

Multi-adversarial Discriminative Deep Domain Generalization for Face Presentation Attack Detection

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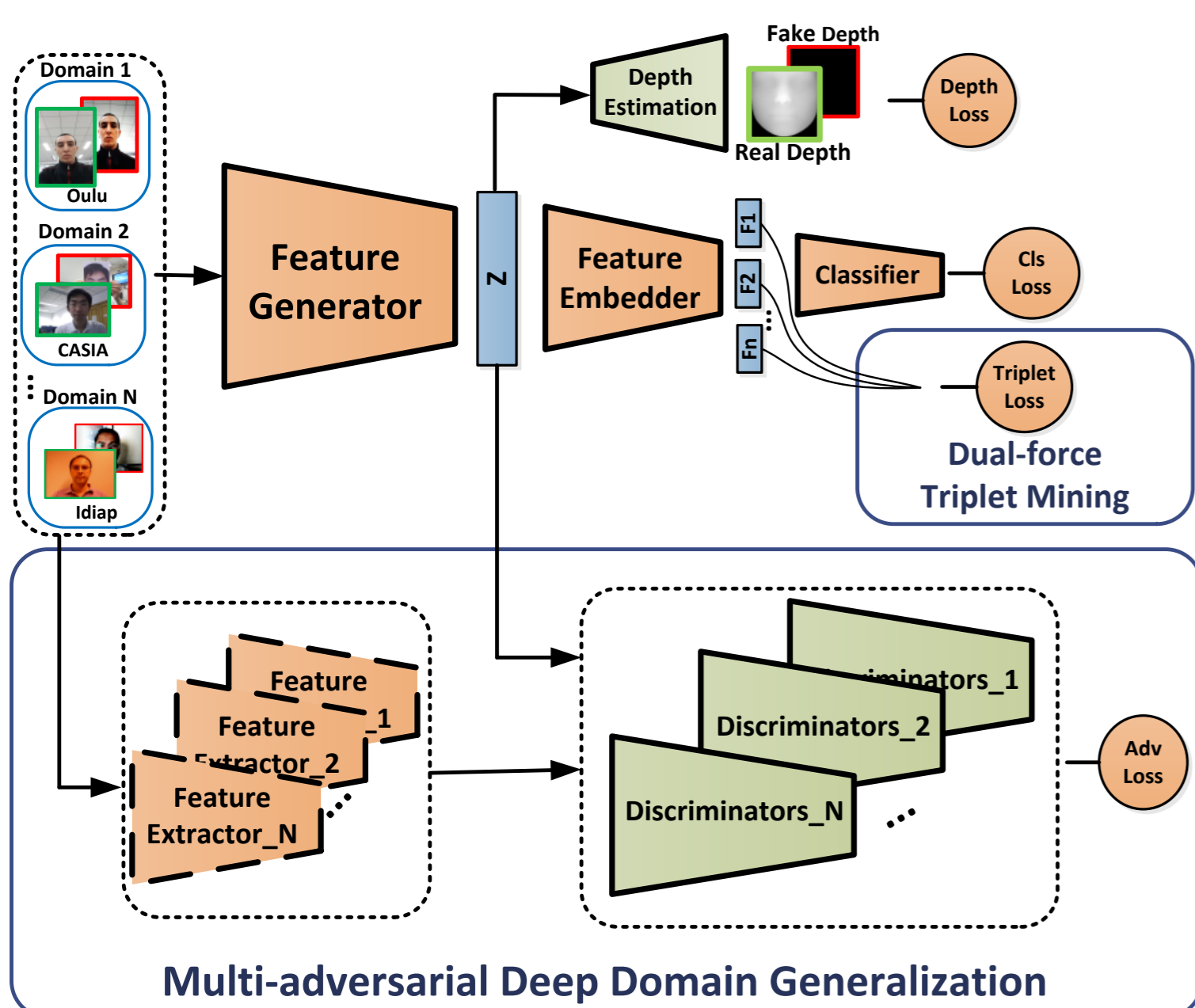
Project Period: Jan 2016 - Jun 2019

OBJECTIVES

1. This work focuses on improving the generalization ability of face anti-spoofing methods from the perspective of the domain generalization.
2. Learning a generalized feature space via a novel multi-adversarial discriminative deep domain generalization framework.

