Two-stage dimension reduction and rank selection in noisy high dimensional image analysis

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Abstract

Principal component analysis (PCA) is the most widely used dimension-reduction method, especially in a matrix, common data structure. For image samples, a data structure can be regarded as a 3st-order rank tensor instead of a matrix, 2st-order rank tensor. In this case, multilinear principal component analysis (MPCA) is usually suggested used for avoiding high dimension problem caused by matrix vectorization. However, when applied a sample of noise images, MPCA could not work effectively. In this talk, we will introduce a two-stage dimension reduction (2SDR) method and related rank selection theory for image reconstruction from high-dimensional noisy image data.