Frequency-aware Discriminative Feature Learning Supervised by Single-Center Loss for Face Forgery Detection
(Supplementary Material)

Jiaming Li[1]   Hongtao Xie[1]   Jiahong Li[2]   Zhongyuan Wang[2]   Yongdong Zhang[1]
[1]University of Science and Technology of China   [2]Kuaishou Technology

ljmd@mail.ustc.edu.cn   {htxie,zhyd73}@ustc.edu.cn   {lijiahong,wangzhongyuan}@kuaishou.com

1 Implementation detail

The SGD optimizer with the momentum of 0.9 and weight decay of 1e-3 is used for optimization. We adjust the learning rate, whose base is set as 0.001 by employing Cosine[2] learning rate scheduler. As for the update of the center point, we use a similar setup of model training, except that the learning rate is fixed as the reciprocal of λ and the gradient is clipped by 0.01. The batch size is set as 64 and the whole framework is trained for 36 epochs. In order to ensure the consistency of experimental results, we manually set the random seed of PyTorch as 0.

2 Additional experiments

Methods	c0			c23			c40		
	Acc	AUC	$pAUC_{0.1}$	Acc	AUC	$pAUC_{0.1}$	Acc	AUC	$pAUC_{0.1}$
Xception [1]†	98.14%	0.9969	0.9949	94.24%	0.9718	0.9031	86.14%	0.8607	0.6515
FDFL(our)	**99.43%**	**0.9973**	**0.9977**	**96.69%**	**0.9928**	**0.9849**	**89.00%**	**0.9239**	**0.8100**

Table 1: Precise results on the FF++ dataset with all three versions. c0 represents videos without compression, c23 represents videos with light compression, c40 represents videos with heavy compression and † represents the results of our baseline. The bold results are the best.

training dataset	test dataset (AUC)			
	Deepfakes	Face2Face	FaceSwap	NeuralTextures
Deepfakes	0.9891	0.5890	0.6687	0.6361
Face2Face	0.6755	0.9306	0.5535	0.6666
FaceSwap	0.7590	0.5464	0.9837	0.4972
NeuralTextures	0.7909	0.7421	0.5399	0.8854

Table 2: Generalization ability evaluation. The experiments are conducted on the c40 version of the FF++ dataset.

References

[1] François Chollet. Xception: Deep learning with depthwise separable convolutions. In *Proceedings of the IEEE conference on computer vision and pattern recognition*, pages 1251–1258, 2017. 1

[2] Ilya Loshchilov and Frank Hutter. Sgdr: Stochastic gradient descent with warm restarts. *arXiv preprint arXiv:1608.03983*, 2016. 1