**SUPPORT VECTOR MACHINE**

# DATATYPES:Here the input data is continuous datatype and the output is dicrete datatype

## SYNTAX:

**Data() # Know the default dataset**

**Data(“iris”) # Take the IRIS dataset from the default dataset**

**View(iris) # View the iris datafile**

**Attach(iris) # Attach the file to the program**

**Library(e1071) # Install the package from the library**

**Final\_svm<-svm(species~.,data=iris) # Build the svm default method will execute kernel of radial method**

**Summary(final\_svm) # Summary of the dataset**

Call:

svm(formula = Species ~ ., data = iris)

Parameters:

SVM-Type: C-classification

SVM-Kernel: radial

cost: 1

Number of Support Vectors: 51

( 8 22 21 )

Number of Classes: 3

Levels:

setosa versicolor virginica

**pred<-predict(final\_svm,iris) # Prediction of default radial method**

**pred**

1 2 3 4 5 6 7 8 9 10 11

setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa

12 13 14 15 16 17 18 19 20 21 22

setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa

23 24 25 26 27 28 29 30 31 32 33

setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa

34 35 36 37 38 39 40 41 42 43 44

setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa

45 46 47 48 49 50 51 52 53 54 55

setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor

56 57 58 59 60 61 62 63 64 65 66

versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor

67 68 69 70 71 72 73 74 75 76 77

versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor

78 79 80 81 82 83 84 85 86 87 88

virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor

89 90 91 92 93 94 95 96 97 98 99

versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor

100 101 102 103 104 105 106 107 108 109 110

versicolor virginica virginica virginica virginica virginica virgin

111 112 113 114 115 116 117 118 119 120 121

virginica virginica virginica virginica virginica virginica virginica virginica virginica versicolor virginica

122 123 124 125 126 127 128 129 130 131 132

virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica

133 134 135 136 137 138 139 140 141 142 143

virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica

144 145 146 147 148 149 150

virginica virginica virginica virginica virginica virginica virginica

Levels: setosa versicolor virginica

**Tab<-table(predicted=pred,actual=iris$species) # Create a table for predicted method**

**Tab**

Actual

predicted setosa versicolor virginica

setosa 50 0 0

versicolor 0 48 2

virginica 0 2 48

**sum(diag(tab))/sum(tab) # Percentage of the predicted value**

[1] 0.9733333

**Svm\_linear<-svm(species~.,data=iris,kernel=”linear”) # Build the algorithm using linear methods**

**Summary(svm\_linear) # Summary of the dataset**

Call:

svm(formula = Species ~ ., data = iris, kernel = "linear")

Parameters:

SVM-Type: C-classification

SVM-Kernel: linear

cost: 1

Number of Support Vectors: 29

( 2 15 12 )

Number of Classes: 3

Levels:

