Lecture 10: Image classification

Spatial Statistics and Image Analysis

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Image classification

- Assume that we have a set of images $\mathbf{x}_1, \ldots, \mathbf{x}_n$ that can be divided into K different classes.
- We want use these images to train a classifier which can be used to classify new images.

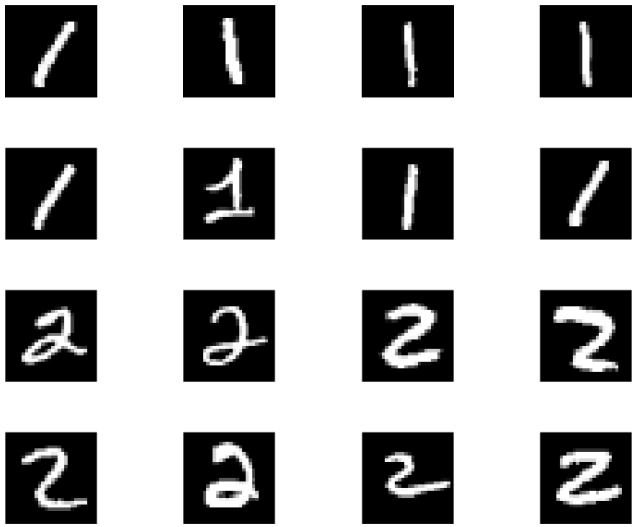
Supervised learning

We also have access to the labels $z_1, \ldots, z_N$ for each image in the training data, which we use when training the classifier.

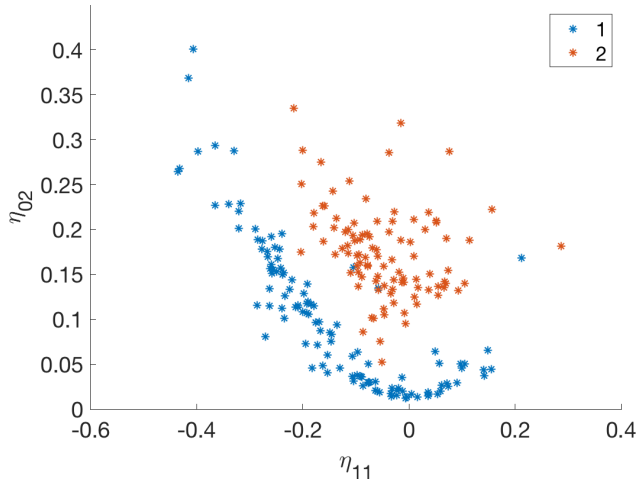
Unsupervised learning

We train the model without any label information (cluster analysis).

