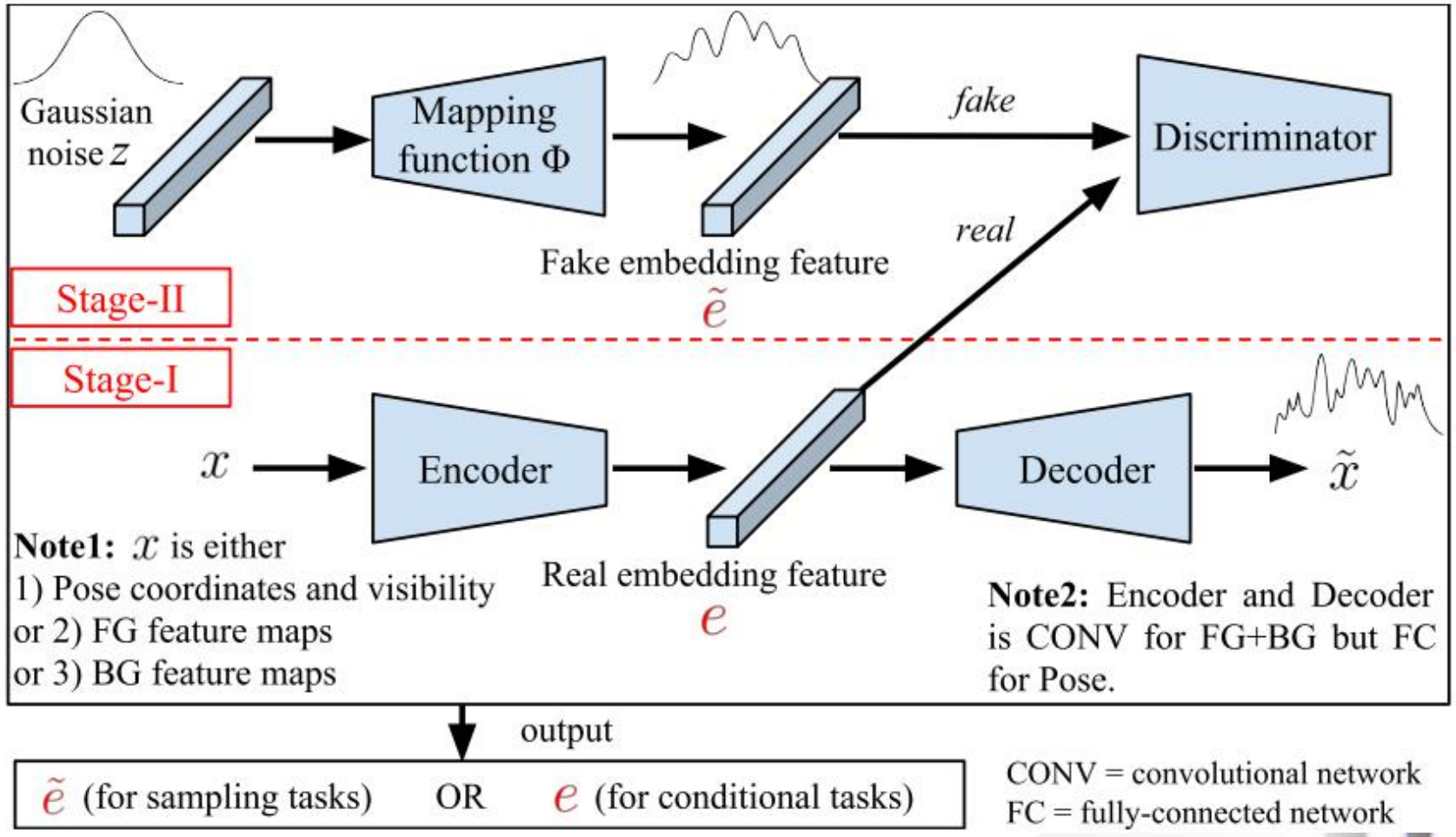
Pose Transfer in Person Re-id

汇报人：梁天保

Disentangled Peson Image Generation

- Method Overview



Disentangled Peson Image Generation

- Stage-I

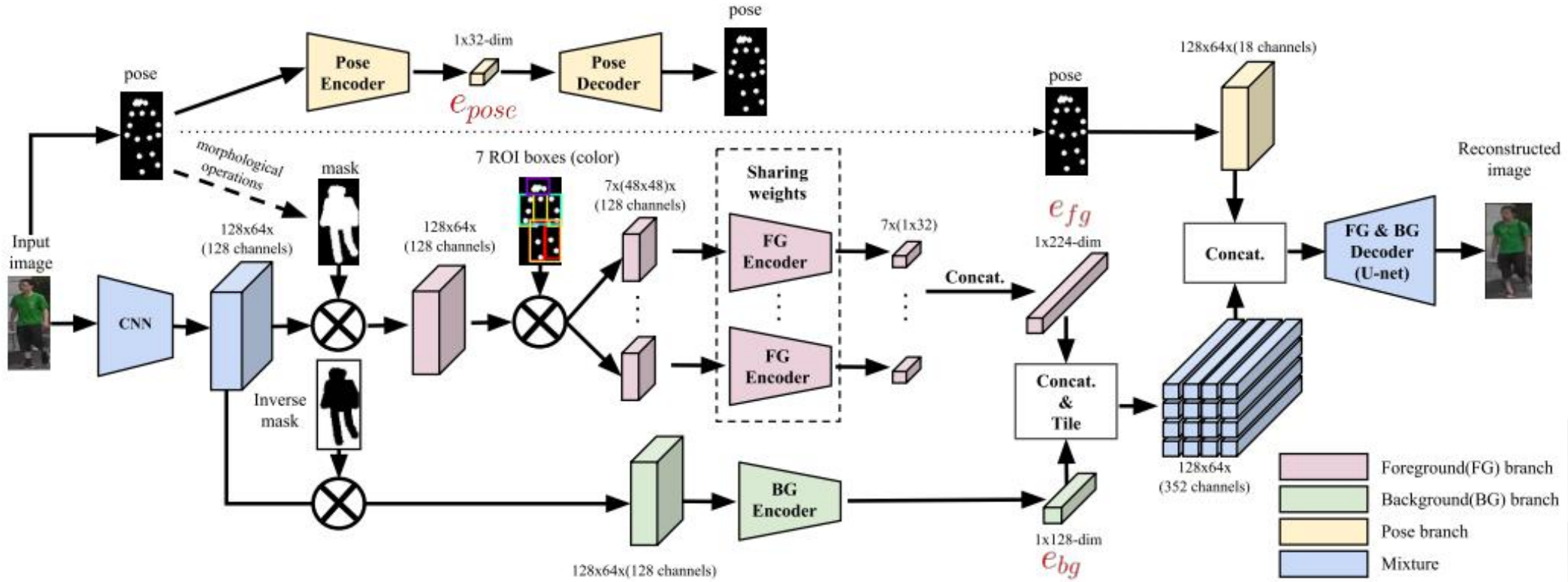


Figure 3: Stage-I: disentangled image reconstruction. This framework is composed of three branches: foreground, background and pose. Note that we use a fully-connected auto-encoder network to reconstruct the pose (incl. keypoint coordinates and visibility), so that we can decode the embedded pose features to obtain the heatmaps at the sampling phase.