setosa versicolor virginica

**pred<-predict(svm\_linear,iris) # Prediction of linear method**

**pred**

|  |
| --- |
| 1 2 3 4 5 6 7 8 9 10 11  setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa  12 13 14 15 16 17 18 19 20 21 22  setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa  23 24 25 26 27 28 29 30 31 32 33  setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa  34 35 36 37 38 39 40 41 42 43 44  setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa  45 46 47 48 49 50 51 52 53 54 55  setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor  56 57 58 59 60 61 62 63 64 65 66  versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor  67 68 69 70 71 72 73 74 75 76 77  versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor  78 79 80 81 82 83 84 85 86 87 88  virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor  89 90 91 92 93 94 95 96 97 98 99  versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor  100 101 102 103 104 105 106 107 108 109 110  versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica  111 112 113 114 115 116 117 118 119 120 121  virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica  122 123 124 125 126 127 128 129 130 131 132  virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica  133 134 135 136 137 138 139 140 141 142 143  virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica  144 145 146 147 148 149 150  virginica virginica virginica virginica virginica virginica virginica  Levels: setosa versicolor virginica |
|  |
| |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Tab<-table(predicted=pred,actual=iris$species) # Create a table for predicted method**  **Tab**   |  | | --- | | Actual  predicted setosa versicolor virginica  setosa 50 0 0  versicolor 0 46 1  virginica 0 4 49 | |  | | |  | | --- | |  | |   **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**  [1] 0.9666667  **Library(kernlab) # Install the package from the library**  **Svm\_nonlinear<-kvsm(species~.,data=iris,kernel=”rbfdot”) # Build the algorithm**  **Using nonlinear methods**  **Summary(svm\_nonlinear) # Summary of the dataset**   |  | | --- | | Length Class Mode  1 ksvm S4 | |  | | |  | | --- | |  | |   **Prediction<-predict(svm\_nonlinear,iris) # Prediction of nonlinear method**  **Pred**  1 2 3 4 5 6 7 8 9 10 11  setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa  12 13 14 15 16 17 18 19 20 21 22  setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa  23 24 25 26 27 28 29 30 31 32 33  setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa  34 35 36 37 38 39 40 41 42 43 44  setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa  45 46 47 48 49 50 51 52 53 54 55  setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor  56 57 58 59 60 61 62 63 64 65 66  versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor  67 68 69 70 71 72 73 74 75 76 77  versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor  78 79 80 81 82 83 84 85 86 87 88  virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor  89 90 91 92 93 94 95 96 97 98 99  versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor  100 101 102 103 104 105 106 107 108 109 110  versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica  111 112 113 114 115 116 117 118 119 120 121  virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica  122 123 124 125 126 127 128 129 130 131 132  virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica  133 134 135 136 137 138 139 140 141 142 143  virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica  144 145 146 147 148 149 150  virginica virginica virginica virginica virginica virginica virginica  Levels: setosa versicolor virginica  **Table(prediction)**   |  | | --- | | prediction  setosa versicolor virginica  50 50 50 | |  | | |  | | --- | |  | | | |
| |  | | --- | |  | |  | | |  | | --- | |  | | |
|  |
| |  | | --- | |  | |
|  |

