

On the distribution theory for probabilistic multilinear PCA

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Abstract

When the data collected have a natural array structure, such as 2D-images (as order 2 arrays), 3D-images or dynamic 2D-images over time (as order 3 arrays), EEG signals over head capsule, etc. Traditional approaches are often based on vectorized data, and each data array is stacked into a long vector. A recent trend for tensor data analysis is to keep the data tensorial structure and to adopt certain multilinear approaches. There are quite some studies and successful usages of multilinear methods in computer sciences, but there is still quite limited development for its fundamental statistical theory. In this talk we aim to study the basic distribution theory for probabilistic multilinear PCA for tensor (array) data.

Keywords: array data, Kronecker envelope, Kronecker product, multilinear, tensor data