Artificial Intelligence and Machine Learning Fundamentals

Activity 9: Support Vector Machine Optimization in scikit-learn

This section will discuss how to use the different parameters of a Support Vector Machine classifier. We will be using comparing and contrasting the different support vector regression classifier parameters you learned and find a set of parameters resulting in the highest classification data on the training and testing data loaded and prepared in previous activity. And to ensure that it happens correctly, you will need to have completed the previous activities and exercises.

We will try out a few combinations. You may choose different parameters:

1. Linear kernel
   ```
   classifier = svm.SVC(kernel="linear")
   classifier.fit(features_train, label_train)
   classifier.score(features_test, label_test)
   ```
2. Polynomial kernel of degree 4, C=2, gamma=0.05
   ```
   classifier = svm.SVC(kernel="poly", C=2, degree=4,
   gamma=0.05)
   classifier.fit(features_train, label_train)
   classifier.score(features_test, label_test)
   ```
   The output is as follows: 0.705.
3. Polynomial kernel of degree 4, C=2, gamma=0.25
   ```
   classifier = svm.SVC(kernel="poly", C=2, degree=4,
   gamma=0.25)
   classifier.fit(features_train, label_train)
   classifier.score(features_test, label_test)
   ```
   The output is as follows: 0.76.
4. Polynomial kernel of degree 4, C=2, gamma=0.5
   ```
   classifier = svm.SVC(kernel="poly", C=2, degree=4,
   gamma=0.5)
   classifier.fit(features_train, label_train)
   classifier.score(features_test, label_test)
   ```
   The output is as follows: 0.72.
5. Sigmoid kernel
   ```
   classifier = svm.SVC(kernel="sigmoid")
   classifier.fit(features_train, label_train)
   classifier.score(features_test, label_test)
   ```
   The output is as follows: 0.71.
6. Default kernel with a gamma of 0.15
   ```
   classifier = svm.SVC(kernel="rbf", gamma=0.15)
   classifier.fit(features_train, label_train)
   classifier.score(features_test, label_test)
   ```
   The output is as follows: 0.76.