

Flexible Clustering via Mixtures of Skew- t Factor Analyzers with Common Factor Loadings

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Abstract

Mixtures of common t factor analyzers (MCtFA) have emerged as a powerful and flexible tool for handling model-based clustering of the high-dimensional data with heavy tails. However, the MCtFA model may still suffer from a lack of robustness against observations whose distributions are highly asymmetric. We propose a further robust extension of the MCtFA model, called the mixture of common restricted skew- t factor analyzers (MCrstFA), by assuming a restricted multivariate skew- t distribution for the common factors. The MCrstFA model can be used to accommodate severely non-normal (asymmetry and leptokurtic) random phenomena while preserving its parsimony in factor-analytic representation and performing graphical visualization in low-dimensional plots. A computationally feasible expectation conditional maximization either algorithm is developed to carry out maximum likelihood estimation. The usefulness of our proposed model is illustrated with simulated and real datasets, and experimental results signify its superiority over some existing competitors.

關鍵詞：Clustering · Common factor loadings · Dimensionality reduction · ECME algorithm · Factor analyzer · Outliers