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Lappeenranta University of Technology

LUT Machine Vision and Pattern Recognition

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BM40A0700 Pattern Recognition

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Exercise 6 solutions: Parameter estimation and classification

1. Maximum Likelihood (ML) versus Bayesian parameter estimation (2 points): not published.
2. Multivariate Gaussian mixture (2 points): The Matlab function

```
[mu, Sigma, P] = em_gmm(traindata, J)
```

is given as a separate file.

The mixtures resulting from experiments with the given data are shown in Fig. 1.

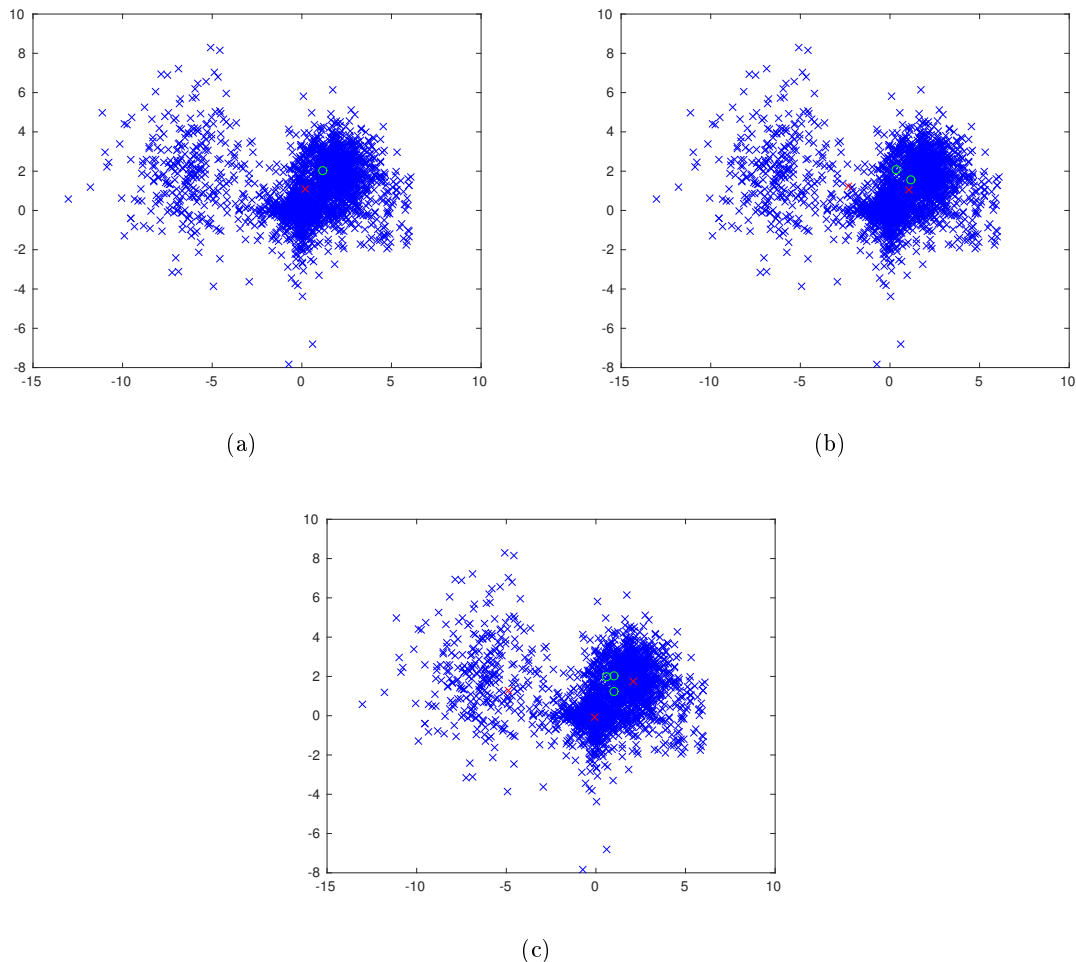


Figure 1: Estimated Gaussian mixtures with (a) one, (b) two, and (c) three components. The green circles mark the initial component means, whereas the red crosses mark the final ones.

Additional files: em_gmm.m, gmmdata.mat.

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3. Statistical classifier with training data (2 points): The Matlab function

```
function C = bayes3(trainclass, traindata, data)
```

performing Bayesian classification with a Gaussian distribution model is given as a separate file. The means, covariance matrices and a priori probabilities for each class are estimated from the training data.

Additional files: bayes1.m, bayes1data.mat, bayes3.m, confmatr.m.