Disentangled Peson Image Generation

- Stage-II

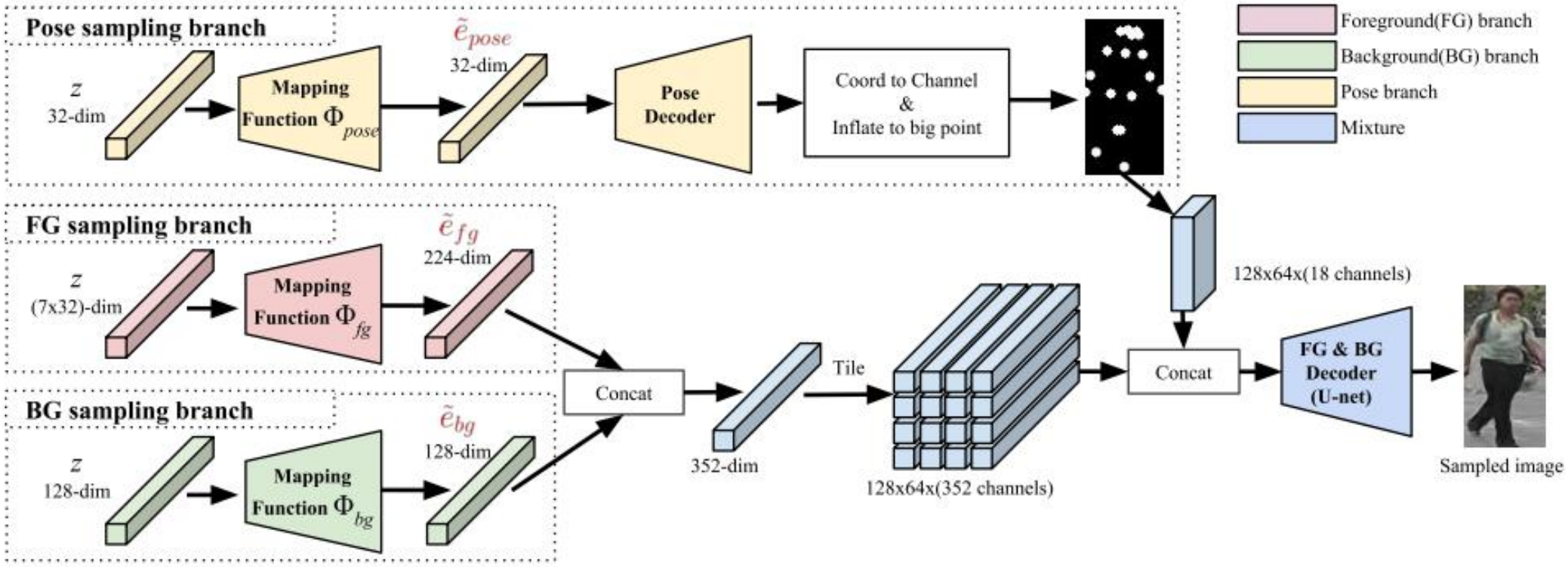


Figure 4: Sampling phase: Sample foreground, background and pose from Gaussian noise to compose new person images.

Disentangled Peson Image Generation

Experiment

Figure 8: Virtual identities for re-ID model training. Each column contains a pair of images of one identity (one FG). BG and Pose are randomly selected from training data.

