Pose-driven Deep Convolutional Model for Person Re-identification

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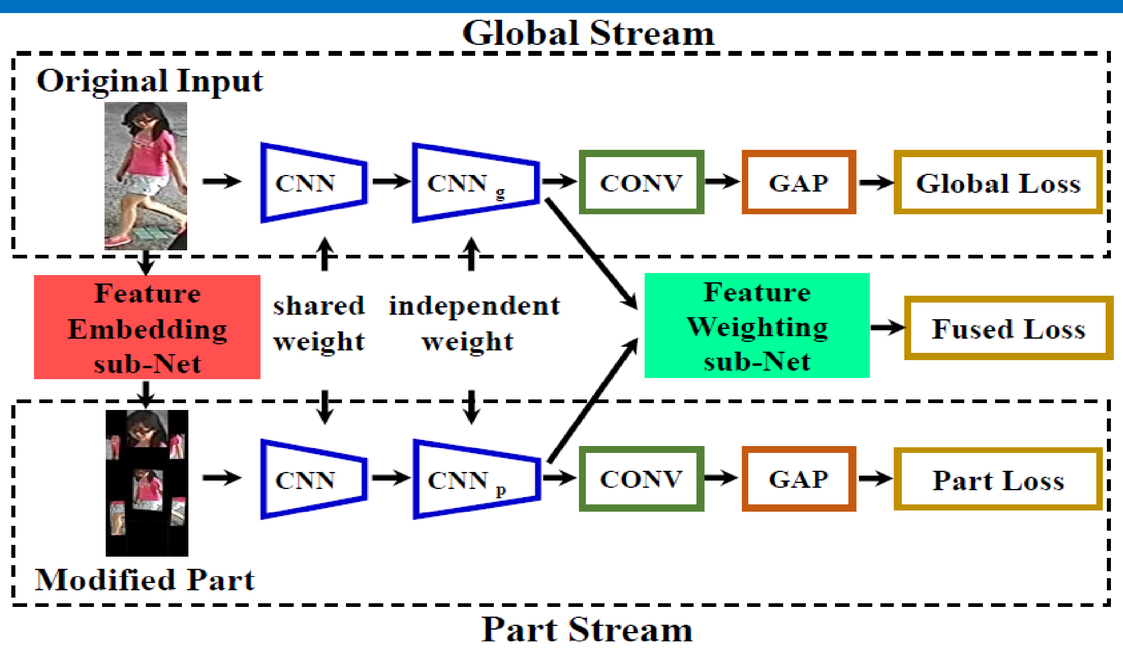
Motivation

- Person's part information can alleviate the large pose variations
- Occlusion or pose estimation error frequently happens in real scene, directly use person's part information may introduces noises

Contribution

- Propose a Pose-driven Deep Convolutional (PDC) model to learn improved feature extraction and matching models from end to end.
- Proposed deep architecture explicitly leverages the human part cues to alleviate the pose variations and learn robust feature representations from both the global image and different local parts.
- Propose a pose driven feature weighting sub-network for feature fusions

Flowchart of PDC Model



Experiments

- Comparison by 5 variants of our approach and the complete PDC

dataset	CUHK03		Market1501		VIPeR
	labeled	detected			
method	rank1	rank1	mAP	rank1	rank1
Global Only	79.83	71.89	52.84	76.22	37.97
Part Only	53.73	47.29	31.74	55.67	22.78
Global+Part	85.07	76.33	62.20	81.74	48.42
Global+Part+FEN	87.15	77.57	62.58	83.05	50.32
Global+Part+FWN	86.41	77.62	62.58	82.69	50.00
PDC	**88.70**	**78.29**	**63.41**	**84.14**	**51.27**

