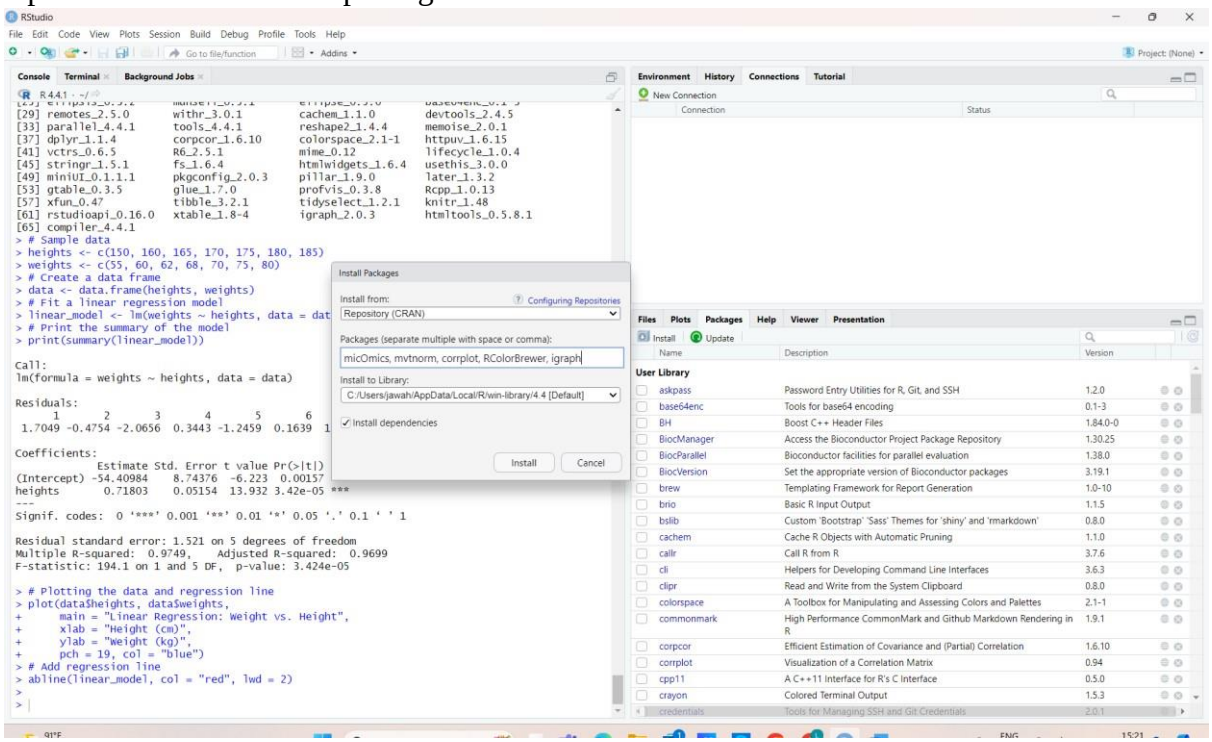
EX 8 Implement SVM/Decision tree classification techniques

Aim:

To implement SVM/ Decision Tree classification technique in R Programming

PROCEDURE:

1. Install R for windows.
2. Install R Studio.
3. Open R Studio and install packages



Thus R studio is set up successfully.

a.SVM Classification:

Program:

```
# Install and load the e1071 package (if not already installed) if
(!requireNamespace("e1071", quietly = TRUE)) {
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 print(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:

	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

```
Call:
svm(formula = Species ~ ., data = train_data, kernel = "radial")


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

Number of Support Vectors:  45

 ( 7 18 20 )


Number of Classes:  3

Levels:
 setosa versicolor virginica
```

```
> # 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)
            Actual
Predicted    setosa versicolor virginica
  setosa         14          0         0
  versicolor      0         17         0
  virginica       0          1        13
>
> # Calculate accuracy
> accuracy <- sum(diag(confusion_matrix)) / sum(confusion_matrix)
> cat("Accuracy:", accuracy * 100, "%\n")
Accuracy: 97.77778 %
```

b. Decision Tree Classification Program:

Install and load the rpart package (if not already installed) if

(!requireNamespace("rpart", quietly = TRUE)) {

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 <-

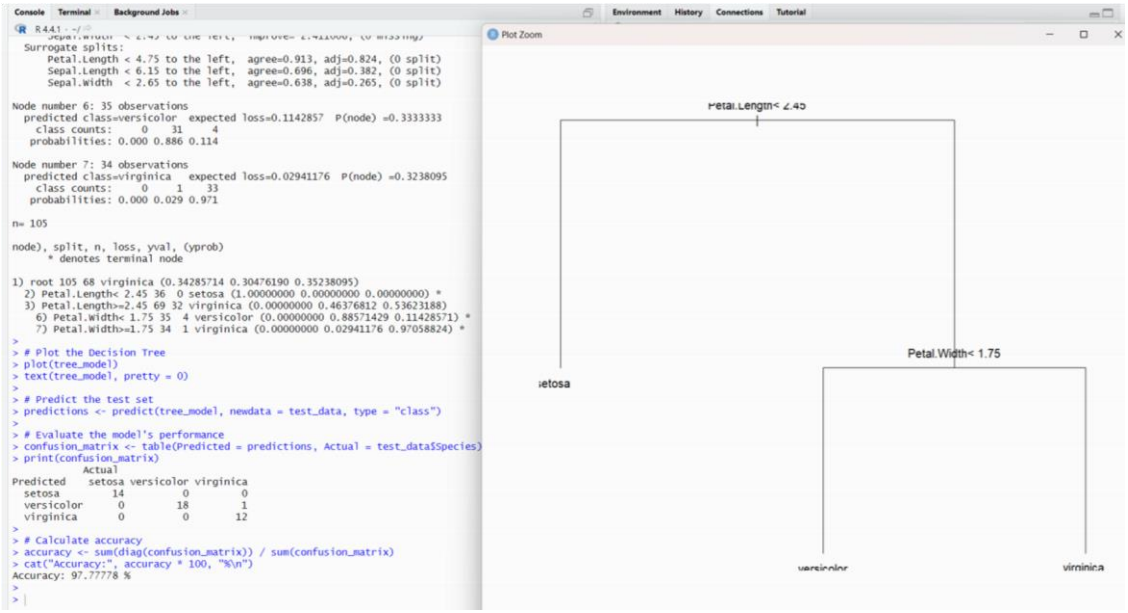
sample(1:nrow(iris), 0.7 * nrow(iris)) train_data <-

```
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 print(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:



Result:

Thus SVM/ Decision Tree classification technique is implemented in R Programming successfully.