CS 557: PATTERN RECOGNITION AND LEARNING
QUIZ 3
FALL 2016

PROBLEM

Given the following statistics:

$\boldsymbol{\mu}_1 = (1,1,1)$

$\boldsymbol{\mu}_2 = (0,1,0)$

$$S_w = \begin{pmatrix} 1/4 & 0 & 0 \\ 0 & 1/2 & 0 \\ 0 & 0 & 1/3 \end{pmatrix}$$

Map the following points using LDA: (0,0,0), (1,0,1), (2,0,0)

SOLUTION

the weight vector is computed as

$$\mathbf{w} = S_w^{-1}(\boldsymbol{\mu}_1 - \boldsymbol{\mu}_2)$$

When putting in the values in the above expression and normalizing **w** we get:

$$\mathbf{w} = [-4/5 \quad 0 \quad -3/5]^T$$

The mapping of the three points is given by (take the dot product with **w**):

(0,0,0) mapped to 0

(1,0,1) mapped to -7/5

(2,0,0) mapped to -8/5