

Progressive Unsupervised Domain Adaptation for Image-based Person Re-Identification

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Background

Person Re-Identification (Re-ID) aims at retrieving a specific person from images or videos captured by different cameras from various times and places.

Unsupervised Domain Adaptation (UDA) has emerged as an effective paradigm for reducing the huge manual annotation cost for Person Re-ID.

EUG^[1] proposed to exploit unlabeled tracklets in a stepwise manner to improve the discriminative capability of the CNN feature representation in the case of one-shot video-based Person Re-ID.





[1] Y. Wu, Y. Lin, X. Dong, Y. Yan, W. Ouyang, and Y. Yang, "Exploit the unknown gradually: One-shot video-based person re-identification by stepwise learning," in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 2018, pp. 5177–5186.

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The Proposed Method

EUG vs. Our condition

EUG: One-shot Video-based Re-ID

- Each identity has one labeled tracklet
- Each tracklet consists of many slightly different frames, making it possible for the model to ignore some noise features by averaging all the frames' features

Ours: Unsupervised Image-based Re-ID

- No any labeled image
- The model cannot distinguish which features are important for an identity and which are random noises.



The Proposed Method



Overview of our framework. We first pretrain a CNN model on the labeled source dataset, then finetune the model on the unlabeled target dataset with an iterative approach. The pretraining and finetuning processes are marked with green and red serial numbers respectively.



Experiment Results

Methods	Duke-to-Market				Market-to-Duke			
	mAP	top-1	top-5	top-10	mAP	top-1	top-5	top-10
Pretrained	35.7	65.8	79.8	84.5	35.2	53.1	67.5	72.3
UDAP [24]	53.7	75.8	89.5	93.2	49.0	68.4	80.1	83.5
PCB-PAST [25]	54.6	78.4	-	-	54.3	72.4	-	-
SSG [7]	58.3	80.0	90.0	92.4	53.4	73.0	80.6	83.2
Co-teaching(\hat{C}^t =500) [27]	71.7	87.8	95.0	96.5	61.7	77.6	88.0	90.7
$MMT(\hat{C}^{t}=500)$ [9]	75.8	91.0	96.8	98.1	66.6	80.0	89.9	92.6
$MMT(\hat{C}^{t}=700)$ [9]	75.0	91.0	96.4	97.7	69.0	81.5	90.9	93.3
$MMT(\hat{C}^{t}=900)$ [9]	73.0	90.8	96.5	98.0	68.0	81.2	90.7	93.1
Ours PUDA(\hat{C}^t =500, w/o MIS)	73.9	88.0	95.3	97.1	-	-	-	-
Ours PUDA(\hat{C}^t =700, w/o MIS)	-	-	-	-	39.6	58.0	68.6	72.1
Ours PUDA(\hat{C}^t =500)	80.0	91.1	96.6	97.7	69.0	81.1	90.4	92.9
Ours PUDA(\hat{C}^t =700)	76.4	90.8	96.7	97. 7	70.7	82.6	91.3	93.9
Ours PUDA(\hat{C}^t =900)	72.7	90.6	96.3	97. 7	68.4	81.1	90.4	93.3





Thanks !