

Pattern Recognition

Tutorial No. 6 06.06.2014

Exercise 16

The 8 corners of a cube are divided into 2 classes Δ_1 and Δ_2 , using the following segmentation:

$$\boldsymbol{\Omega}_{1} = \left\{ \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \end{bmatrix} \end{bmatrix} \right\} \qquad \boldsymbol{\Omega}_{2} = \left\{ \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \end{bmatrix} \end{bmatrix} \right\}$$

- a) Show graphically, that the classes can be separated linear in the 3-dimensional space.
- b) Transform the patterns in a 2-dimensional space, using a KLT with the 2 largest eigenvalues.
- c) Can the patterns be separated in the reduced feature space?
- d) Can the patterns be separated in the reduced feature space, when a LDA-preprocessing is applied?