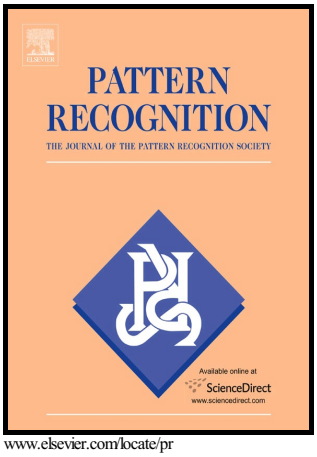

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Deep Linear Discriminant Analysis on Fisher Networks: A Hybrid Architecture for Person Re-identification

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Abstract

Person re-identification is to seek a correct match for a person of interest across different camera views among a large number of impostors. It typically involves two procedures of non-linear feature extractions against dramatic appearance changes, and subsequent discriminative analysis in order to reduce intra-personal variations while enlarging inter-personal differences. In this paper, we introduce a hybrid deep architecture which combines Fisher vectors and deep neural networks to learn non-linear transformations of pedestrian images to a deep space where data can be linearly separable. The proposed method starts from Fisher vector encoding which computes a sequence of local feature extraction, aggregation, and encoding. The resulting Fisher vector output are fed into stacked supervised layer to seek non-linear transformation into a deep space. On top of the deep neural network, Linear Discriminant Analysis (LDA) is reinforced such that linearly separable latent representations can be learned in an end-to-end fashion. By optimizing an objective function modified from LDA, the network is enforced to produce feature distributions which have a low variance within the same class and high variance between classes. The objective is essentially derived from the general LDA eigenvalue problem and allows to train the network with Stochastic Gradient Descent and back-propagate LDA gradients to compute Gaussian Mixture Model (GMM) gradients in Fisher vector

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