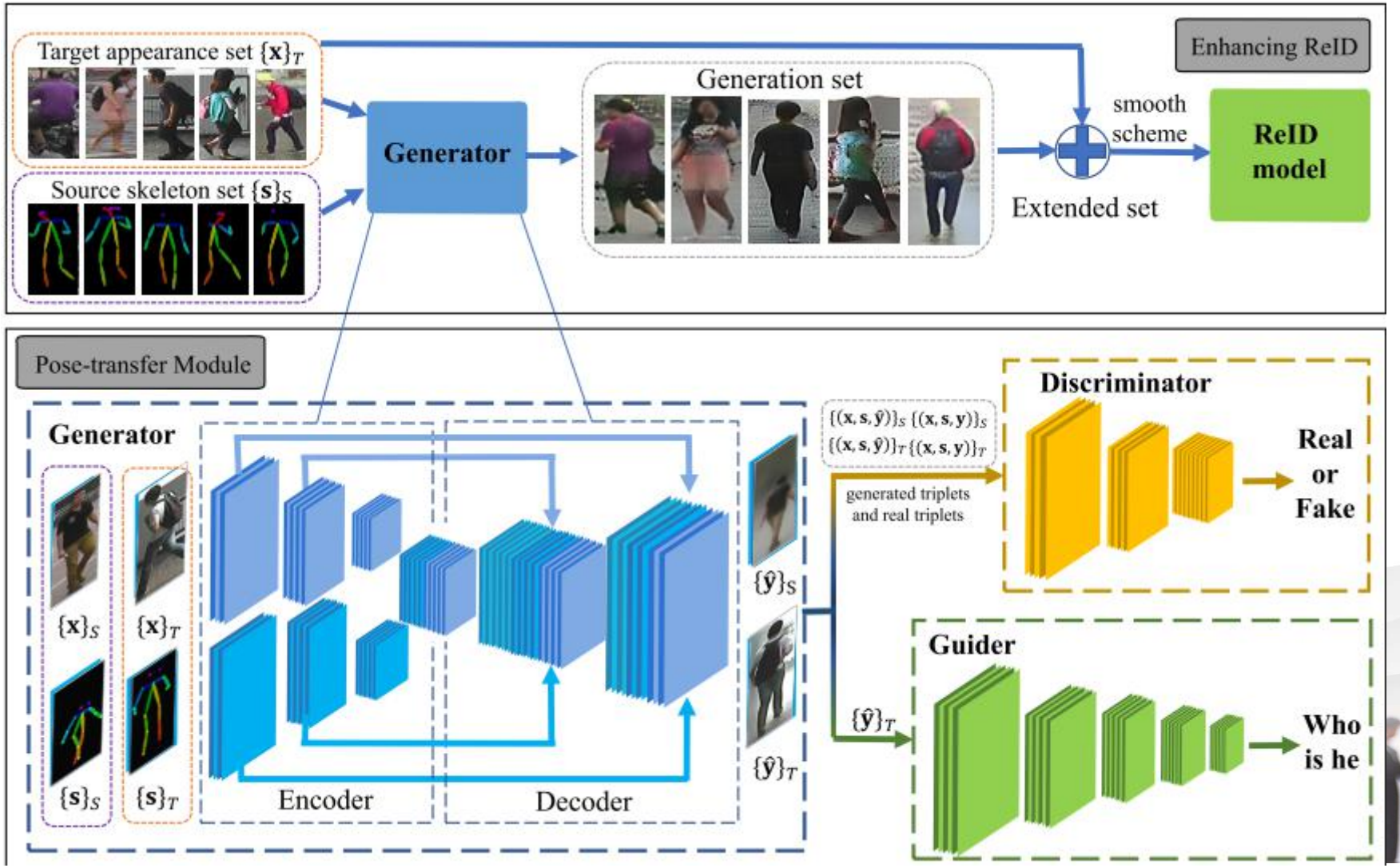
Disentangled Peson Image Generation

Experiment

Model	Training data	Rank-1	mAP
Bow [41]	Market	0.344	0.141
Bow* [41]	Market	0.358	0.148
LOMO* [18]	/	0.272	0.08
WholeBody feature (Ours)	Market	0.307	0.100
BodyROI7 feature (Ours)	Market	0.338	0.107
BodyROI7 feature PCA (Ours)	Market	0.355	0.114
Res50* [6]	CUHK03 (labeled)	0.300	0.115
Res50* [6]	Duke (labeled)	0.361	0.142
Res50	VM	0.338	0.134
Res50+PUL	VM+Market	0.369	0.156
Res50+PUL+KISSME	VM+Market	0.375	0.154

Pose Transferrable Person Re-Id

- Method Overview



Pose Transferrable Person Re-Id

- Experiment

Pose Transferrable Person Re-Id

- Experiment

Methods	Market-1501		Duke-R	
	rank-1	mAP	rank-1	mAP
BoW+kissme [46]	44.42	20.76	25.13	12.17
LOMO+XQDA [19]	-	-	30.75	17.04
FisherNet [35]	48.15	29.94	-	-
Null Space [40]	55.43	29.87	-	-
Gated SCNN [32]	65.88	39.55	-	-
Basel (R)* [47]	73.90	47.78	65.22	44.99
ReRank [52]	77.11	63.63	-	-
Basel (R)+LSRO [51]	78.06	56.23	67.68	47.13
Verif + Identif* [49]	79.51	59.87	68.9	49.3
PAN* [50]	82.81	63.35	71.59	51,55
Transfer* [9]	83.7	65.5	-	-
APR [20]	84.29	64.67	70.69	51.88
SVDNet [30]	82.3	62.1	76.7	56.8
DPFL [7]	-	-	79.2	60.6
TriNet* [13]	84.92	69.14	-	-
DML* [41]	87.73	68.83	-	-
SVDNet+REDA* [53]	87.08	71.13	79.31	62.44
Pose-transfer (R)	79.75	57.98	68.64	48.06
Basel (D)	84.47	64.17	73.92	50.79
Pose-transfer (D)	85.52	65.33	75.17	52.25
Basel (D, Tri)	86.73	67.78	77.03	55.34
Pose-transfer (D, Tri)	87.65	68.92	78.52	56.91

