A new Image Segmentation method based on Finite Doubly Truncated Bivariate Gaussian Mixture Model is proposed in this paper. The Truncated Bivariate Gaussian Distribution includes several of the skewed and asymmetric distributions as particular cases with finite range. This distribution also includes the Gaussian distribution as a limiting case. We use Expectation
maximization (EM) algorithm to estimate the model parameters of the image data and the number of mixture components is estimated by using K-means Clustering algorithm. The K-means clustering algorithm is also utilized for developing the initial estimates of the EM-algorithm. The segmentation is carried out by clustering of feature vector into appropriate component according to the Maximum Likelihood Estimation criteria. The advantage of our method lies its efficiency on initialization of the model parameters and segmenting the images in a totally unsupervised manner. The performance of the proposed algorithm is studied by computing the segmentation performance measures like, PRI, GCE and VOI. The ability of this method for image retrieval is demonstrated by computing the image quality metrics for six images namely OSTRICH, POT, TOWER, BEARS, DEER and BIRD. The experimental results show that this method outperforms the existing model based image segmentation methods.

Reference

- Bengt Muthen (1990) “Moments of the censored and truncated bivariate normal distribution”, British Journal of Mathematical and Statistical psychology, No.43, pp.131-143.