Deep Compact Person Re-IDentification with Distractor Synthesis via DC-GANs

Víctor Ponce-López*, Tilo Burghardt, Yue Sun, Sion Hannuna, Dima Damen, Majid Mirmehdi
Dept. of Computer Science, Electric & Electronic Engineering, University of Bristol.
vponcelop@gmail.com ; v.poncelopez@bristol.ac.uk

ABSTRACT

- Dual-Stream CNN learns both appearance and facial features in tandem from still images and infers person IDs.
- We leverage an alternative lightweight ID-CondenseNet architecture that integrates a face-guided DC-GAN to generate distractor person images for enhanced training.
- Both architectures are tested on FLIMA, a new extension of an existing person Re-ID dataset with added frame-by-frame annotations of face presence. We outperform the largest existing Re-ID dataset, MSMT17.

1. Introduction

- Visual Person Re-ID links people across disjoint views.
- Challenging sub-domain in Computer Vision:
  - Inherent viewpoint and illumination changes, partial occlusions, limitations on resolution, significant appearance alterations (e.g., changes in clothing).
  - Unimodal approaches, such as face recognition systems, are on their own inadequate.
  - Computational demand for network inference.
- Methods evaluated on novel released datasets.

2. Proposed Method

- Dual-Stream CNN learns both appearance and facial features in tandem from still images and infers person IDs.
- We leverage an alternative lightweight ID-CondenseNet architecture that integrates a face-guided DC-GAN to generate distractor person images for enhanced training.
- Both architectures are tested on FLIMA, a new extension of an existing person Re-ID dataset with added frame-by-frame annotations of face presence. We outperform the largest existing Re-ID dataset, MSMT17.

3. Experiments on FLIMA & MSMT17

- Dual-Stream CNN learns both appearance and facial features in tandem from still images and infers person IDs.
- We leverage an alternative lightweight ID-CondenseNet architecture that integrates a face-guided DC-GAN to generate distractor person images for enhanced training.
- Both architectures are tested on FLIMA, a new extension of an existing person Re-ID dataset with added frame-by-frame annotations of face presence. We outperform the largest existing Re-ID dataset, MSMT17.

4. Conclusion

- Potential approaches for person Re-ID are based on the exploitation of facial and person appearance representations.
- Guided DC-GAN integrates the face detector, leveraged from the face stream of our Dual-Stream CNN architecture. It is used to generate person images for enhanced training.
- Distractor augmentation and network compression have a role to play for larger scale applications.