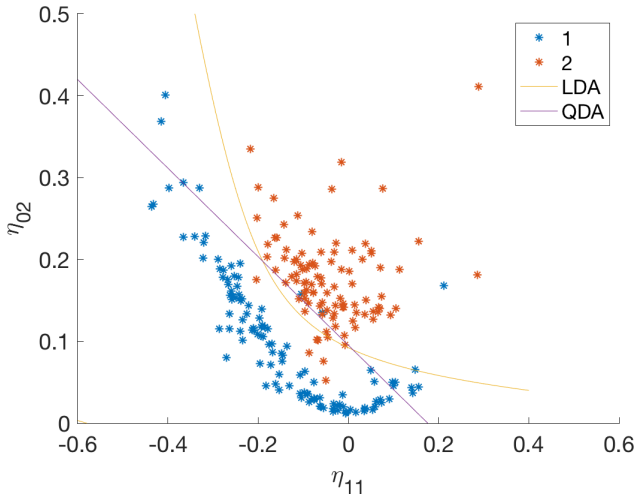
MINST data



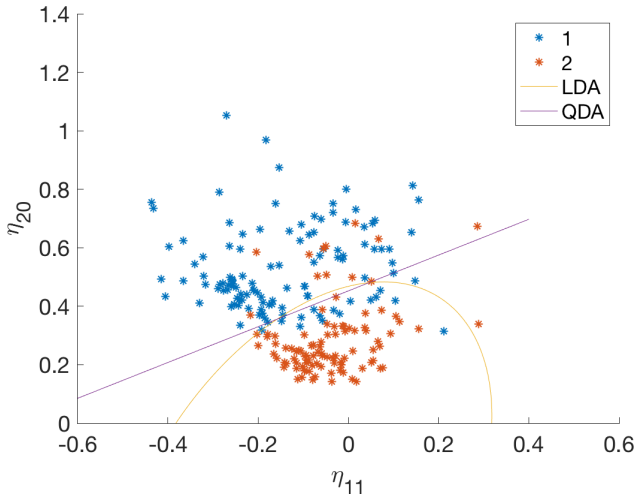
Scale invariant moments



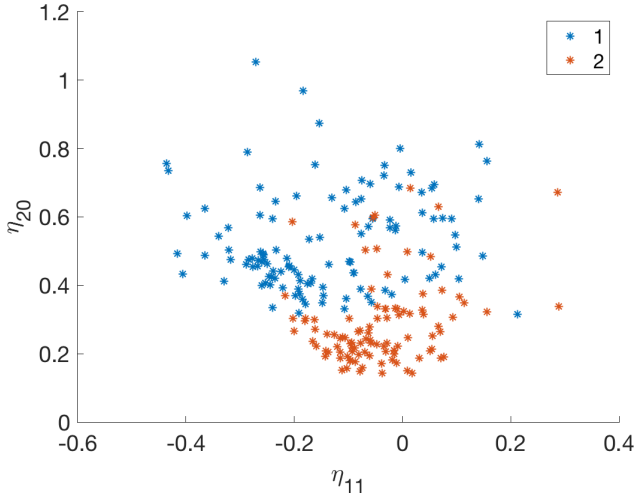
LDA and QDA



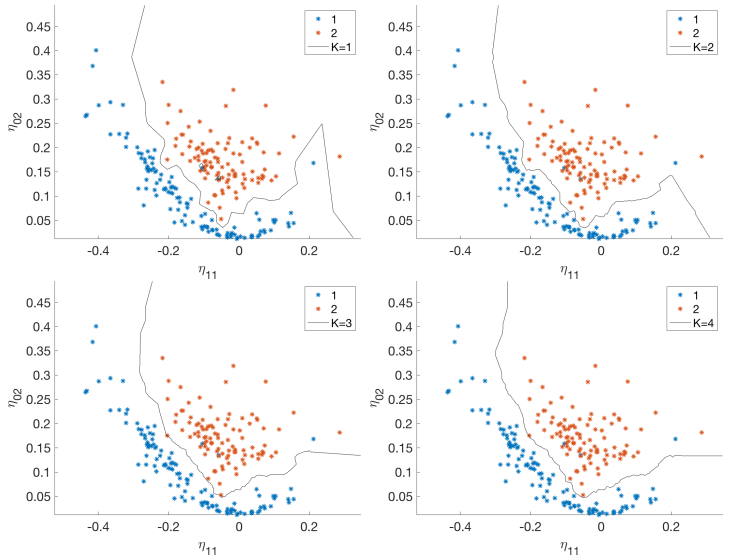
LDA and QDA



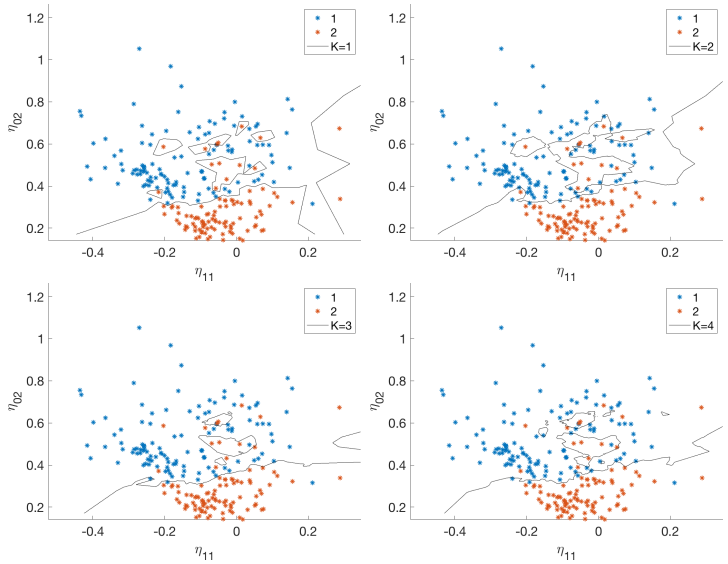
Scale invariant moments



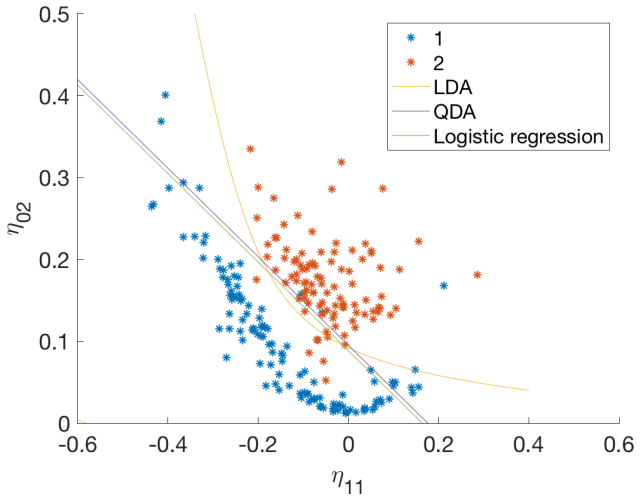
