



Information Retrieval in High Dimensional Data

Lab #11, 01.02.2018

SVM

Task 1. In this task, we will once again work with the MNIST set. Prepare a training set matrix `X_train` consisting of the first 500 vectorized training samples of digits 1 and 2 each, and a corresponding label vector `y_train`. Use 1 and -1 for the labels.

- a) Write the function `simplesvm` which expects a training data matrix `X_train`, a training label vector `y_train` and a test data matrix `X_test` as its input. As a result, it returns the estimated test label vector `y_test`. To this end, employ `solvedualsvm` from the last lab course. Note that (8.29) in the lecture notes is overdetermined. You can exploit this to get a more robust estimation of b . Test your implementation with another 800 images from the MNIST data set.
- b) Implement `kernelsvm(X_train, y_train, sigma, X_test)` which works the same way as `simplesvm` - but in the feature space described by the Gaussian kernel. Test your implementation with different values for `sigma`.