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Cross-Domain Action Recognition via Collective Matrix Factorization**with Graph Laplacian Regularization**Jun Tang^{a, b}, Haiqun Jin^{a, b}, Shoubiao Tan^{a, b, *}, Dong Liang^b^a*Key Laboratory of Intelligent Computing & Signal Processing, Ministry of Education,**Anhui University, Huangshan Road, Hefei 230039, China*^b*School of Electronics and Information Engineering, Anhui University, Hefei, 230039, China*

Abstract This paper investigates the problem of cross-domain action recognition. Specifically, we present a cross-domain action recognition framework by utilizing some labeled data from other datasets as the auxiliary source domain. It is a challenging task as data from different domains may have different feature distribution. To map data from different domains into the same abstract space and boost the action recognition performance, we propose a method named collective matrix factorization with graph Laplacian regularization (CMFGLR). Our approach is built upon the technique of collective matrix factorization, which simultaneously learns a common latent space, linear projection matrices for obtaining semantic representations, and an optimal linear classifier. Moreover, we explore the label consistency across different domain and the local geometric consistency in each domain and obtain a graph Laplacian regularization term to enhance the discrimination of learned features. Experimental results verify that CMFGLR significantly outperforms several state-of-the-art methods.

Keywords action recognition; collective matrix factorization; graph Laplacian regularization; latent semantic representation

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