**Prop.table(table(prediction))**

|  |
| --- |
| prediction  setosa versicolor virginica  0.3333333 0.3333333 0.3333333 |
|  |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Prop.table(table(prediction))**   |  | | --- | | **prediction**  **setosa versicolor virginica**  **0.3333333 0.3333333 0.3333333** |   **Tab<-table(prediction=prediction,actual=iris$species) # Create a table for predicted**  **Method**  **Tab**   |  | | --- | | **Actual**  **prediction setosa versicolor virginica**  **setosa 50 0 0**  **versicolor 0 46 1**  **virginica 0 4 49** | |  | | |  | | --- | |  | | | | |  | | --- | |  | |   **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **[1] 0.9733333**  **Svm\_nonlinear<-kvsm(species~.,data=iris,kernel=”polydot”) # Build the algorithm**  **Using nonlinear methods**  **Summary(svm\_nonlinear) # Summary of the dataset**   |  | | --- | | **Length Class Mode**  **1 ksvm S4** |   **Prediction<-predict(svm\_nonlinear,iris) # Prediction of nonlinear method**  **pred**  **1 2 3 4 5 6 7 8 9 10 11**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **12 13 14 15 16 17 18 19 20 21 22**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **23 24 25 26 27 28 29 30 31 32 33**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **34 35 36 37 38 39 40 41 42 43 44**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **45 46 47 48 49 50 51 52 53 54 55**  **setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor**  **56 57 58 59 60 61 62 63 64 65 66**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **67 68 69 70 71 72 73 74 75 76 77**  **versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor**  **78 79 80 81 82 83 84 85 86 87 88**  **virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor**  **89 90 91 92 93 94 95 96 97 98 99**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **100 101 102 103 104 105 106 107 108 109 110**  **versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **111 112 113 114 115 116 117 118 119 120 121**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **122 123 124 125 126 127 128 129 130 131 132**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **133 134 135 136 137 138 139 140 141 142 143**  **virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **144 145 146 147 148 149 150**  **virginica virginica virginica virginica virginica virginica virginica**  **Levels: setosa versicolor virginica**  **Table(prediction)**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Prediction**  **setosa versicolor virginica**  **50 47 53**  **prop.table(table(prediction))**   |  | | --- | | **Prediction**  **setosa versicolor virginica**  **0.3333333 0.3133333 0.3533333** | | **Tab<-table(prediction=prediction,actual=iris$species) # Create a table for predicted**  **Method**  **Tab**   |  | | --- | | **Actual**  **prediction setosa versicolor virginica**  **setosa 50 0 0**  **versicolor 0 46 1**  **virginica 0 4 49** | | **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **[1] 0.9666667**  **Svm\_nonlinear<-kvsm(species~.,data=iris,kernel=”tanhdot”) # Build the algorithm**  **Using nonlinear methods**  **Summary(svm\_nonlinear) # Summary of the dataset**  **Length Class Mode**  **1 ksvm S4**  **Prediction<-predict(svm\_nonlinear,iris) # Prediction of nonlinear method**  **pred**  **1 2 3 4 5 6 7 8 9 10 11**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **12 13 14 15 16 17 18 19 20 21 22**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **23 24 25 26 27 28 29 30 31 32 33**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **34 35 36 37 38 39 40 41 42 43 44**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **45 46 47 48 49 50 51 52 53 54 55**  **setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor**  **56 57 58 59 60 61 62 63 64 65 66**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **67 68 69 70 71 72 73 74 75 76 77**  **versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor**  **78 79 80 81 82 83 84 85 86 87 88**  **virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor**  **89 90 91 92 93 94 95 96 97 98 99**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **100 101 102 103 104 105 106 107 108 109 110**  **versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **111 112 113 114 115 116 117 118 119 120 121**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **122 123 124 125 126 127 128 129 130 131 132**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **133 134 135 136 137 138 139 140 141 142 143**  **virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **144 145 146 147 148 149 150**  **virginica virginica virginica virginica virginica virginica virginica**  **Levels: setosa versicolor virginica**  Table(prediction)   |  | | --- | | Prediction  setosa versicolor virginica  54 54 42  **prop.table(table(prediction))**  prediction  setosa versicolor virginica  0.36 0.36 0.28 | | **tab<-table(prediction=prediction,actual=iris$species) # Create a table for predicted**  **Method**  **Tab**  Actual  prediction setosa versicolor virginica  setosa 50 4 0  versicolor 0 27 27  virginica 0 19 23  **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | [1] 0.6666667     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | |  | | |  | | --- | |  | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Svm\_nonlinear<-kvsm(species~.,data=iris,kernel=”vanillaot”) # Build the algorithm**  **Using nonlinear methods**  **Summary(svm\_nonlinear) # Summary of the dataset**  **Length Class Mode**  **1 ksvm S4**  **Prediction<-predict(svm\_nonlinear,iris) # Prediction of nonlinear method**  **pred**  **1 2 3 4 5 6 7 8 9 10 11**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **12 13 14 15 16 17 18 19 20 21 22**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **23 24 25 26 27 28 29 30 31 32 33**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **34 35 36 37 38 39 40 41 42 43 44**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **45 46 47 48 49 50 51 52 