

IN 5520 2020

Classification 1

Exercises related to the lecture on 7.10.20

A light exercise set to get you started on classification. You will need to implement your own Gaussian classifier for mandatory exercise 2.

All images/files are under undervisningsmateriale/images. Start by downloading them (images tm*.png).

Remark: NO solution to this implementation exercise will be given, as Mandatory 2 builds on it.

Exercise 1.

Matlab exercise for classification based on a univariate Gaussian classifier.

Step 1: Implement a Gaussian classifier using a single feature at a time.

For the algorithm, see last lecture foils

The image tm1.png to tm6.png contain the 6 original bands of a Landsat satellite image of Kjeller (corresponding to different wavelengths).

For images = tm1.png, tm2.png,... tm6.png do

Step 2: Train the classifier

Train the classifier on the image tm\$.png (replace with the band number \$) (band (found at undervisningsmateriale/week7) using the 4 classes defined in the mask file tm_train.png. You do this by computing the mean vector and variance for each class k based on the pixels with class label k in the training mask file.

Classify all pixels in the image and save the estimated class labels in an image. Display this image.

Compute the classification error by counting the number of misclassified pixels in the test mask

tm_test.png (contains the true labels for the test pixels).

(We have one satellite image, and only the pixels in the training mask are used to estimate the parameters μ and σ . Only the pixels in the test mask are used to compute the classification accuracy. We can still display the entire classified image to look at the result).

Step 3: Find the best feature for classification using single features.

Compute the percentage of correctly classified pixels for each of the features alone, and find the accuracy for the best single feature.

