Cluster Contrast for Unsupervised Person Re-Identification

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1 Appendix

The Cluster Contrast is simple and effective. It can be used together with existing unsupervised re-ID methods to further improve their performances. In this section, we demostrate the generalization ability of Cluster Contrast by applying it on exsisting methods. For example, the Cluster Contrast can be used with the Generalized Mean Pooling (GeM) [3] to further improves the purely unsupervised re-ID performance. In unsupervised domain adaption re-ID, the cluster contrast further boost the SpCL's performance. In particular, With additional camera ID information, the Cluster Contrast with CAP [4] outperforms all SOTA unsupervised re-ID methods.

Table 1: The Cluster Contrast further boosts the existing purely unsuprvised re-ID, unsupervised domain adaptation and camera-aware unsupervised re-ID methods

Method	Market-1501					MSMT17				
	source	mAP	top-1	top5	top 10	source	mAP	top-1	top-5	top10
Purely Unsupervised										
Cluster Contrast	None	83.0	92.9	97.2	98.0	None	33.0	62.0	71.8	76.7
GeM + Cluster Contrast	None	84.2	93.4	97.6	98.3	None	33.6	63.3	73.3	78.0
Unsupervised Domain Adaptation										
SPCL [2]	MSMT17	77.5	89.7	96.1	97.6	Market	26.8	53.7	65.0	69.8
SPCL + Cluster Contrast	MSMT17	83.3	92.8	96.9	98.1	Market	35.1	62.4	75.3	79.9
Camera-aware Unsupervised										
CAP [4]	None	79.2	91.4	96.3	97.7	None	36.9	67.4	78.0	81.4
ICE [1]	None	82.3	93.8	97.6	98.4	None	38.9	70.2	80.5	84.4
CAP + Cluster Contrast	None	83.5	93.1	97.1	98.2	None	40.1	69.8	80.2	84.0

1.1 Purely Unsupervised Re-ID

The Gemeralized-Mean (GeM) pooling [3] is a trainable pooling layer which is widely used to improve the image retrieval performance. By replacing the global average pooling with GeM pooling in Resnet-50 backbone, the Cluster Contrast further improves the unsurpervised re-ID performance as shown in Table 1.

1.2 Unsupervised Domain Adaptation Re-ID

Our method can be easily generalized to unsupervised domain adaptation re-ID methods. We adopt the hybrid memory from SpCL [2] with our method, which combines the labeled source dataset with the pseudo-labeled target dataset as a unified cluster-level memory. As shown in Table 1, the Cluster Contrast method further boost SpCL's performance.

1.3 Camera-aware Unsupervised Re-ID

To solve the large intra-ID variance caused by the change of camera views, the camera aware method [1, 4] uses the camerea ID information to guide model training. Specifically, they further split the unsupervised clustering results by camera ID and use the camera-aware contrastive loss to pull the positive samples from the same camera closer and push the negtive samples from different cameras away. To show the generalization ability of the Cluster Contrast method, we adopt the cluster-level memory into CAP [4] as an example. As show in Table 1, our method boost the CAP performance significantly, outperforming all unsupervised re-ID methods on MSMT17 dataset.

References

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