



25th INTERNATIONAL CONFERENCE
ON PATTERN RECOGNITION

Milan, Italy 10 | 15 January 2021





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Robust Pedestrian Detection in Thermal Imagery Using Synthesized Images

My Kieu * , Lorenzo Berlincioni * , Leonardo Galteri,
Marco Bertini, Andrew D. Bagdanov, Alberto Del Bimbo

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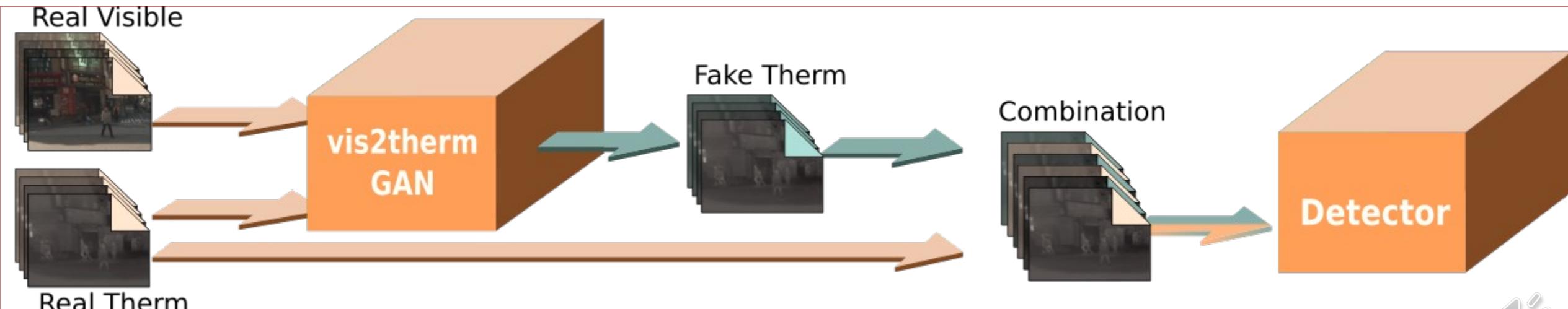
firstname.lastname@unifi.it



