

High dimensional spaces pose a challenge to any classification task. In fact, these spaces contain much redundancy and it becomes crucial to reduce the dimensionality of the data to improve analysis, density modeling, and classification. In this paper, we present a method for dimensionality reduction in mixture models and its use in classification. For each component of the mixture, the data are projected by a linear transformation onto a lower-dimensional space. Subsequently, the projection matrices and the densities in such compressed spaces are learned by means of an Expectation Maximization (EM) algorithm. However, two main issues arise as a result of implementing this approach, namely: 1) the scale of the densities can be different across the mixture components and 2) a singularity problem may occur. We suggest solutions to these problems and validate the proposed method on three image data sets from the UCI Machine Learning Repository. The classification performance is compared with that of a mixture of probabilistic principal component analysers (MPPCA). Across the three data sets, our accuracy always compares favourably, with improvements ranging from 2.5% to 35.4%.