Model selection for Gaussian kernel PCA denoising

We propose kernel Parallel Analysis (kPA) for automatic kernel scale and model order selection in Gaussian kernel PCA. Parallel Analysis [1] is based on a permutation test for covariance and has previously been applied for model order selection in linear PCA, we here augment the procedure to also tune the Gaussian kernel scale of radial basis function based kernel PCA. We evaluate kPA for denoising of simulated data and the US Postal data set of handwritten digits. We find that kPA outperforms other heuristics to choose the model order and kernel scale in terms of signal-to-noise ratio (SNR) of the denoised data.

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