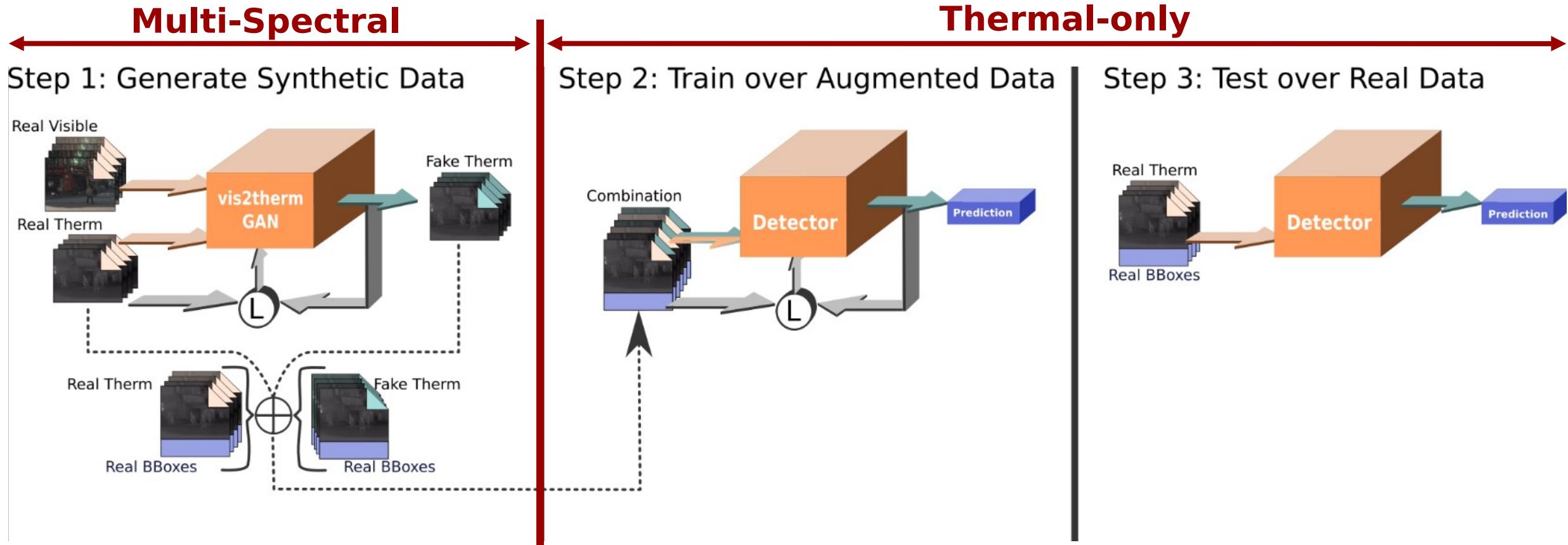
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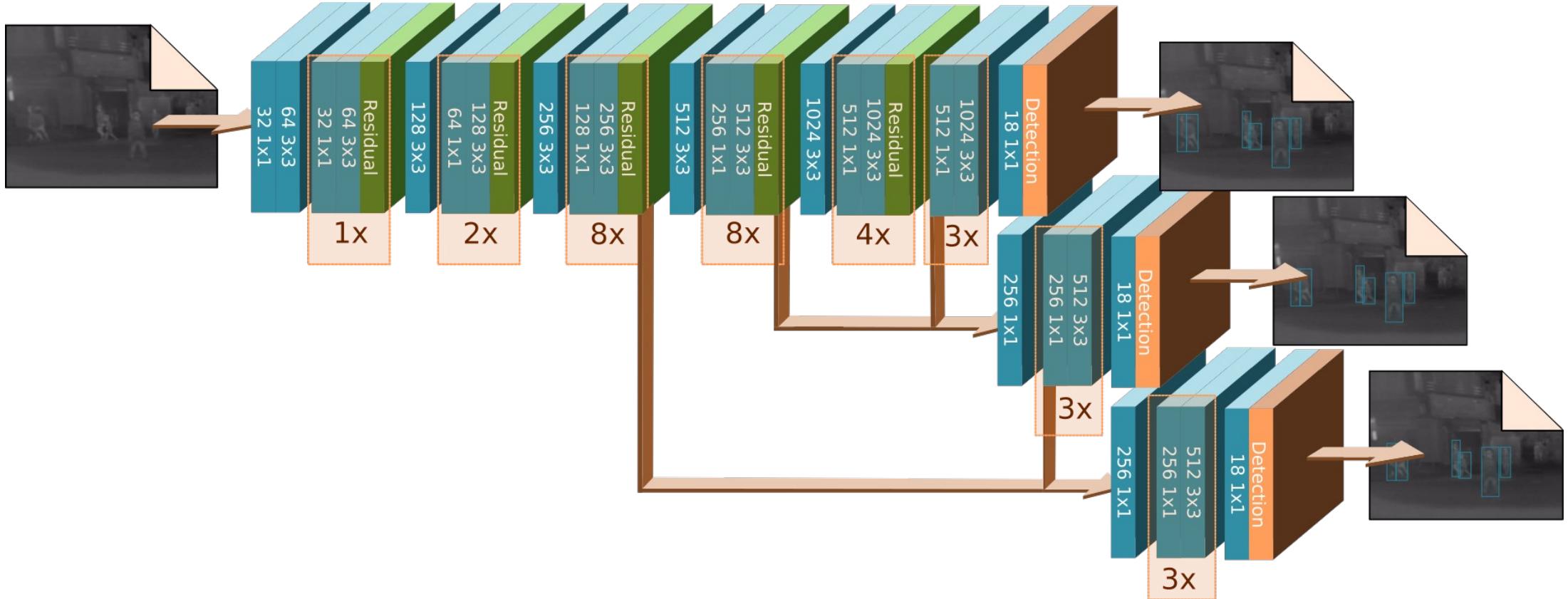
Pedestrian detection in Thermal Imagery



Full Pipeline



YOLOv3 detector



Ablation Studies

	Mixture		Miss Rate (%)		
	Real (%)	Synthetic (%)	all	day	night
Synthesized	0	100	45.88	54.37	26.04
	10	90	44.90	54.24	22.79
	20	80	41.21	51.04	18.92
	30	70	35.32	44.44	16.35
	40	60	34.78	43.45	14.53
	50	50	33.90	41.97	14.64
	60	40	31.50	39.83	12.33
	70	30	32.29	41.68	12.42
	80	20	25.88	33.01	<u>11.12</u>
	90	10	<u>25.62</u>	<u>31.86</u>	12.92
Real	100	0	28.46	36.32	11.97
Combined	all	all	34.29	41.93	16.80

