91.4
Run 2	100.0	99.1	89.5	95.1	93.9	98.0	99.1	99.4	90.7	72.6	72.4	91.8
Run 3	100.0	99.2	88.9	94.7	95.9	97.3	99.5	99.5	85.9	78.3	76.1	92.3
Mean ± std.	100.0 ± 0.0	99.1 ± 0.1	89.1 ± 0.4	94.9 ± 0.2	94.8 ± 1.0	94.8 ± 0.4	99.3 ± 0.3	99.4 ± 0.1	87.1 ± 3.1	75.0 ± 3.0	73.8 ± 2.0	91.8 ± 0.5

4 Comparing if data augmentations transfer across models.

We compare the AP and mAP across different classifiers which are trained on the 8-class data set. We can observe the general trend that data augmentations help classifier generalize. However, there are notable exceptions for both VGG (StarGAN/SAN/DeepFake) and the DCT-ResNet (BigGAN/CycleGAN/StarGAN/GauGAN/SAN).
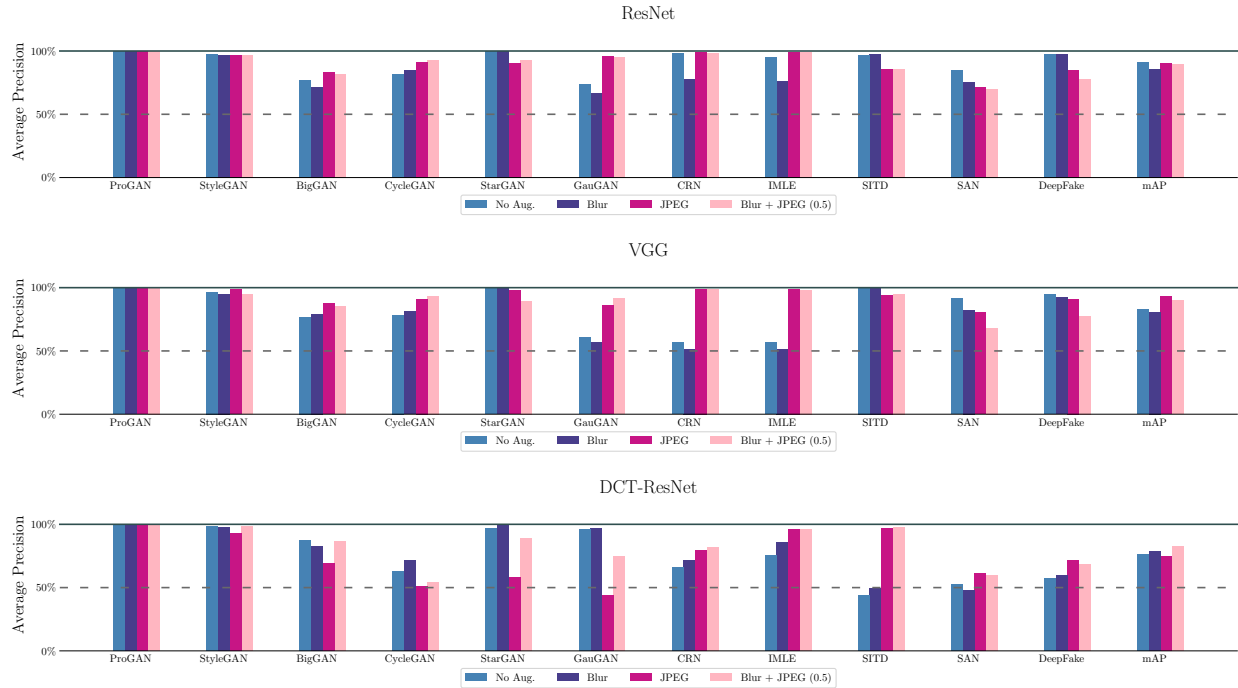

Figure 1: **Different classifier trained with data augmentations.** The data augmentations seem to transfer to other classifiers and, in some instances, are the key to generalization. These experiments were conducted on eight classes from the training data set. Best viewed in color.