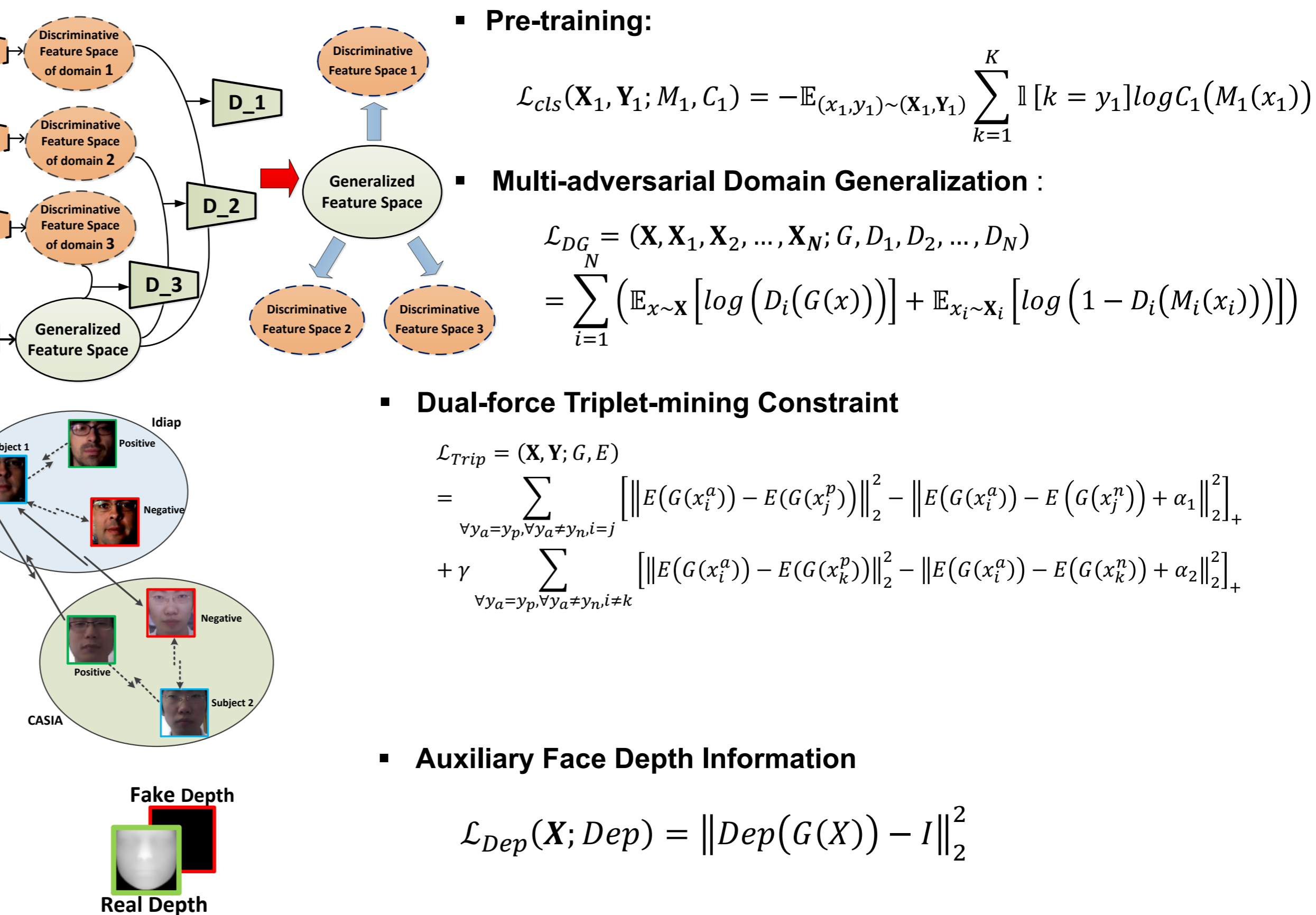
