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A Mixture of Generalized Hyperbolic Distributions

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We introduce a mixture of generalized hyperbolic distributions as an alternative to the ubiquitous mixture of Gaussian distributions as well as their near relatives of which the mixture of multivariate t and skew-t distributions are predominant. The mathematical development of our mixture of generalized hyperbolic distributions model relies on its relationship with the generalized inverse Gaussian distribution. The latter is reviewed before our mixture models are presented along with details of the aforesaid reliance. Parameter estimation is outlined within the expectation-maximization framework before the performance of our mixture models is illustrated in clustering applications on simulated and real data. In particular, the ability of our models to recover parameters for data from underlying Gaussian, and skew-t distributions is demonstrated. Finally, the role of Generalized hyperbolic mixtures as a superclass as well as the anticipated impact of these models on the model-based clustering, classification and density estimation literature is discussed with special focus on the role of Gaussian mixtures.

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