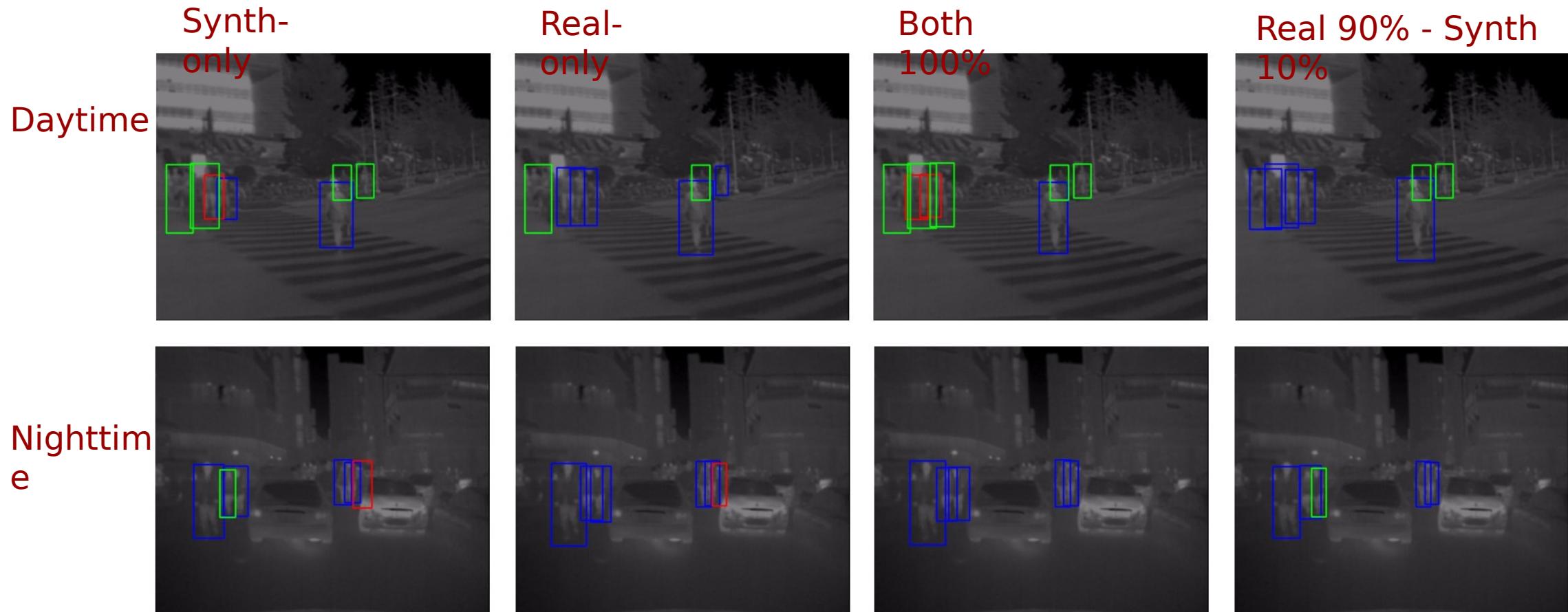


Comparison with state-of-the-art single-modality

Detectors		<u>MR all</u>	MR day	MR night
KAIST baseline	[12]	64.76	64.17	63.99
FasterRCNN	[16]	47.59	50.13	40.93
TPIHOG	[4]	-	-	57.38
SSD300	[3]	69.81	-	-
Saliency + KAIST	[25]	-	39.40	40.50
R^3 -Net Saliency + KAIST	[25]	-	30.40	21.00
VGG16-two-stage	[51]	46.30	53.37	31.63
ResNet101-two-stage	[51]	42.65	49.59	26.70
Bottom-up	[2]	35.20	40.00	20.50
Ours Mixed 40_60		34.78	43.45	14.53
Ours Mixed 80_20		25.88	33.01	11.12
Ours Mixed 90_10		<u>25.62</u>	<u>31.86</u>	<u>12.92</u>



Qualitative samples





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