

```

> library(e1071)
> data(iris)
> head(iris)
  Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1      5.1         3.5         1.4      0.2      setosa
2      4.9         3.0         1.4      0.2      setosa
3      4.7         3.2         1.3      0.2      setosa
4      4.6         3.1         1.5      0.2      setosa
5      5.0         3.6         1.4      0.2      setosa
6      5.4         3.9         1.7      0.4      setosa
> set.seed(123)
> indices <- sample(1:nrow(iris), 0.8 * nrow(iris))
> train_data <- iris[indices, ]
> train_labels <- iris$Species[indices]
> test_data <- iris[-indices, ]
> test_labels <- iris$Species[-indices]
> nrow(iris)
[1] 150
> nrow(train_data)
[1] 120
> nrow(test_data)
[1] 30
> svm_model <- svm(train_data, train_labels, kernel = "radial", cost = 1)
> svm_model

Call:
svm.default(x = train_data, y = train_labels, kernel = "radial", cost = 1)

Parameters:
  SVM-Type:  C-Classification
  SVM-Kernel: radial
             cost: 1

Number of Support Vectors: 46
> svm_predictions <- predict(svm_model, test_data)
> svm_predictions
      1      2      3      11      18      19      28      33      36      48      55
setosa  setosa  setosa  setosa  setosa  setosa  setosa  setosa  setosa  setosa  versicolor
56      57      58      59      61      62      65      66      70      77      83
versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor
84      98     100     105     113     125     131     141     141     141     141
virginica  versicolor versicolor virginica  virginica  virginica  virginica  virginica  virginica  virginica  virginica
Levels: setosa versicolor virginica
> confusion_matrix <- table(Actual = test_labels, Predicted = svm_predictions)
> accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix)
> cat("Confusion Matrix:\n", confusion_matrix, "\n")
Confusion Matrix:
10  0  0 14  0  1  5
10  0  0 14  0  1  5
> cat("Accuracy: ", accuracy, "\n")
Accuracy:  0.966667

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> confusionMatrix(svm_predictions, test_labels)
Confusion Matrix and Statistics

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      Reference
Prediction setosa versicolor virginica
setosa      10         0         0
versicolor  0        14         0
virginica   0         1         5

```

overall statistics

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Accuracy : 0.9667
95% CI : (0.8278, 0.9992)
No Information Rate : 0.5
P-value [Acc > NIR] : 2.887e-08

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Kappa : 0.9464

McNemar's Test P-value : NA

Statistics by Class:

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      Class: setosa Class: versicolor Class: virginica
Sensitivity      1.0000      0.9333      1.0000
Specificity      1.0000      1.0000      0.9600
Pos Pred Value   1.0000      1.0000      0.8333
Neg Pred Value   1.0000      0.9375      1.0000
Prevalence       0.3333      0.5000      0.1667
Detection Rate   0.3333      0.4667      0.1667
Detection Prevalence 0.3333      0.4667      0.2000
Balanced Accuracy 1.0000      0.9667      0.9800

```