**Flexible clustering via mixtures of multivariate skew-t-normal distributions**

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We propose a robust probabilistic mixture model based on the multivariate skew-t-normal (MSTN) distribution. This new mixture model includes mixtures of normal, t and skew-normal distributions as special cases and serves as a flexible alternative to recently proposed multivariate skew t mixtures. We develop an analytically tractable EM-based algorithm for computing maximum likelihood estimates of model parameters in which the skewness parameters and degrees of freedom are asymptotically uncorrelated. We also present a procedure of merging mixture components to automatically identify the number of clusters by fitting piecewise linear regression to the rescaled entropy plot. The utility and performance of the proposed methodology are illustrated by two real data examples.

***Keywords***: EM-type algorithms, Entropy, Flow cytometry, ICL, Skewness.

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