# Implement SVM/Decision tree classification technique

## AIM:

To Implement SVM and Decision tree classification techniques using R programming in R Studio.

#### a) SVM IN R

```
# Install and load the e1071 package (if not already installed)
install.packages("e1071") library(e1071)
# Load the iris dataset data(iris)
# Inspect the first few rows of the dataset head(iris)
# Split the data into training (70%) and testing (30%) sets
set.seed(123) # For reproducibility
sample_indices <- sample(1:nrow(iris), 0.7 * nrow(iris))
train_data <- iris[sample_indices, ] test_data <- iris[-
sample_indices, ]
# Fit the SVM model svm_model <- svm(Species ~ ., data =
train_data, kernel = "radial")
# Print the summary of the model summary(svm_model)
# Predict the test set predictions <- predict(svm_model,
newdata = test_data)
# Evaluate the model's performance
confusion matrix <- table(Predicted = predictions, Actual = test_data$Species) print(confusion matrix)
# Calculate accuracy accuracy <-
sum(diag(confusion matrix)) / sum(confusion matrix)
cat("Accuracy:", accuracy * 100, "%\n")
```

#### **OUTPUT:**

```
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```

package 'proxy' successfully unpacked and MD5 sums checked package 'e1071' successfully unpacked and MD5 sums checked

The downloaded binary packages are in

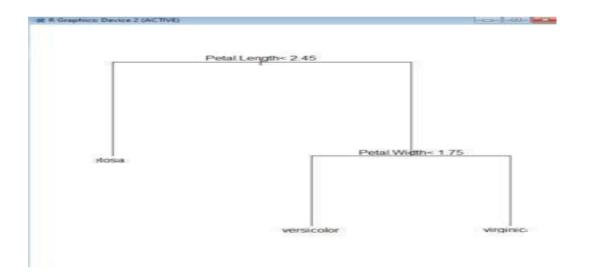
1	actual		
Predicted	setosa	versicolor	virginica
setosa	14	0	0
versicolor	0	17	0
virginica	0	1	13
Accuracy: 97	.77778 9	6	

# b) Decision tree in R

```
# Install and load the rpart package (if not already installed)
install.packages("rpart") library(rpart)
# Load the iris dataset data(iris)
# Split the data into training (70%) and testing (30%) sets
set.seed(123) # For reproducibility
sample_indices <- sample(1:nrow(iris), 0.7 * nrow(iris))
train_data <- iris[sample_indices, ] test_data <- iris[-
sample indices, ]
# Fit the Decision Tree model tree_model <- rpart(Species ~
., data = train_data, method = "class")
# Print the summary of the model summary(tree_model)
# Plot the Decision Tree
plot(tree_model) text(tree_model,
pretty =
0)
# Predict the test set predictions <- predict(tree_model,
newdata = test_data, type = "class")
# Evaluate the model's performance
confusion_matrix <- table(Predicted = predictions, Actual = test_data$Species) print(confusion_matrix)
# Calculate accuracy
accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix) cat("Accuracy:",
accuracy * 100, "%\n")
```

## **OUTPUT:**

```
SVM.R × Decision tree.R ×
        # Install and load the rpart package (if not already installed) install.packages("rpart")
                                                                                        → Run → ↑ → Source •
       library(rpart)
       # Load the iris dataset
        data(iris)
       # Split the data into training (70%) and testing (30%) sets set.seed(123) # For reproducibility sample_indices <- sample(1:nrow(iris), 0.7 * nrow(iris)) train_data <- iris[sample_indices, ] test_data <- iris[-sample_indices, ] # Fit the Decision Tree mode]
   8
  10
       tree_model <- rpart(Species ~ ., data = train_data, method = "class")
# Print the summary of the model
summary(tree model)</pre>
  11
  12
  13
  14
       summary(tree_model)
  15
        # Plot the Decision Tree
       plot(tree_model)
  16
       text(tree_model, pretty = 0)
# Predict the test set
  17
  18
       predictions <- predict(tree_model, newdata = test_data, type = "class")
# Evaluate the model's performance</pre>
  19
  21
        confusion_matrix <- table(Predicted = predictions, Actual = test_data$Species)</pre>
        print(confusion_matrix)
  22
  23
        # Calculate accuracy
       accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix)</pre>
  24
        cat("Accuracy:", accuracy * 100,
```



#### **RESULT:**

Thus, the Implementation SVM/Decision tree classification techniques using R programming in R Studio.