- Comparison with Related Works

On CUHK03 labeled

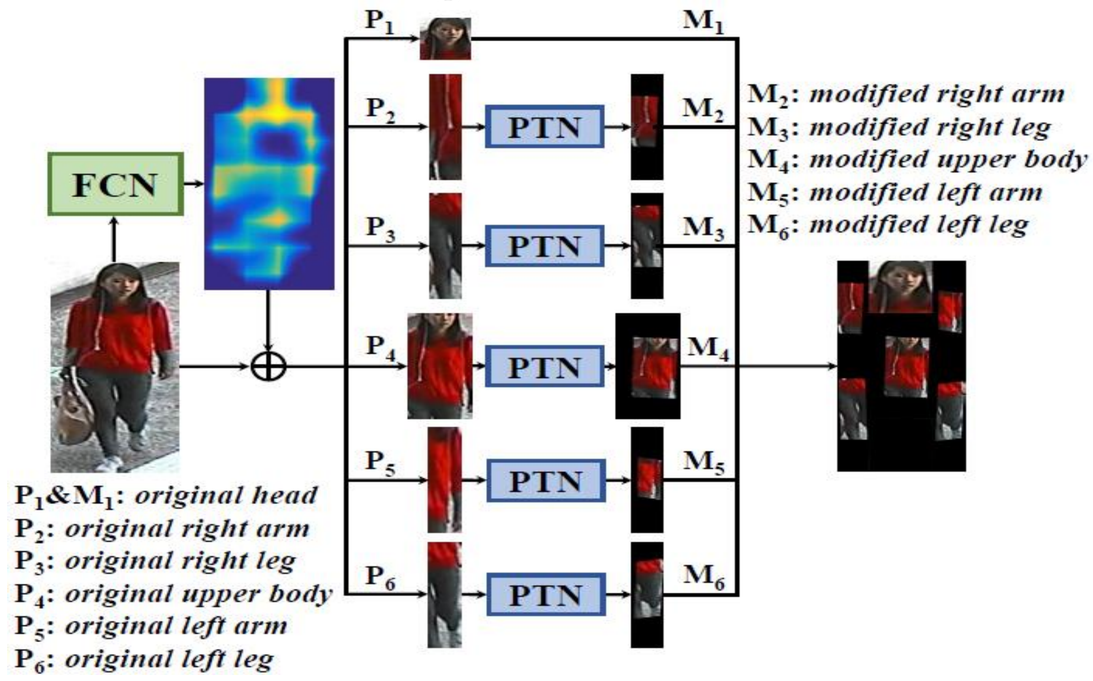
Methods	rank1	rank5	rank10	rank20
IDLA [1]	54.74	86.50	93.88	98.10
PersonNet [52]	64.80	89.40	94.90	98.20
DGDropout [53]	72.58	91.59	95.21	97.72
EDM [40]	61.32	88.90	96.44	99.94
Spindle [16]	88.50	97.80	98.60	99.20
PDC	**88.70**	**98.61**	**99.24**	**99.67**

On Market1501

Methods	mAP	rank1	rank5	rank10	rank20
PersonNet [52]	26.35	37.21	-	-	-
DGDropout [53]	31.94	59.53	-	-	-
Gate S-CNN [46]	39.55	65.88	-	-	-
LSTM S-CNN [47]	35.30	61.60	-	-	-
PIE [62]	55.95	79.33	90.76	94.41	96.65
Spindle [16]	-	76.90	91.50	94.60	96.70
PDC	**63.41**	**84.14**	**92.73**	**94.92**	**96.82**

