FACULTY OF BIOSCIENCE ENGINEERING
Masters of Bioinformatics
Support Vector Machines

KU LEUVEN

Support Vector Machine Assignment

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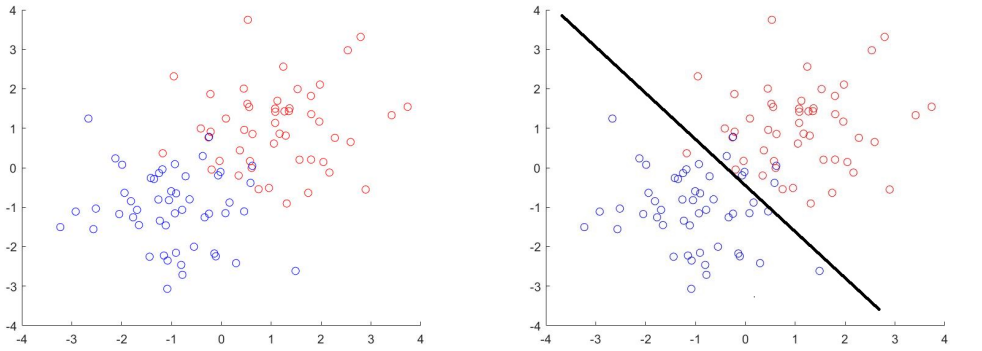
Contents

1 Objectives

The objectives of this assignment are to learn and work with real life applications of SVM.

2 Simple 2 Gaussian

This sections looks at two simulated datasets. The datasets are created using the MatLab *randn*() function. One dataset is centered around (1,1) and the other (-1,1)



(a) Two Gaussians (b) Two Gaussians with optimal classifier

Figure 1: (a) Two Simulated Datasets. (b) Two Simulated Datasets with Optimal Classifier.

Given this figure, can you make a geometric construction using lines to estimate the optimal classifier? Under which conditions do you think this construction is optimal/-valid?

Figure 1:a is the output of the simulated datasets. As shown in figure 1:b it is possible to show an optimal classifier. This classifier is known as the Bayes Classifier. A test observation is assigned with predictor vector x_0 to the class j for which

$$Pr(Y = j|X = x_0)$$

is largest. The classifier is optimal because it produces the lowest possible error rate and allows for some overlap. The classifier is valid because the underlying distribution of the dataset is known.

3 The Support Vector Machine