INF 4300 2016

Classification 1

Exercises related to the lecture on 26.09.16

A small set of exercises until we dive deeper into classification, but with mandatory 1 due soon this is probably OK. Mandatory 2 will require you to implement a classifier, so do it now ☺

The images used in the exercise are found at
http://www.uio.no/studier/emner/matnat/ifi/INF4300/h15/undervisningsmateriale/week7/

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 for lecture 14.10.15

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

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 ~inf3300/www_docs/bilder) 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 for 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 mu and sigma. 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.