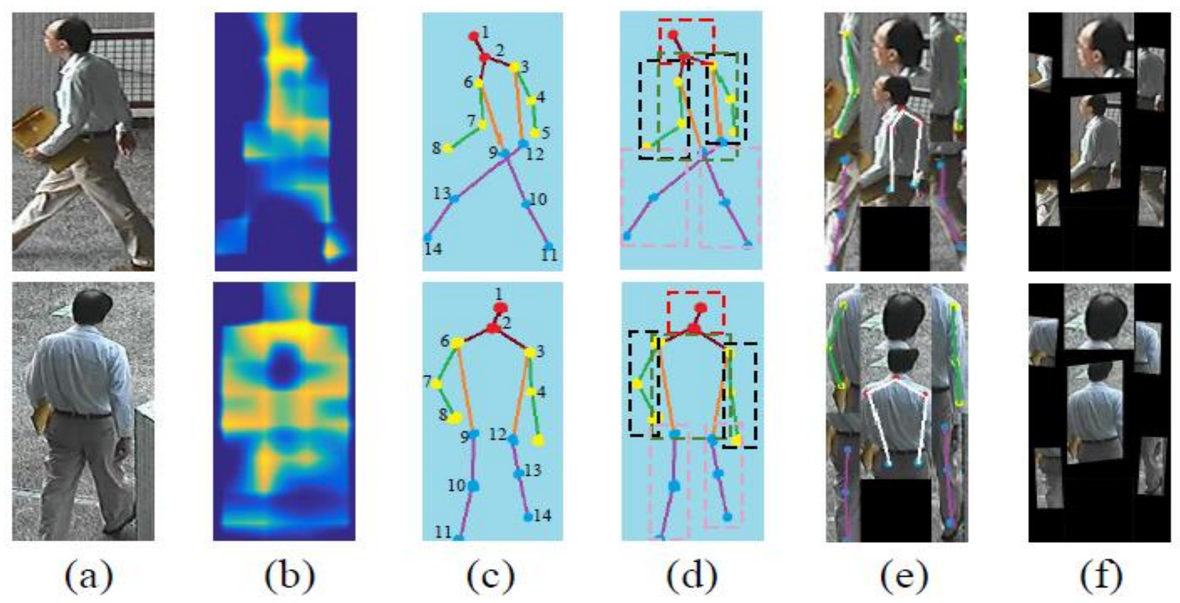
Illustration of PDC

- Feature Embedding subNet

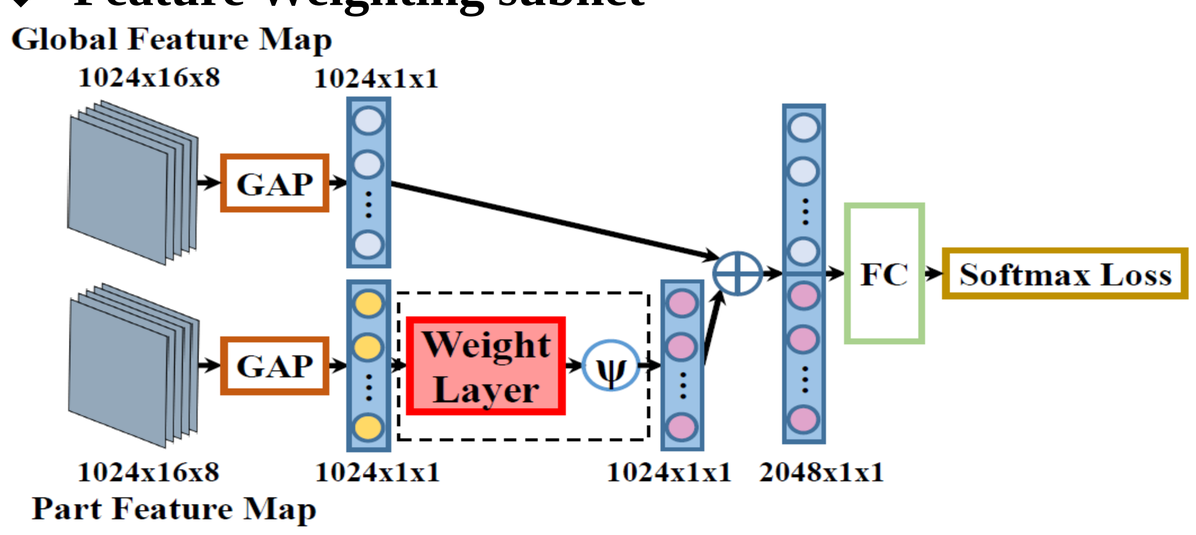


- Pose normalization in Feature Embedding sub-Net

(a) Original image
(b) Response maps of 14 body joints
(c) Key points of 14 body joints
(d) 6 body parts
(e) 6 body parts after rotated and resized
(f) Normalized by Pose Transform Network



- Feature Weighting subnet



Acknowledgments

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