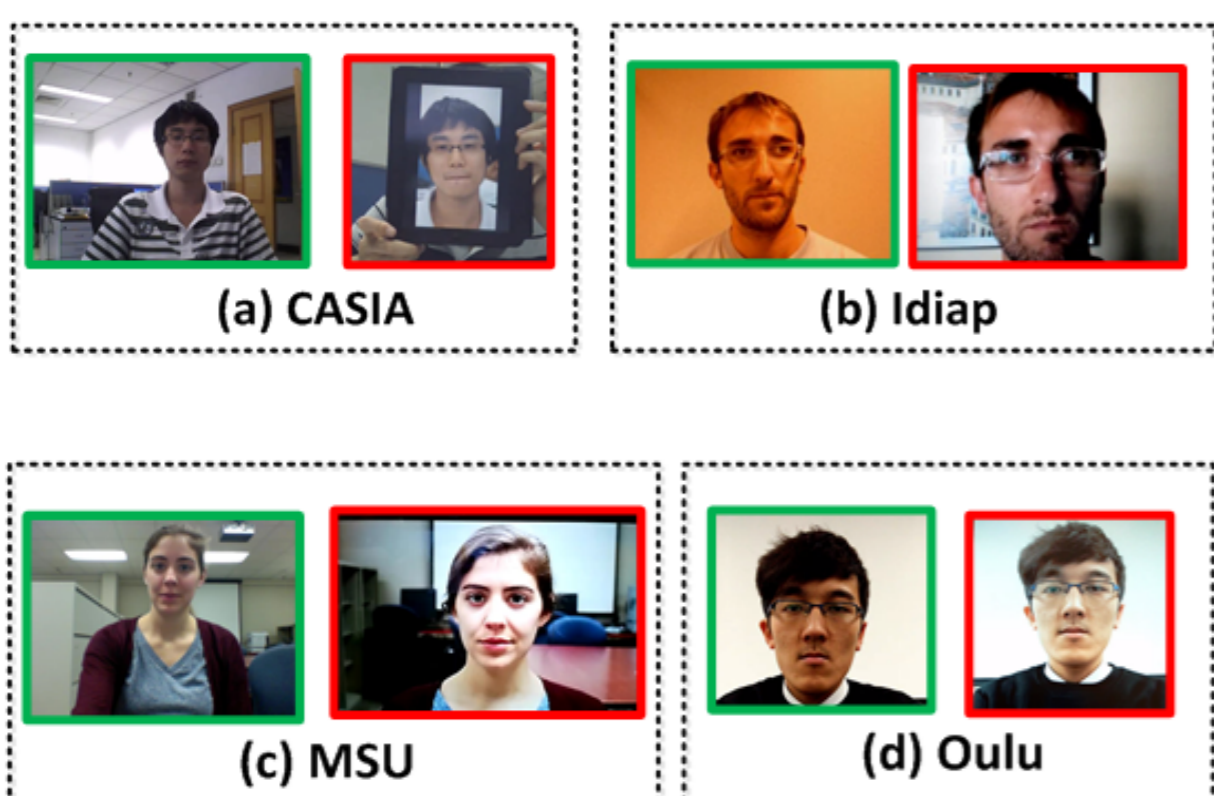
HIGHLIGHTS

