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Exercises and Labs 9 for Lecture "Authentication „ (M.Sc.)

Lab 9.1 Consider datasets *xyz.dat* provided previously.
Corresponding scripts are *xyz_load.m*

Consider initial classifiers *LDA* or *SVM* for the datasets.

a) For original dimension d of the feature space apply ComRef method for dimensionality reduction into spaces $d-1$ and calculate new features.

b) Recalculate classifiers in the $d-1$ dimensional spaces. Possible procedures are:

1. Initial by LDA & refinement by SVM;
2. Initial by SVM & refinement by LDA;
3. Initial by SVM & refinement by SVM.

c) Find $d-1$ dimensional feature spaces, where recalculated classifiers have stronger generalisation abilities as in the original feature space, i.e. classification performance tests (e.g. by 50/50% Holdout Method) possess higher accuracies as well as smaller variancies (e.g. by 5-fold cross validation).

Remark: You will find useful information regarding number of $d-1$ dimensional spaces and how to construct all of them in this publication:
H. Dörksen and V. Lohweg, "Combinatorial Refinement of Feature Weighting for Linear Classification," in 19th IEEE Int. Conf. on Emerging Technologies and Factory Automation (ETFA 2014), 2014.

Lab 9.2 Consider initial classifiers *LDA* or *SVM* for provided datasets.

a) - c) As in Lab 9.1 within dimensionality reduction into 2D feature spaces.

d) Visualise the classes in the one of the 2D feature spaces. Visualise the original classifier and its refinement.

Remark: In the publication mentioned before you will find useful information.