KNN results



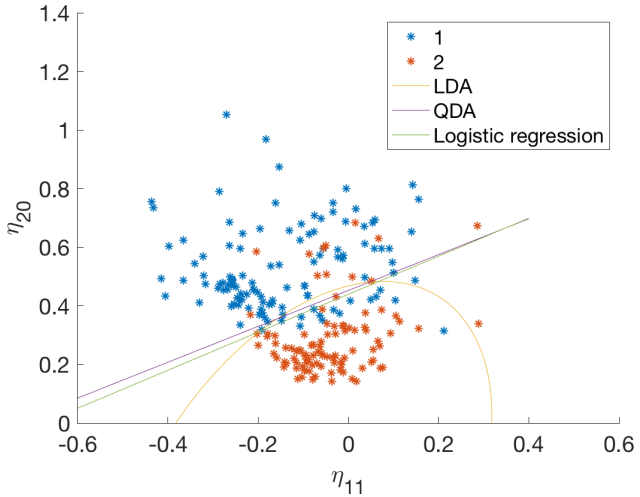
KNN results



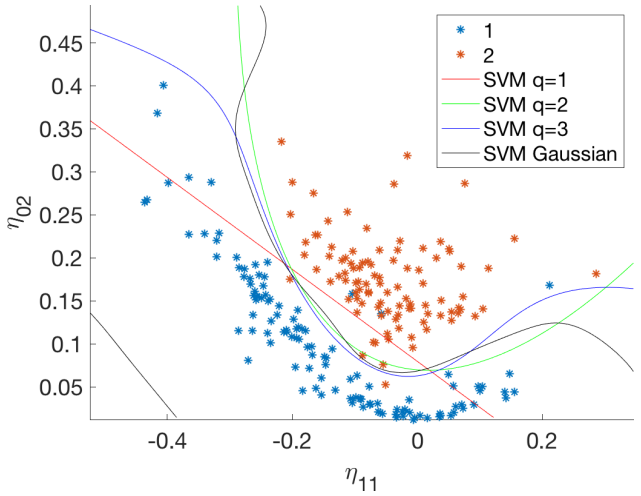
Comparison



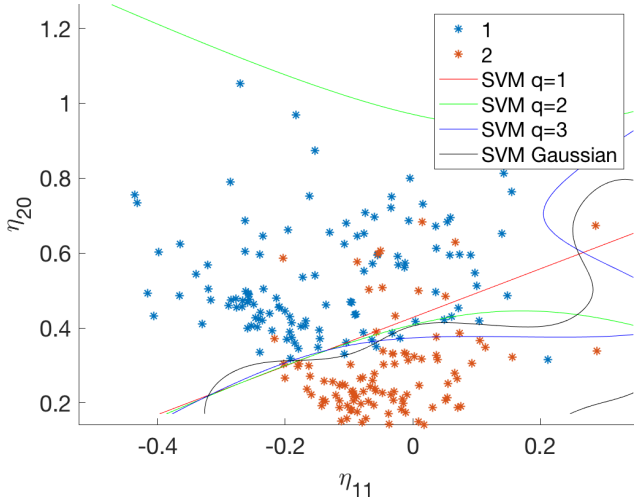
Comparison



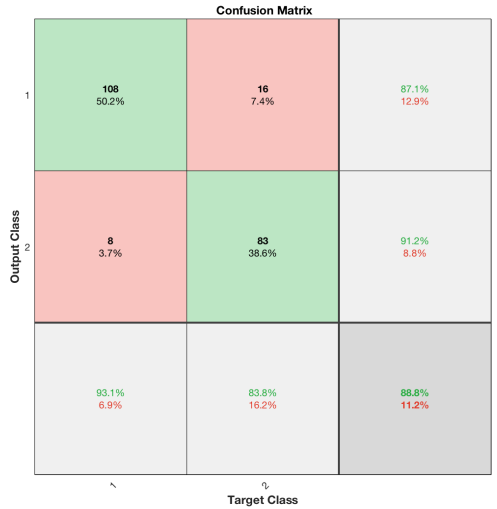
SVM results



SVM results



Confusion matrix for 5-fold crossvalidation



Confusion matrix for the SVM with Gaussian kernel