Pose Transferrable Person Re-Id

- Experiment

Methods	Labeled		Detected	
	rank-1	mAP	rank-1	mAP
BoW+XQDA [46]	7.9	7.3	6.4	6.4
PUL* [8]	-	-	9.1	9.2
LOMO+XQDA [19]	14.8	13.6	12.8	11.5
Basel (R)* [47]	22.2	21.0	21.3	19.7
Basel (R)+DaF* [39]	27.5	31.5.	26.4	30.0
Basel (R)+XQ+Re [52]	38.1	40.3	34.7	37.4
PAN* [50]	36.9	35.0	36.3	34.0
DPFL [7]	43.0	40.5	40.7	37.0
SVDNet [30]	40.9	37.8	41.5	37.3
TriNet+REDA* [53]	58.1	53.8	55.5	50.7
Pose-Transfer (R)	33.8	30.5	30.1	28.2
Basel (R, Tri)	42.8	39.2	39.1	36.6
Pose-Transfer (R, Tri)	45.1	42.0	41.6	38.7

Pose Transferrable Person Re-Id

- Experiment

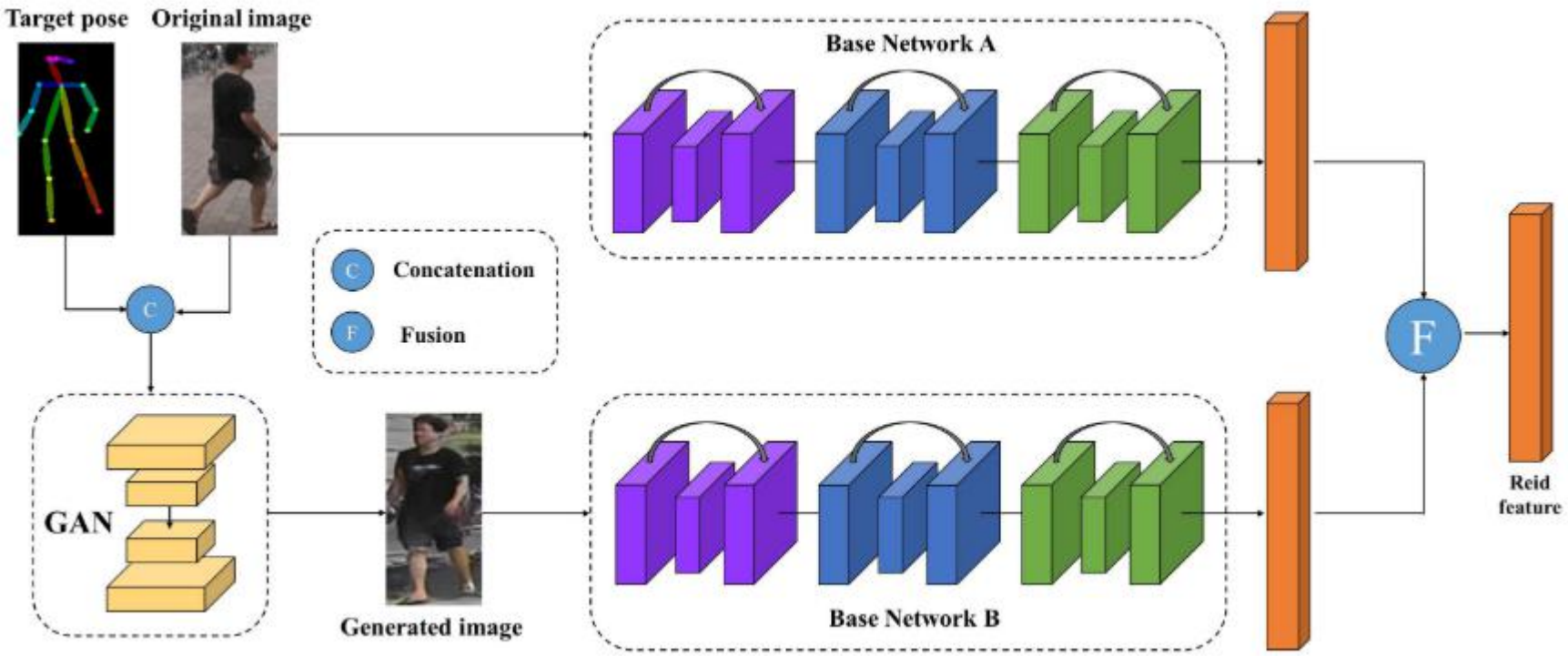
Methods	Market-1501		DukeMTMC-reID		CUHK03 (labeled)		CUHK03 (detected)	
	rank-1	mAP	rank-1	mAP	rank-1	mAP	rank-1	mAP
Basel (R) [47]	73.90	47.78	65.22	44.99	22.2	21.0	21.3	19.7
Basel (R)+LSRO [51]	78.06	56.23	67.68	47.13	-	-	-	-
Pose-transfer (R)	**79.75**	**57.98**	**68.64**	**48.06**	**33.8**	**30.5**	**30.1**	**28.2**

