Multidimensional Scaling - when the dissimilarity data are distributions

Masahiro Mizuta
Hokkaido University, Sapporo 060-0811, Japan

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 $\chi^2(p, \delta_y / \gamma_y)$ multiplied by a scalar (say $\gamma_y$), i.e. $s_{ij} = \gamma_y \chi^2(p, \delta_y / \gamma_y)$. The purpose of the proposed method is to construct a configuration $x_i \sim N(\mu, \alpha_i^2 I_p)$, $i = 1, 2, \cdots, n$.

Examples for the proposed method are shown with actual data.