Ex.No -8 Roll No - 210701134

Implement SVM/Decision tree classification techniques

AIM:

To Implement SVM/Decision tree classification techniques using R.

PROCEDURE:

1. CollectandloadthedatasetfromsourceslikeCSVfilesordatabases.
2. Clean and preprocess the data, including handling missing values and encoding categorical variables.
3. Split the dataset into training and testing sets to evaluate model performance.
4. Normalize or standardize the features, especially for SVM, to ensure consistent scaling.
5. Choose the appropriate model: SVM for margin-based classification, Decision Tree for rule-based classification.
6. Train the model on the training data using the `fit` method.
7. Makepredictionsonthetestingdatausingthe`predict`method.
8. Evaluate the model using metrics like accuracy, confusion matrix, precision, and recall.
9. Visualize the results with plots, such as decision boundaries for SVM or tree structures for Decision Trees.
10. Fine-tune the model by adjusting hyperparameters like `C` for SVM or `max_depth` for Decision Trees.

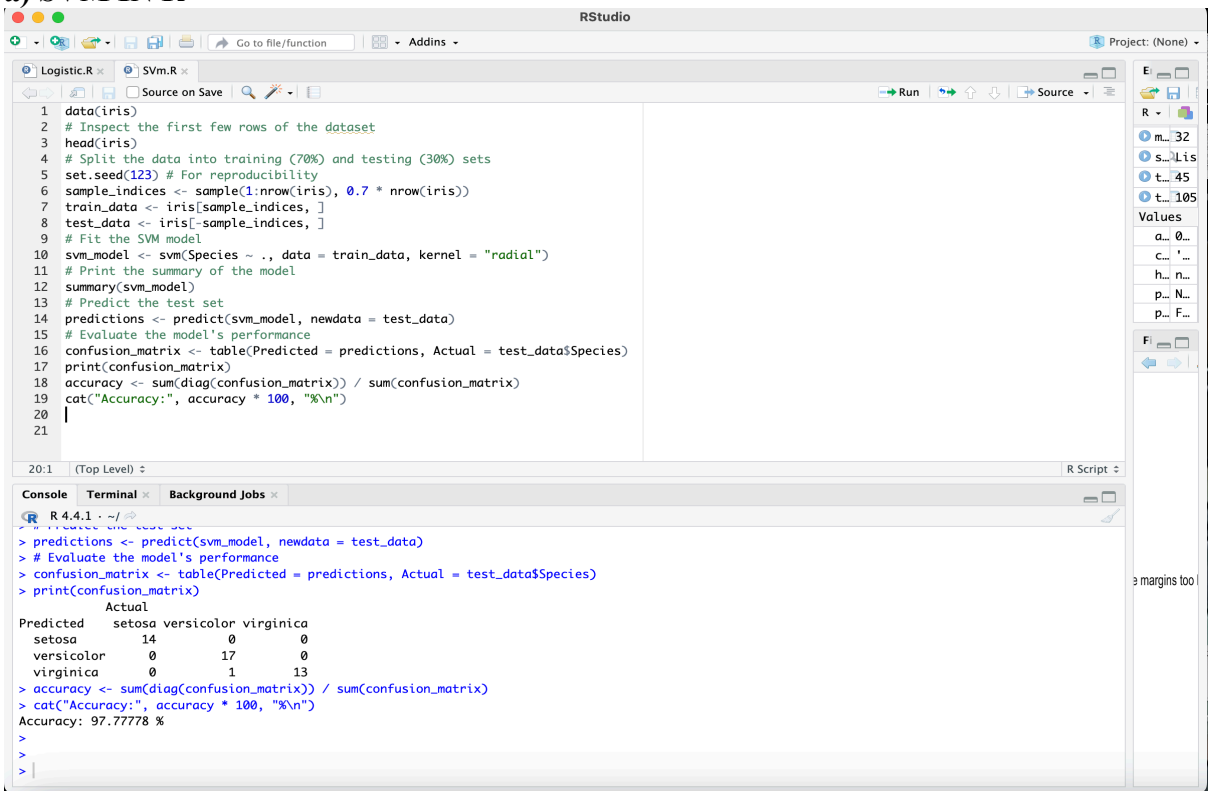
CODE:

```
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)
```

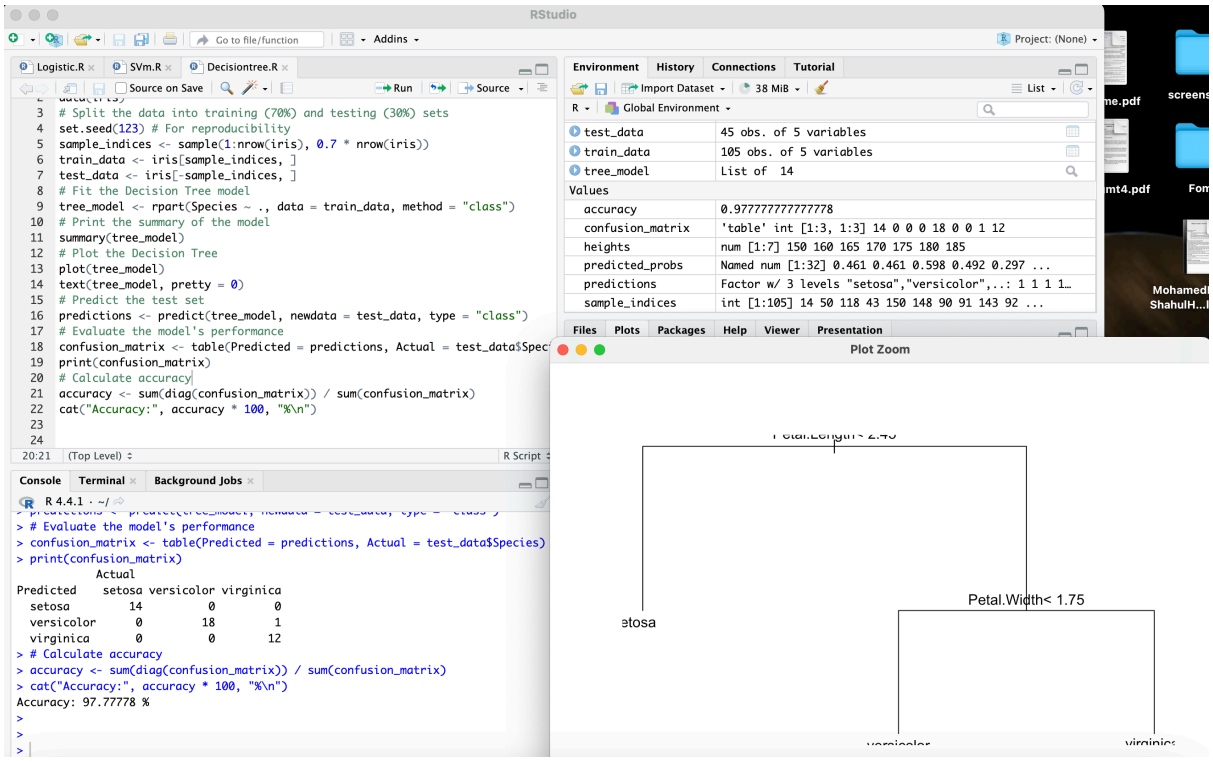
```
# Evaluate the model's performance
confusion_matrix <- table(Predicted = predictions, Actual = test_data$Species)
print(confusion_matrix)
accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix)
cat("Accuracy:", accuracy * 100, "%\n")
```

OUTPUT:

a) SVM IN R



b)Decision tree:



RESULT:

Thus, Implement SVM/Decision tree classification techniques has been successfully executed.