

Nonnegative Matrix Factorization: a parametric statistical view and an application for the assessment of food choices

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It is the purpose of the talk to investigate the Nonnegative Matrix Factorization (NMF) task from a statistical parametric perspective and to examine how NMF techniques can be applied to food consumption data. Such data are nonnegative by nature and of high dimension. The NMF model provides a representation of consumption data through latent vectors with nonnegative coefficients, we call consumption systems, in a small number. As the NMF approach may encourage sparsity of the data representation produced, the resulting consumption systems are easily interpretable. Whereas the majority of the literature dedicated to NMF focused on algorithmic issues, we formulate NMF, in a parametric context, as an identifiable statistical problem, for which M-estimation techniques, such as Maximum Likelihood Estimation (MLE), yield consistent estimates. The NMF method is finally applied to data issued from a French consumption survey.