Practice Problems

Apr 13th 2021

Given a training dataset $D = \{((2,3),1),((1,1),1),((1.5,2),1),((4,2),-1),((3.5,1),-1),((2,0),-1)\}$

1. Train a SVM in `scikit learn` (use the class `SVC`).

2. From the trained model get the parameters learned: the α coefficients, the support vectors and the intercept.

3. Define a discriminant functions in terms of the parameters of the model. Apply the function to the training samples. Verify that the function evaluated over the support vectors produce the right values.

4. Calculate the value of w.

5. Calculate the magnitude of the margin.

6. Plot the training data, the discriminant function and the classification boundary with the corresponding margins.

References

[SC04]   Shawe-Taylor, J. and Cristianini, N. 2004 Kernel Methods for Pattern Analysis. Cambridge University Press.

[Alp2014] Alpaydin, E. Introduction to Machine Learning, 3Ed. The MIT Press, 2014