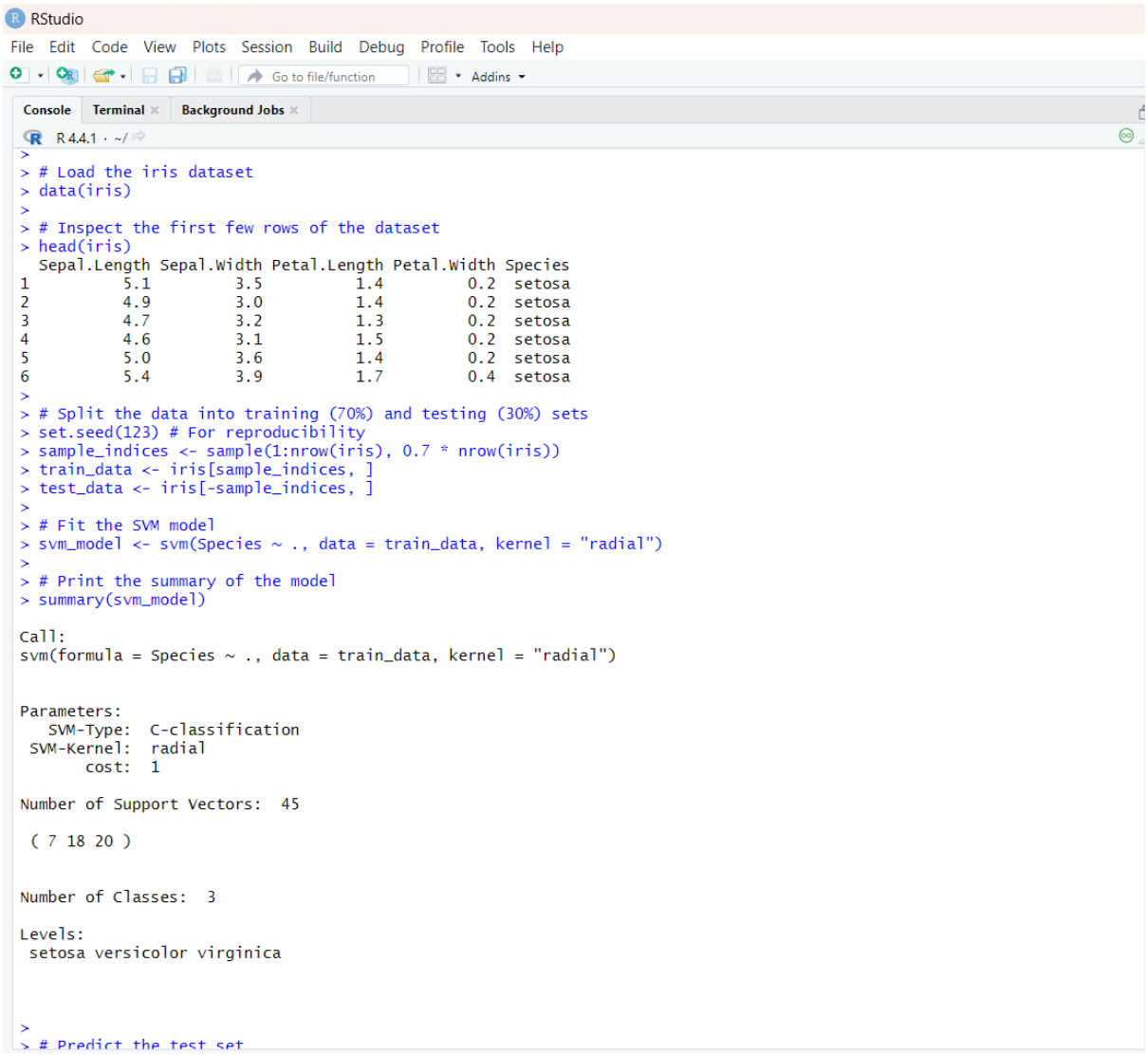
Exp8: **210701263**

Implement SVM/Decision tree classification techniques

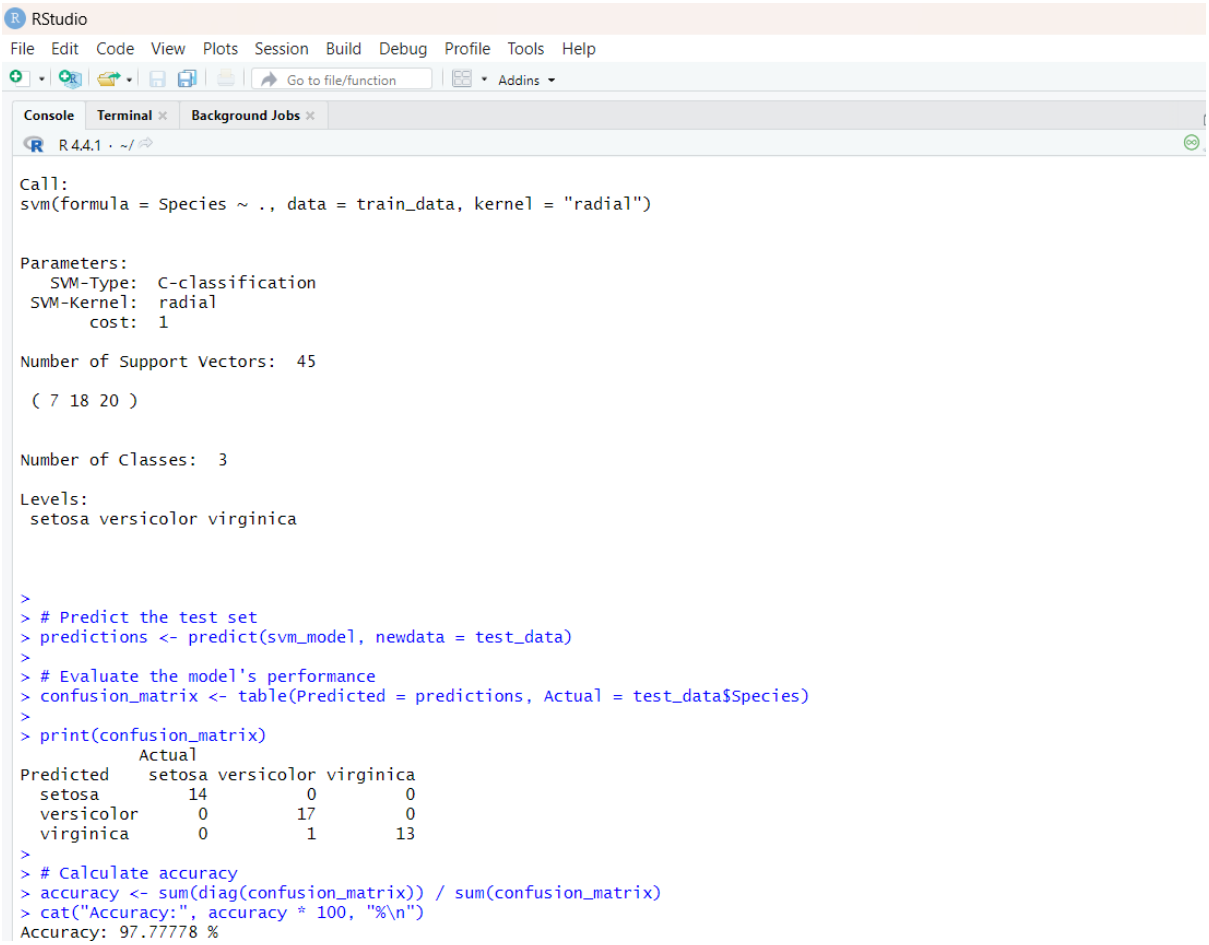
a) SVM IN R

```
# 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")
```



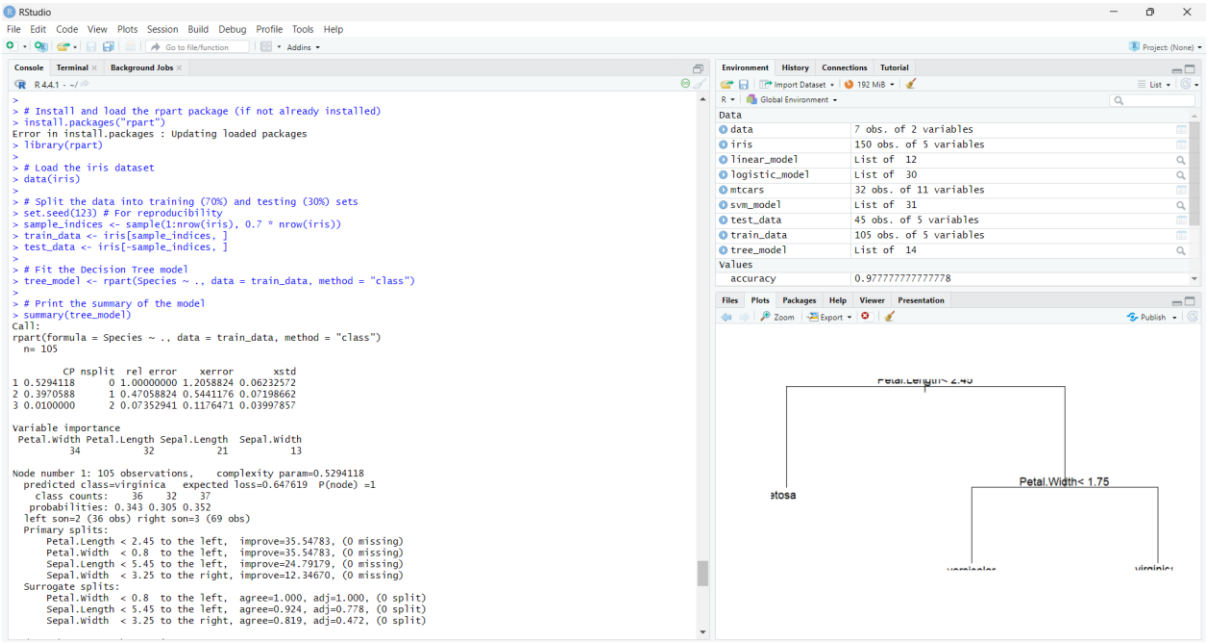
b) Decision tree in R

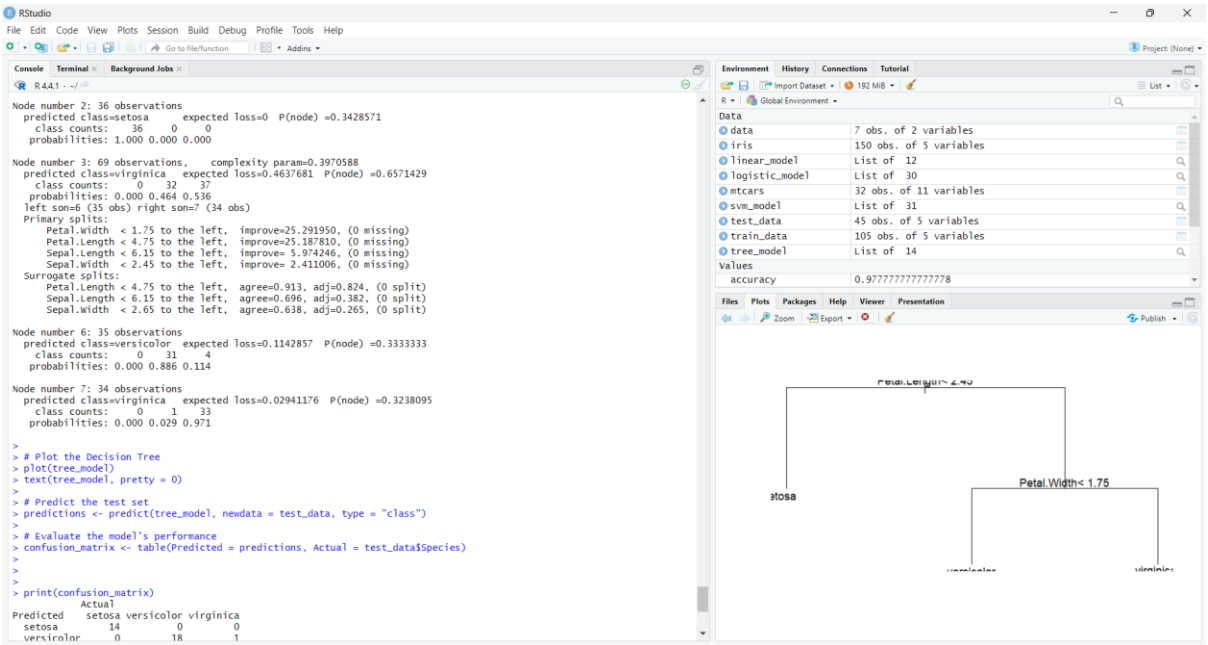
# Install and load the rpart package (if not already installed)
install.packages("rpart") library(rpart)

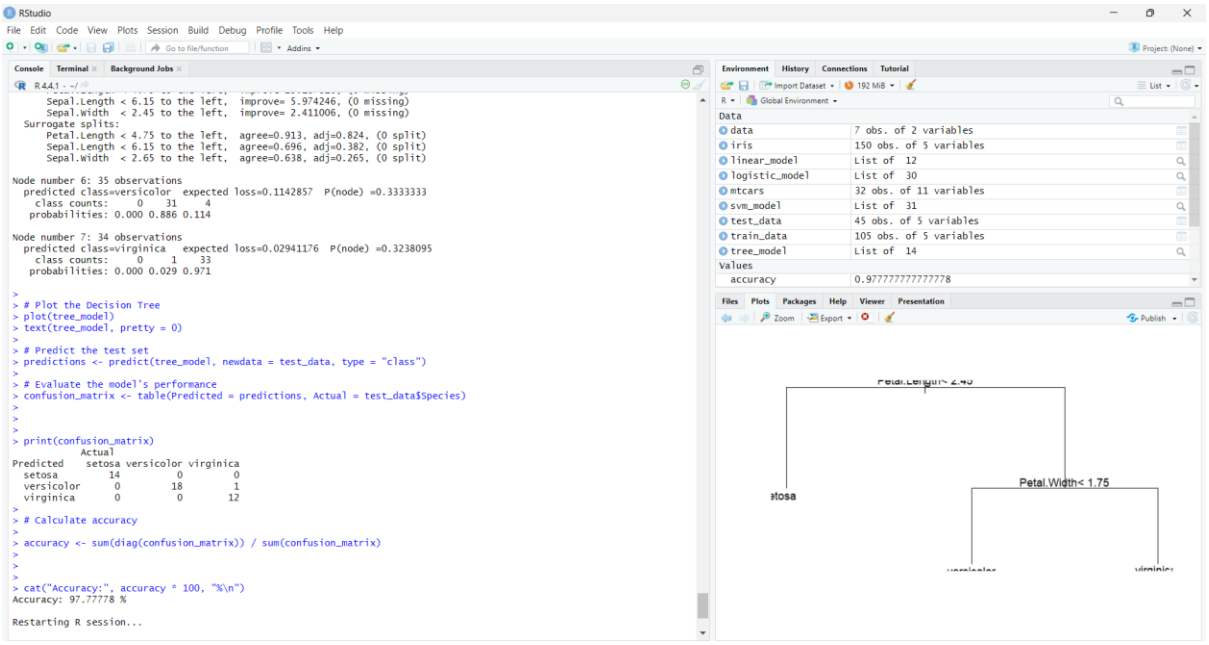



```
