MatLab® code for the paper “Kernel Optimization in Discriminant Analysis,” IEEE Trans. On Pattern Analysis and Machine Intelligence, 2011.

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This code is an implementation of the Homoscedastic criterion for discriminant analysis described in:

Di You, Onur C. Hamsici and Aleix M. Martinez, “Kernel Optimization in Discriminant Analysis”, IEEE Trans. On Pattern Analysis and Machine Intelligence, 2011.

Use of this software is granted for basic research at non-for profit institutions only. Commercial use of this software is not permitted. Corporations or for-profit institutions interested in the use of this software should contact Prof. Aleix M. Martinez.

This directory contains the following files:

File: Maxhomo.m

Description: This file contains the implementation of the Homoscedastic criterion described in the paper cited above. Check the file for the description of parameters.

File: KSDA\_MaxHomo.m

Description: This function implements the Kernel Subclass Discriminant Analysis (KSDA) for classification with the kernel parameter and subclass divisions optimized by the Homoscedastic criterion.

File: Demo.m

Description: This demo consists of two parts: visualization and classification. First, data from two mixtures of Gaussians are generated as an XOR format and each class represents a mixture of two Gaussian distributions. Kernel Subclass Discriminant Analysis (KSDA) or Kernel Discriminant Analysis (KDA) is used to discriminate two classes. The RBF kernel parameter and the subclass divisions are optimized by the Homoscedastic criterion. First, the discriminant function is plotted and one can visualize the classification boundary. Testing samples from the same distributions are generated and classified. The classification accuracy obtained by the nearest neighbor classifier in the kernel subspace is shown.

File: NNclustering.m

Description: This function re-orders the data according to Nearest Neighbor rule.

File: get\_NH.m

Description: This function clusters the re-ordered data in each class into a known number of subclasses.

File: KSDA.m

Description: This function implements the Kernel Subclass Discriminant Analysis (KSDA) approach described in the paper.

File: NearestNeighbor.m

Description: This function implements the nearest neighbor classifier.

File: Nmean.m

Description: This function implements the nearest mean classifier.