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Deep and Low-level Feature based Attribute Learning for Person Re-identification

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Abstract

In video surveillance, pedestrian attributes are defined as semantic descriptors like gender, clothing or accessories. In this paper, we propose a CNN-based pedestrian attribute-assisted person re-identification framework. First we perform the attribute learning by a part-specific CNN to model attribute patterns related to different body parts and fuse them with low-level robust Local Maximal Occurrence (LOMO) features to address the problem of the large variation of visual appearance and location of attributes due to different body poses and camera views. Our experiments on three public benchmarks show that the proposed method improves the state of the art on attribute recognition. Then we merge the learned attribute CNN embedding with another identification CNN embedding in a triplet structure to perform the person re-identification task. Both CNNs are pre-trained in a supervised way on attributes and person identities respectively, and then continue the training with a combined architecture for re-identification. We experimentally show that this fusion of “identity and attributes features” improves the overall re-identification.

Keywords: Person re-identification; soft-biometrics; pedestrian attributes; convolutional neural network

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