

RGB-Infrared Person Re-identification via Image Modality Conversion

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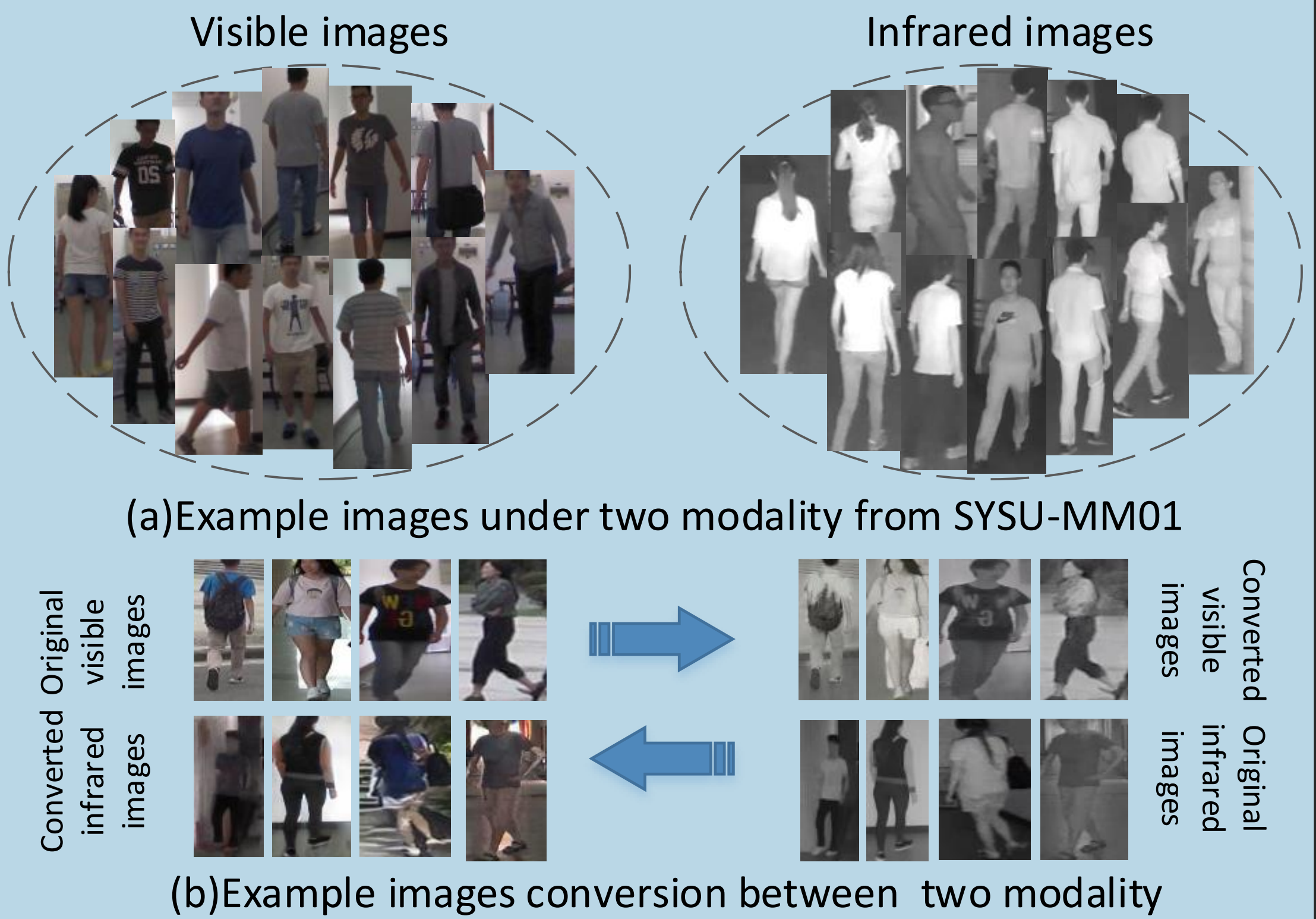


