Bilinear Multiset Partial Least Squares and Its Application to Face Hallucination

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Abstract

To deal with low resolution (LR) problem in face analysis system, face super-resolution (FSR) is a powerful technique to recover high resolution (HR) images from the input LR ones. But, conventional FSR approaches focus on pairwise LR-HR face cases, which are not available to reconstruct multiple-LR-view facial images at the same time. To solve this problem, we first propose a bilinear multiset partial least squares (BMPLS) to simultaneously handle multiple sets of matrix variables, which searches for left and right transformations by maximizing the accumulated pairwise covariance criterion. Then, with the BMPLS method, we further present a novel face super-resolution algorithm dubbed BMPLS-SR. BMPLS-SR not only exploits the spatial structure information of face image data with different resolutions, but also has the capability of simultaneously learning the latent 2D coherent feature from multiple-LR-view face data sets. The experimental results on two benchmark face datasets show that the proposed BMPLS-SR outperforms the state-of-the-art algorithms in terms of quantitative and qualitative evaluations.

Keywords: Face super-resolution, partial least suqares, bilinear learning, face hallucination, latent coherent feature