53 54 55**  **setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor**  **56 57 58 59 60 61 62 63 64 65 66**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **67 68 69 70 71 72 73 74 75 76 77**  **versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor**  **78 79 80 81 82 83 84 85 86 87 88**  **virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor**  **89 90 91 92 93 94 95 96 97 98 99**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **100 101 102 103 104 105 106 107 108 109 110**  **versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **111 112 113 114 115 116 117 118 119 120 121**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **122 123 124 125 126 127 128 129 130 131 132**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **133 134 135 136 137 138 139 140 141 142 143**  **virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **144 145 146 147 148 149 150**  **virginica virginica virginica virginica virginica virginica virginica**  **Levels: setosa versicolor virginica**  Table(prediction)   |  | | --- | | prediction  setosa versicolor virginica  50 47 53  **prop.table(table(prediction))**  prediction  setosa versicolor virginica  0.3333333 0.3133333 0.3533333 | | **tab<-table(prediction=prediction,actual=iris$species) # Create a table for predicted**  **Method**  **Tab**  Actual  prediction setosa versicolor virginica  setosa 50 0 0  versicolor 0 46 1  virginica 0 4 49     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1] 0.9666667  **Svm\_nonlinear<-kvsm(species~.,data=iris,kernel=”laplacedot”) # Build the algorithm**  **Using nonlinear methods**  **Summary(svm\_nonlinear) # Summary of the dataset**  **Length Class Mode**  **1 ksvm S4**  **Prediction<-predict(svm\_nonlinear,iris) # Prediction of nonlinear method**  **pred**  **1 2 3 4 5 6 7 8 9 10 11**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **12 13 14 15 16 17 18 19 20 21 22**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **23 24 25 26 27 28 29 30 31 32 33**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **34 35 36 37 38 39 40 41 42 43 44**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **45 46 47 48 49 50 51 52 53 54 55**  **setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor**  **56 57 58 59 60 61 62 63 64 65 66**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **67 68 69 70 71 72 73 74 75 76 77**  **versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor**  **78 79 80 81 82 83 84 85 86 87 88**  **virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor**  **89 90 91 92 93 94 95 96 97 98 99**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **100 101 102 103 104 105 106 107 108 109 110**  **versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **111 112 113 114 115 116 117 118 119 120 121**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **122 123 124 125 126 127 128 129 130 131 132**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **133 134 135 136 137 138 139 140 141 142 143**  **virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **144 145 146 147 148 149 150**  **virginica virginica virginica virginica virginica virginica virginica**  **Levels: setosa versicolor virginica**  Table(prediction)   |  | | --- | | prediction  setosa versicolor virginica  50 50 50  **prop.table(table(prediction))**  prediction  setosa versicolor virginica  0.3333333 0.3333333 0.3333333 | | **tab<-table(prediction=prediction,actual=iris$species) # Create a table for predicted**  **Method**  **Tab**  Actual  prediction setosa versicolor virginica  setosa 50 0 0  versicolor 0 50 0  virginica 0 0 50  **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | [1] 1  **Svm\_nonlinear<-kvsm(species~.,data=iris,kernel=”besseldot”) # Build the algorithm**  **Using nonlinear methods**  **Summary(svm\_nonlinear) # Summary of the dataset**  **Length Class Mode**  **1 ksvm S4**  **Prediction<-predict(svm\_nonlinear,iris) # Prediction of nonlinear method**  **pred**  **1 2 3 4 5 6 7 8 9 10 11**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **12 13 14 15 16 17 18 19 20 21 22**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **23 24 25 26 27 28 29 30 31 32 33**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **34 35 36 37 38 39 40 41 42 43 44**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **45 46 47 48 49 50 51 52 53 54 55**  **setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor**  **56 57 58 59 60 61 62 63 64 65 66**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **67 68 69 70 71 72 73 74 75 76 77**  **versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor**  **78 79 80 81 82 83 84 85 86 87 88**  **virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor**  **89 90 91 92 93 94 95 96 97 98 99**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **100 101 102 103 104 105 106 107 108 109 110**  **versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **111 112 113 114 115 116 117 118 119 120 121**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **122 123 124 125 126 127 128 129 130 131 132**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **133 134 135 136 137 138 139 140 141 142 143**  **virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **144 145 146 147 148 149 150**  **virginica virginica virginica virginica virginica virginica virginica**  **Levels: setosa versicolor virginica**  Table(prediction)   |  | | --- | | prediction  setosa versicolor virginica  50 49 51  **prop.table(table(prediction))**  prediction  setosa versicolor virginica  0.3333333 0.3266667 0.3400000 | | **tab<-table(prediction=prediction,actual=iris$species) # Create a table for predicted**  **Method**  **Tab**  Actual  prediction setosa versicolor virginica  setosa 50 0 0  versicolor 0 48 1  virginica 0 2 49  **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**   |  | | --- | | [1] 0.98 | |  | | |  | | --- | |  | | |   **Svm\_nonlinear<-kvsm(species~.,data=iris,kernel=”Anovadot”) # Build the