Multidimensional Scaling - when the dissimilarity data are distributions

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Abstract

Multidimensional Scaling (MDS) is a powerful tool for analyzing dissimilarity data. In conventional MDS, the input dissimilarity data can be assumed (non-negative) real values. In this talk, we focus on dissimilarity data which are represented as distributions. We assume that the distributions are non-central chi-square. A method which constructs a configuration of concepts with normal distributions is proposed.

The dissimilarity between objects i and j is assumed as non-central chi-square $\chi^2(p, \delta_{ij}/\gamma_{ij})$ multiplied by a scalar (say γ_{ij}), i.e. $s_{ij} = \gamma_{ij}\chi^2(p, \delta_{ij}/\gamma_{ij})$. The purpose of the proposed method is to construct a configuration; $x_i \sim N(\mu_i, \alpha_i^2 I_p), i = 1, 2, \cdots, n$.

Examples for the proposed method are shown with actual data.