1158-00-73 **Cristina Tortora*** (cristina.tortora@sjsu.edu), One Washington square, San Jose, CA 95112. *Adding flexibility in directional outlier detection and model-based learning.*

Model-based clustering assumes that the data were generated from a convex combination of densities. The choice of the density function is crucial; the multivariate contaminated normal distribution (MCN) was proposed to model datasets characterized by the presence of outliers. The MCN is a two-component Gaussian mixture; one of the components, with a large prior probability, represents the good observations, and the other, with a small prior probability, the same mean, and an inflated covariance matrix, represents the outliers. Mixtures of MCN distributions can detect outliers and perform cluster analysis improving the clustering performance when compared to normal mixtures and representing an alternative to t mixtures. However, the mixture of MCN distributions uses univariate parameters to model the proportion of outliers and their impact on the inflation parameter, i.e., they are the same for all the variables. This is a limit because the outliers may be different in each dimension. To overcome this issue, we propose a multiple scaled contaminated normal distribution with a p-dimensional proportion of outliers and degrees of contamination, where p is the number of variables. (Received February 20, 2020)