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Model-based clustering using mixtures of multivariate skewed power exponential distributions.

Mixtures of multivariate power exponential (MPE) distributions have been previously shown to be competitive for model-based clustering in comparison to other elliptical mixture distributions. Here, we introduce a family of mixtures of multivariate skewed power exponential distributions to combine the flexibility of the MPE distribution with the ability to model cluster-specific skewness. These mixtures are more robust to variations from normality and can model skewness, varying tail weight, and peakedness of data. For parameter estimation, a generalized expectation-maximization approach combining minorization-maximization and optimization based on accelerated line search algorithms on the Stiefel manifold is utilized. These mixtures are implemented both in the model-based clustering and classification frameworks. Both simulated and benchmark data are used for illustration and comparison to other mixture families. (Received August 08, 2019)