Trevor Tracy

A8.m

1. [Experimenting observations shown in 3. & 4.]

2. Per the instructions, here are the stats for each class prediction under each (or most) of my “box constraint” and “kernel scale” predictions.

[These were generated using all 13 columns of input data, using an RBF SVM model]

>Constraint = 1 & Kernel = Default

Text

Description automatically generated with medium confidence

>Constraint = 1 & Kernel = 1

Text

Description automatically generated with medium confidence

>Constraint = 0.1 & Kernel = 0.1

A picture containing chart

Description automatically generated

>Constraint = 0.1 & Kernel = 5

Text

Description automatically generated

>Constraint = 1 & Kernel = 5

Text

Description automatically generated

3/4. Upon experimenting, it appears that setting a larger box constraint seems to increase the weight of misclassifications, which leads to a stricter separation between our two-class model.

[For simpler generation of the visual decision boundary, these were generated using 2 features for inputs instead of all 13]

Chart

Description automatically generatedChart

Description automatically generated

Additionally, when modifying the Kernel Scales, lowering the value appears to reduce the decision boundary around the testing data. The following shows a representation of that in this exercise.

Chart

Description automatically generated Chart

Description automatically generated with medium confidence Chart

Description automatically generated

So as the box constraint value decreases, we end up with a simpler model. On the other hand, increasing the kernel scale seem to have the opposite effect of creating a simpler decision boundary by adjusting it’s “individual neighborhood”.

5. Using all 13 columns of input data, the following ROC Curves were generated using “box constraint=1” and “kernel scales=1”:

Chart

Description automatically generatedChart

Description automatically generated