Problem

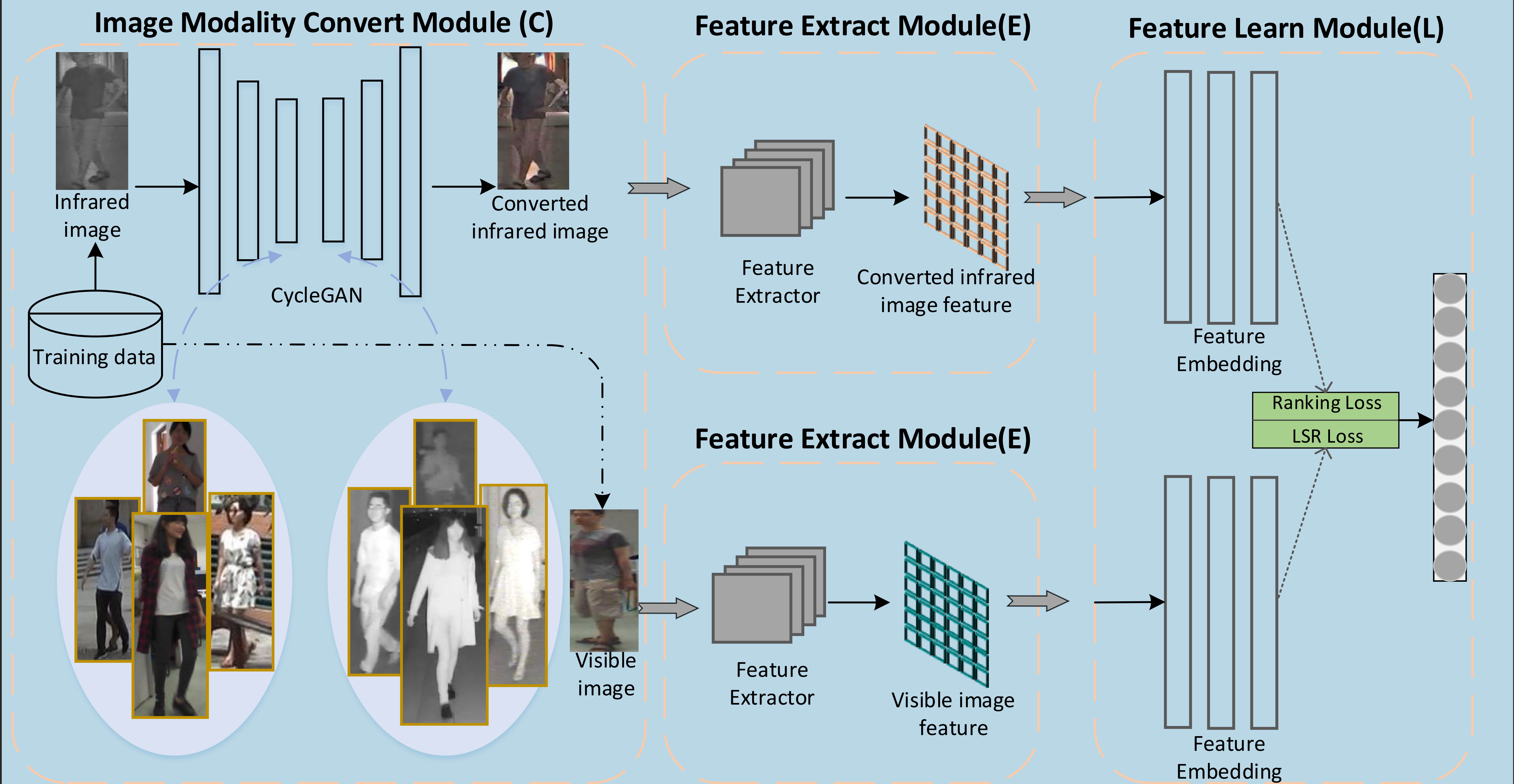
Person re-identification(Re-ID) aims at utilizing the computer vision system to search a certain person out from a gallery set of images(video) when given a query image(video) of this person, who left the field of view of one camera and was captured by other non-overlapping cameras[1]. Most of current Re-ID methods focus on visible images under good visible light conditions. However, under poor illumination conditions, visible images are uninformative. To handle these conditions, infrared images become an alternative solution. Literature[2] is the first to identify RGB-IR person re-identification and referred this cross-modality image matching task as RGB-IR re-identification(RGB-IR Re-ID).

Main innovation

(a) is Example images from SYSU-MM01. With the learned CycleGAN[3] model, for a modal image captured by a certain camera, it can generate a corresponding image, as shown in the (b). Its merits are highlighted in two aspects: 1)Using CycleGAN to convert infrared images into color images can not only increase the recognition characteristics of images, but also allow the network to better learn the two modal image features; 2)Our novel method can serve as data augmentation. Specifically, it can increase data diversity and total data against over-fitting by converting labeled training images to another modal images.



