

BRSU

Neural Networks Assignment 9

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1 EXERCISE 2

1.1 TASK

The graphs below represent three different one-dimensional classification (dichotomization) tasks (along a sketched x-axis, dash means "no data point")(figure 1.1. What is the lowest-order polynomial decision function that can correctly classify the given data? Black dots denote class 1 with target function value $y_1 = +1$ and white dots depict class 2 with targets $y_2 = -1$. What are the decision boundaries?

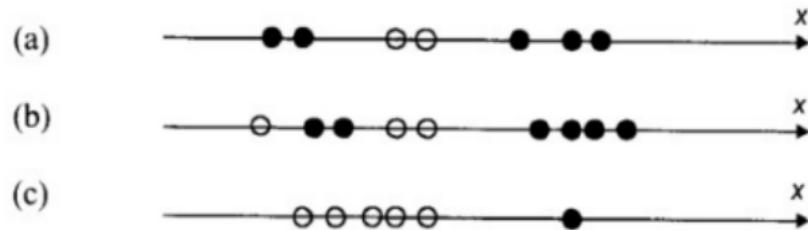


Figure 1.1:

If you wanted to classify the data sets (a), (b), (c) using SVM's with Gaussian basis functions, how many hidden layer neurons would you need for each problem?

1.2 SOLUTION

The order depends on the number of turning points. For one turning point a polynomial of order 2 is needed.

(a) The lowest order polynomial would be 2 (parabola).

(b) The lowest order polynomial would be 3.

(c) The lowest order polynomial would be 1 (line).

The number of hidden layer neurons equals the order of the polynomial needed -1.

2 EXERCISE 3