# Load the iris dataset data(iris)

# 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")
```






RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Console Terminal Background Jobs
Sepal.Length < 6.15 to the left, improve= 5.974246, (0 missing)
Sepal.Width < 2.45 to the left, improve= 2.411006, (0 missing)
Surrogate splits:
Petal.Length < 4.75 to the left, agree=0.913, adj=0.824, (0 split)
Sepal.Length < 6.15 to the left, agree=0.696, adj=0.382, (0 split)
Sepal.Width < 2.65 to the left, agree=0.638, adj=0.265, (0 split)
Node number 6: 35 observations
predicted class=versicolor expected loss=0.1142857 P(node) =0.3333333
class counts: 0 31 4
probabilities: 0.000 0.886 0.114
Node number 7: 34 observations
predicted class=virginica expected loss=0.02941176 P(node) =0.3238095
class counts: 0 1 33
probabilities: 0.000 0.029 0.971
> # 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)
Actual
Predicted setosa versicolor virginica
setosa 14 0 0
versicolor 0 18 1
virginica 0 0 12
> # Calculate accuracy
> accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix)
> cat("Accuracy:", accuracy * 100, "%\n")
Accuracy: 97.77778 %
Restarting R session...
Environment History Connections Tutorial
Import Dataset
192 MiB
List
Global Environment
Data
data 7 obs. of 2 variables
iris 150 obs. of 5 variables
linear_model List of 12
logistic_model List of 30
mtcars 32 obs. of 11 variables
svm_model List of 31
test_data 45 obs. of 5 variables
train_data 105 obs. of 5 variables
tree_model List of 14
Values
accuracy 0.97777777777778
Files Plots Packages Help Viewer Presentation
Zoom
Export
Publish
Petal.Width< 1.75