algorithm**  **Using nonlinear methods**  **Summary(svm\_nonlinear) # Summary of the dataset**  **Length Class Mode**  **1 ksvm S4**  **Prediction<-predict(svm\_nonlinear,iris) # Prediction of nonlinear method**  **pred**  **1 2 3 4 5 6 7 8 9 10 11**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **12 13 14 15 16 17 18 19 20 21 22**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **23 24 25 26 27 28 29 30 31 32 33**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **34 35 36 37 38 39 40 41 42 43 44**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **45 46 47 48 49 50 51 52 53 54 55**  **setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor**  **56 57 58 59 60 61 62 63 64 65 66**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **67 68 69 70 71 72 73 74 75 76 77**  **versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor**  **78 79 80 81 82 83 84 85 86 87 88**  **virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor**  **89 90 91 92 93 94 95 96 97 98 99**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **100 101 102 103 104 105 106 107 108 109 110**  **versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **111 112 113 114 115 116 117 118 119 120 121**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **122 123 124 125 126 127 128 129 130 131 132**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **133 134 135 136 137 138 139 140 141 142 143**  **virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **144 145 146 147 148 149 150**  **virginica virginica virginica virginica virginica virginica virginica**  **Levels: setosa versicolor virginica**  Table(prediction)   |  | | --- | | prediction  setosa versicolor virginica  50 47 53  **prop.table(table(prediction))**  prediction  setosa versicolor virginica  0.3333333 0.3133333 0.3533333 | | **tab<-table(prediction=prediction,actual=iris$species) # Create a table for predicted**  **Method**  **Tab**  Actual  prediction setosa versicolor virginica  setosa 50 0 0  versicolor 0 47 0  virginica 0 3 50  **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**   |  | | --- | | [1] 0.98 | |  | | |  | | --- | |  | | |   **Svm\_nonlinear<-kvsm(species~.,data=iris,kernel=”splinedot”) # Build the algorithm**  **Using nonlinear methods**  **Summary(svm\_nonlinear) # Summary of the dataset**  **Length Class Mode**  **1 ksvm S4**  **Prediction<-predict(svm\_nonlinear,iris) # Prediction of nonlinear method**  **pred**  **1 2 3 4 5 6 7 8 9 10 11**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **12 13 14 15 16 17 18 19 20 21 22**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **23 24 25 26 27 28 29 30 31 32 33**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **34 35 36 37 38 39 40 41 42 43 44**  **setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa setosa**  **45 46 47 48 49 50 51 52 53 54 55**  **setosa setosa setosa setosa setosa setosa versicolor versicolor versicolor versicolor versicolor**  **56 57 58 59 60 61 62 63 64 65 66**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **67 68 69 70 71 72 73 74 75 76 77**  **versicolor versicolor versicolor versicolor virginica versicolor virginica versicolor versicolor versicolor versicolor**  **78 79 80 81 82 83 84 85 86 87 88**  **virginica versicolor versicolor versicolor versicolor versicolor virginica versicolor versicolor versicolor versicolor**  **89 90 91 92 93 94 95 96 97 98 99**  **versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor versicolor**  **100 101 102 103 104 105 106 107 108 109 110**  **versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **111 112 113 114 115 116 117 118 119 120 121**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **122 123 124 125 126 127 128 129 130 131 132**  **virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **133 134 135 136 137 138 139 140 141 142 143**  **virginica versicolor virginica virginica virginica virginica virginica virginica virginica virginica virginica**  **144 145 146 147 148 149 150**  **virginica virginica virginica virginica virginica virginica virginica**  **Levels: setosa versicolor virginica**  Table(prediction)   |  | | --- | | Prediction  setosa versicolor virginica  54 49 47  **prop.table(table(prediction))**  prediction  setosa versicolor virginica  0.3600000 0.3266667 0.3133333 | | **tab<-table(prediction=prediction,actual=iris$species) # Create a table for predicted**  **Method**  **Tab**  Actual  prediction setosa versicolor virginica  setosa 43 10 1  versicolor 7 38 4  virginica 0 2 45  **Sum(diag(tab))/sum(tab) # Percentage of the predicted value**   |  | | --- | | [1] 0.84 **OBSERVATIONS:**  * **Accuracy of svm using radial trick is 97.3%** * **Accuracy of svm using linear trick is 96.6%** * **Accuracy of svm using non-linear [rbfdot] is 97.3%** * **Accuracy of svm using non-linear[polydat]is 96.6%** * **Accuracy of svm using non-linear[tanhdot] is 66.6%** * **Accuracy of svm using non-linear[vanilladaot] is 96.6%** * **Accuracy of svm using non-linear[ laplacedot] is 1%** * **Accuracy of svm using non-linear[besseldot] is 98%** * **Accuracy of svm using non-linear[anovadot] is 98%** * **Accuracy of svm using non-linear [splinedot] is 84%**   **Out of these observations we have to conclude that**  **For SVM non-linear besseldot and anovadot going to give the more**  **Accuracy** | |  | | |  | | --- | |  | | |          |  | | --- | |  | | |  | | --- | |  | |  | | |  | | --- | |  | | | | |  | | |  | | --- | |  | | | |  | |  | |  | | |  | | --- | |  | | | |  | | |  | | --- | |  | | | | |  | | --- | |  | | | | |  | | --- | |  | | |  | |  | | |  | | --- | |  | | | |  | |  | |  | | |  | | --- | |  | | | |  | | |  | | --- | |  | | | | |  | | --- | |  | | | | |  | | --- | |  | | | | |  | | |  | | --- | |  | | | |  | |  | |  | | |  | | --- | |  | | | |  | | |  | | --- | |  | | | | |  | | --- | |  | | | | |  | | --- | |  | | | |  | | |  | | --- | |  | |  |  | | --- | |  | | |  | | |  | | --- | |  | |  |  | | --- | |  | |