Methods	Market-1501		DukeMTMC-reID		CUHK03 (labeled)		CUHK03 (detected)	
	rank-1	mAP	rank-1	mAP	rank-1	mAP	rank-1	mAP
No Guider	76.93	54.22	66.70	45.98	28.1	26.0	25.2	23.9
With Guider	**79.75**	**57.98**	**68.64**	**48.06**	**33.8**	**30.5**	**30.1**	**28.2**

Table 4. Quantifying the effectiveness of guider with the ReID evaluation protocols.

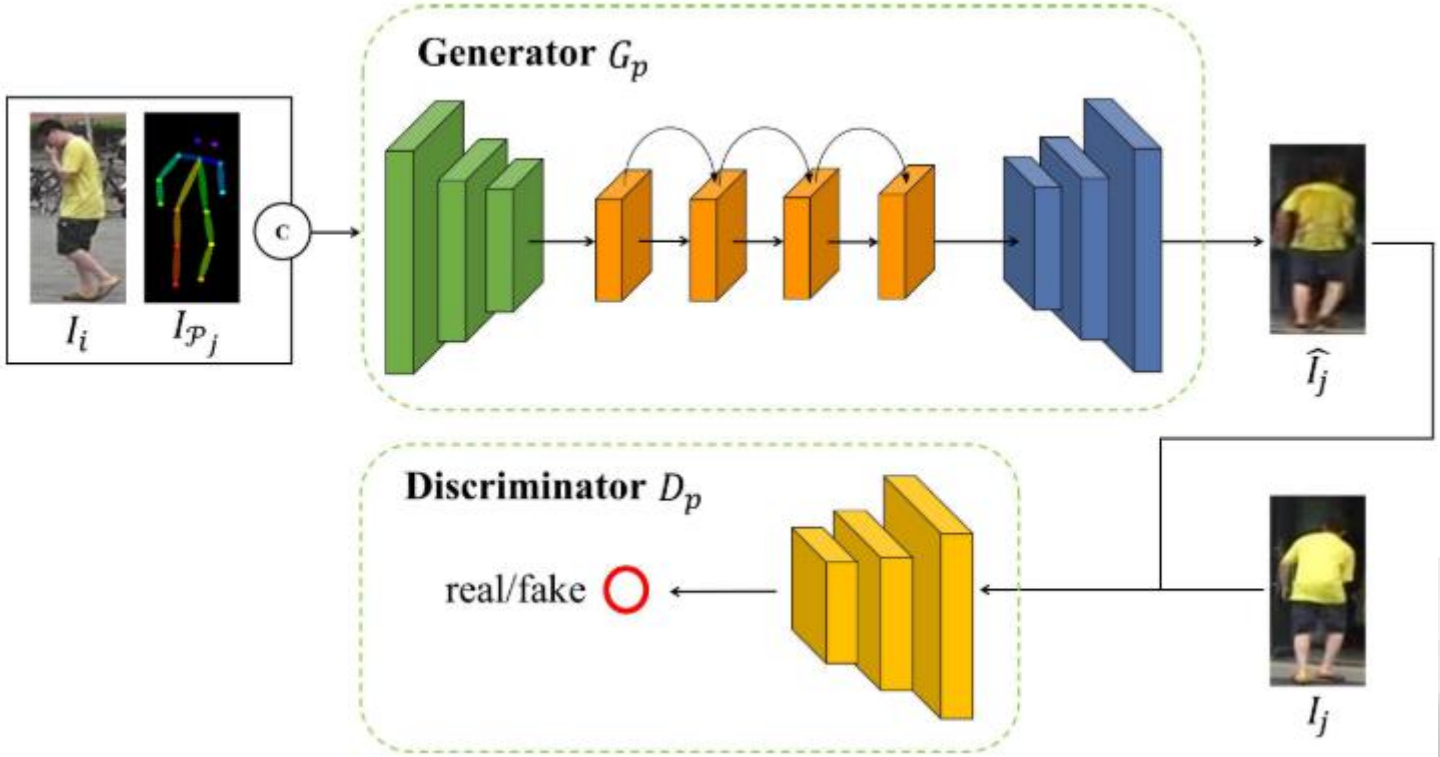
Pose-Normalized Image Generation for Person Re-Id

