

STAT 432 Linear Discriminant Analysis

Spring 2018 / Dalpiaz / UIUC

Recall that the pdf of a Normal random variable, X , with mean μ and variance σ^2 is given by

$$f(x | \mu, \sigma) = \frac{1}{\sigma\sqrt{2\pi}} \exp\left[-\frac{1}{2}\left(\frac{x - \mu}{\sigma}\right)^2\right].$$

Consider the following estimates and information from data for a two-class classification problem:

Class A	Class B
$\hat{\mu}_A = 2$	$\hat{\mu}_B = 4$
$\hat{\sigma}_A^2 = 3$	$\hat{\sigma}_B^2 = 5$
$n_A = 10$	$n_B = 30$

Use LDA to answer the following questions. Assume all estimates given are unbiased. All estimates used should be unbiased.

(a) Classify y when $x = 2.7$.

(b) Give an estimate of the probability $P[Y = B | X = 3.8]$.

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(c) Find the decision boundary. (Hint: It should be a single value of x . The result may be somewhat surprising.)