Framework



$$\min_{G, E, C, Dep} \max_{D_1, D_2, \dots, D_N} \mathcal{L}_{MADDG} = \mathcal{L}_{DG} + \mathcal{L}_{Trip} + \mathcal{L}_{Dep} + \mathcal{L}_{cls}$$

Dataset



Experimental Results

Table 3. Comparison to face anti-spoofing methods on four testing sets for domain generalization on face anti-spoofing.

Method	O&C&I to M		O&M&I to C		O&C&M to I		I&C&M to O	
	HTER(%)	AUC(%)	HTER(%)	AUC(%)	HTER(%)	AUC(%)	HTER(%)	AUC(%)
MS_LBP	29.76	78.50	54.28	44.98	50.30	51.64	50.29	49.31
Binary CNN	29.25	82.87	34.88	71.94	34.47	65.88	29.61	77.54
IDA	66.67	27.86	55.17	39.05	28.35	78.25	54.20	44.59
Color Texture	28.09	78.47	30.58	76.89	40.40	62.78	63.59	32.71
LBPTOP	36.90	70.80	42.60	61.05	49.45	49.54	53.15	44.09
Auxiliary(Depth Only)	22.72	85.88	33.52	73.15	29.14	71.69	30.17	77.61
Auxiliary(All)	-	-	28.4	-	27.6	-	-	-
Ours (MADDG)	17.69	88.06	24.5	84.51	22.19	84.99	27.98	80.02

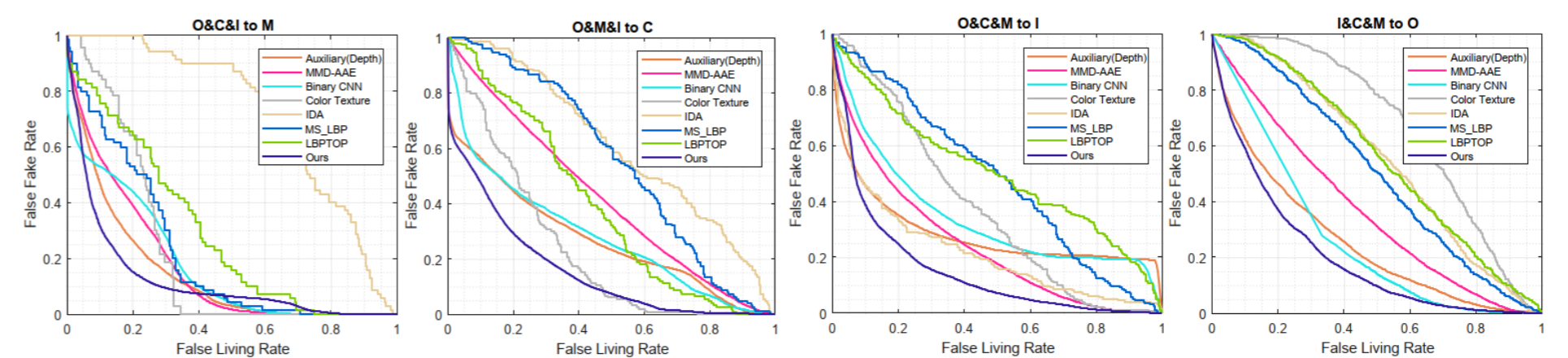


Figure 6. ROC curves of four testing sets for domain generalization on face anti-spoofing.

SELECTED PUBLICATIONS

1. Rui Shao, Xiangyan Lan, Jiawei Li, Pong C. Yuen. Multi-adversarial Discriminative Deep Domain Generalization for Face Presentation Attack Detection. In CVPR, 2019
2. Rui Shao, Xiangyan Lan, Pong C. Yuen. Joint Discriminative Learning of Deep Dynamic Textures for 3D Mask Face Anti-spoofing. In TIFS, 2019
3. Rui Shao, Xiangyan Lan, Pong C. Yuen. Deep Convolutional Dynamic Texture Learning with Adaptive Channel-discriminability for 3D Mask Face Anti-spoofing. In IJCB, 2017
4. Rui Shao, Xiangyan Lan, Pong C. Yuen. Feature Constrained by Pixel: Hierarchical Adversarial Deep Domain Adaptation. In ACM MM, 2018