- Method Overview



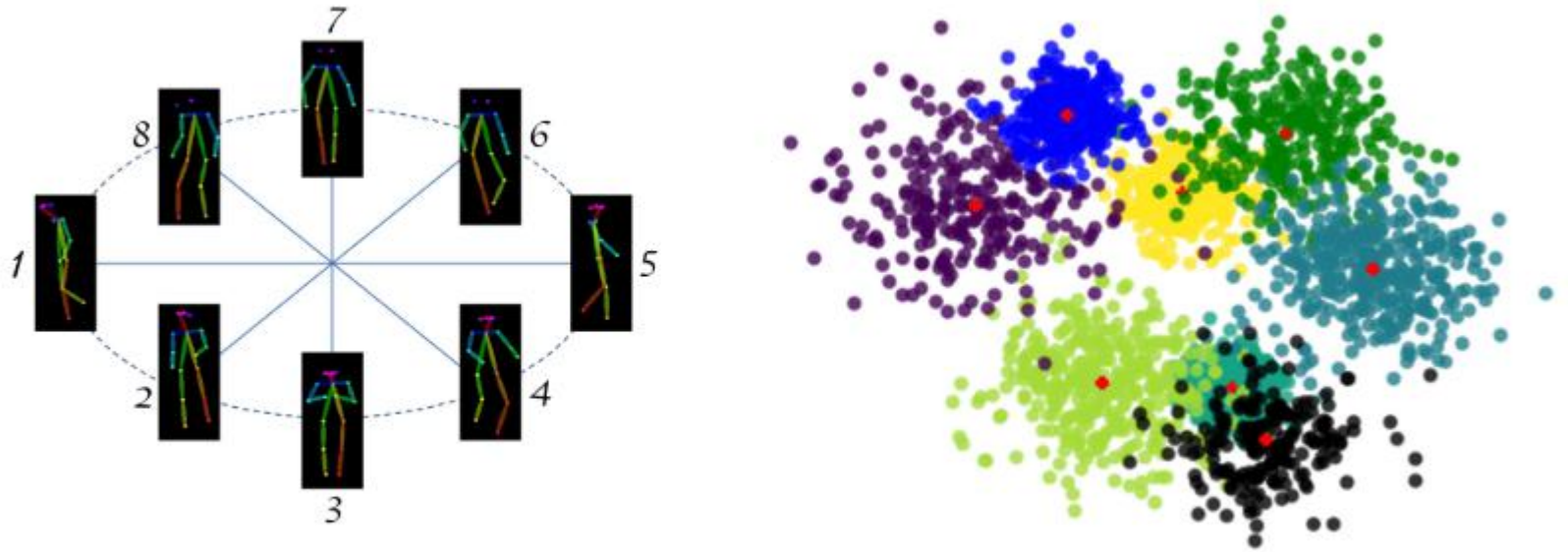
Pose-Normalized Image Generation for Person Re-Id

- Image Generator



Pose-Normalized Image Generation for Person Re-Id

- Method Overview



(a) Eight canonical poses on Market-1501 (b) t-SNE visualization of different poses.

