

Deep Gaussian Mixture Models

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In the recent years, there has been an increasing interest on deep learning for classification and clustering tasks. Deep learning is a hierarchical inference method formed by subsequent multiple layers of learning able to more efficiently describe complex relationships. In this work, Deep Gaussian Mixture Models are introduced and discussed.

A Deep Gaussian Mixture model (DGMM) is a network of multiple layers of latent variables, where, at each layer, the variables follow a mixture of Gaussian distributions. Thus, the deep mixture model consists of a set of nested mixtures of linear models, which globally provides a nonlinear model able to describe the data in a very flexible way. In order to avoid over parameterized solutions, dimension reduction by factorial models can be applied at each layer of the architecture thus resulting in deep mixtures of factor analyzers.