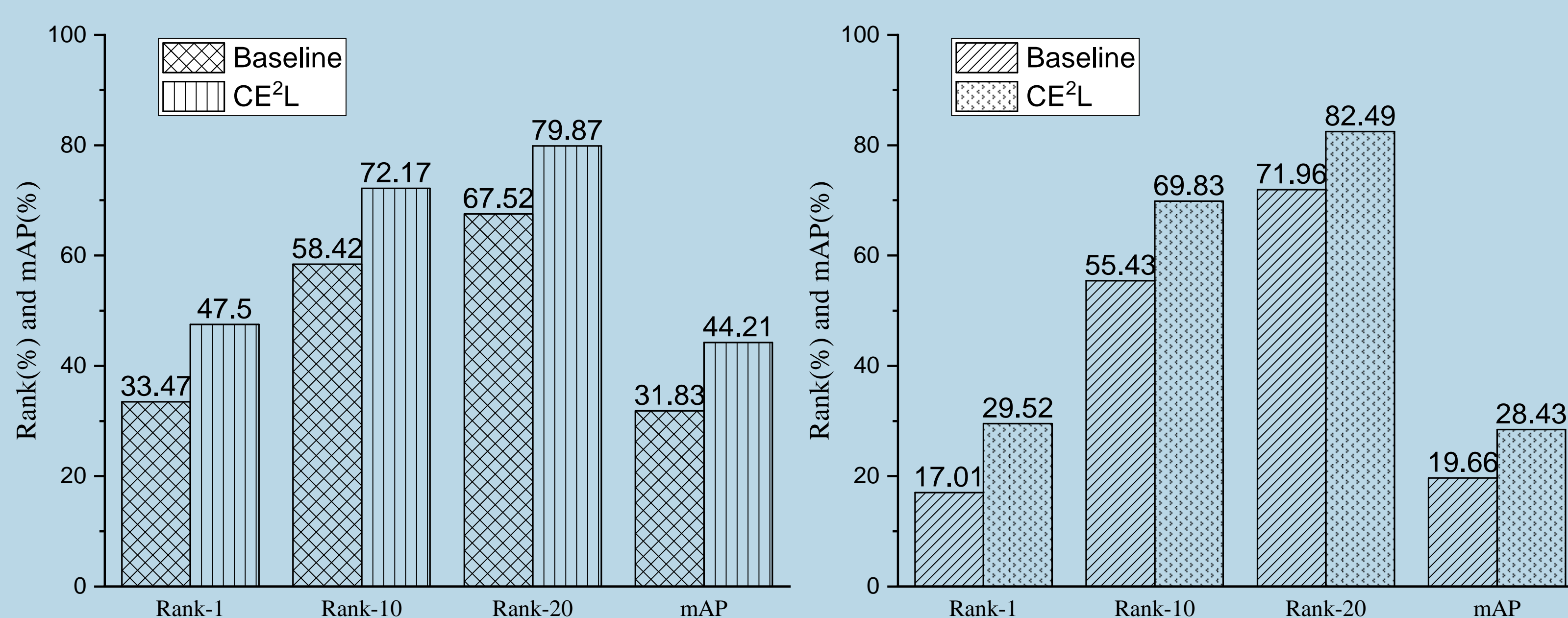
Our method



The proposed framework with image modality conversion for RGB-IR Re-ID. It contains three parts, i.e., Image Modality Convert Module, Feature Extract Module and Feature Learn Module. Image Modality Convert Module aims to convert image modality according to input visible/infrared image. Feature Extract Module focuses on feature extraction. Feature Learn Module concentrates on feature learning with the assistance of ranking loss and LSR loss.

Experiments

it demonstrates that our method consistently outperforms the baseline with nearly 14% and 13% for rank-1 matching rate and mAP for RegDB respectively. For SYSU-MM01, our method also exceeds the baseline, and can achieve an absolute gain of 11% and 9% in terms of rank-1 and mAP compared with the baseline.



Acknowledgements

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References

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- [2] M. Ye, X. Lan, J. Li, and P. C. Yuen: *Hierarchical discriminative learning for visible thermal person re-identification*, in Thirty-Second AAAI Conference on Artificial Intelligence, 2018.
- [3] J. Zhu, T. Park, P. Isola, and A. Efros: *Unpaired image-to-image translation using cycle-consistent adversarial networks*, in IEEE International Conference on Computer Vision, ICCV 2017