Pose-Normalized Image Generation for Person Re-Id

- Experiment

Methods	Single-Query		Multi-Query	
	R-1	mAP	R-1	mAP
TMA [31]	47.90	22.3	–	–
SCSP [6]	51.90	26.40	–	–
DNS [54]	61.02	35.68	71.56	46.03
LSTM Siamese [41]	–	–	61.60	35.31
Gated_Sia [42]	65.88	39.55	76.50	48.50
HP-net [29]	76.90	–	–	–
Spindle [57]	76.90	–	–	–
Basel.+LSRO [65]*	78.06	56.23	85.12	68.52
PIE [62]	79.33	55.95	–	–
Verif.-Identif. [64]	79.51	59.87	85.84	70.33
DLPAR[58]	81.00	63.40	–	–
DeepTransfer [12]	83.70	65.50	89.60	73.80
Verif-Identif.+LSRO[65]*	83.97	66.07	88.42	76.10
PDC [39]	84.14	63.41	–	–
DML [56]	87.7	68.8	–	–
SSM [3]	82.2	68.8	88.2	76.2
JLML [26]	85.10	65.50	89.70	74.50
ResNet-50-A	87.26	69.32	91.81	77.85
Ours (SL)	**89.43**	**72.58**	**92.93**	**80.19**

Pose-Normalized Image Generation for Person Re-Id

- Experiment

Method	R-1	R-5	R-10
DeepReid [25]	19.89	50.00	64.00
Imp-Deep [2]	44.96	76.01	83.47
EMD [38]	52.09	82.87	91.78
SI-CI [43]	52.17	84.30	92.30
LSTM Siamese [41]	57.30	80.10	88.30
PIE [62]	67.10	92.20	96.60
Gated_Sia [42]	68.10	88.10	94.60
Basel. + LSRO [65]	73.10	92.70	96.70
DGD [46]	75.30	–	–
OIM [48]	77.50	–	–
PDC [39]	78.92	94.83	97.15
DLPAR[58]	**81.60**	**97.30**	98.40
ResNet-50-A (SL)	76.83	93.79	97.27
Ours (SL)	79.76	96.24	**98.56**
ResNet-50-A (TL)	16.50	38.60	52.84
Ours (TL)	16.85	39.05	53.32

(a) Results on CUHK03

Pose-Normalized Image Generation for Person Re-Id

- Experiment

Method	R-1	R-5	R-10
eSDC [59]	19.76	32.72	40.29
kLFDA [49]	32.76	59.01	69.63
mFilter [60]	34.30	55.00	65.30
Imp-Deep [2]	47.53	71.50	80.00
DeepRanking [7]	50.41	75.93	84.07
Ensembles [33]	53.40	76.30	84.40
ImpTrpLoss [10]	53.70	84.30	91.00
GOG [32]	57.80	79.10	86.20
Quadruplet [8]	62.55	83.44	89.71
NullReid [55]	64.98	84.96	89.92
ResNet-50-A (SL)	64.56	83.66	89.74
Ours (SL)	**67.65**	**86.64**	**91.82**
ResNet-50-A (TL)	27.20	48.60	59.20
Ours (TL)	27.58	49.17	59.57

(b) Results on CUHK01

Pose-Normalized Image Generation for Person Re-Id

- Experiment

Dataset	Market-1501		DukeMTMC-reID		CUHK03		CUHK01	
Methods	R-1	mAP	R-1	mAP	R-1	R-5	R-1	R-5
ResNet-50-A	87.26	69.32	72.80	52.48	76.83	93.79	64.56	83.66
ResNet-50-B	63.75	41.29	26.62	14.30	32.54	55.12	36.18	51.17
Ours	**89.43**	**72.58**	**73.58**	**53.20**	**79.76**	**96.24**	**67.65**	**86.64**

Table 4. The Ablation Study of Rank-1 and Rank-5 on benchmarks.