

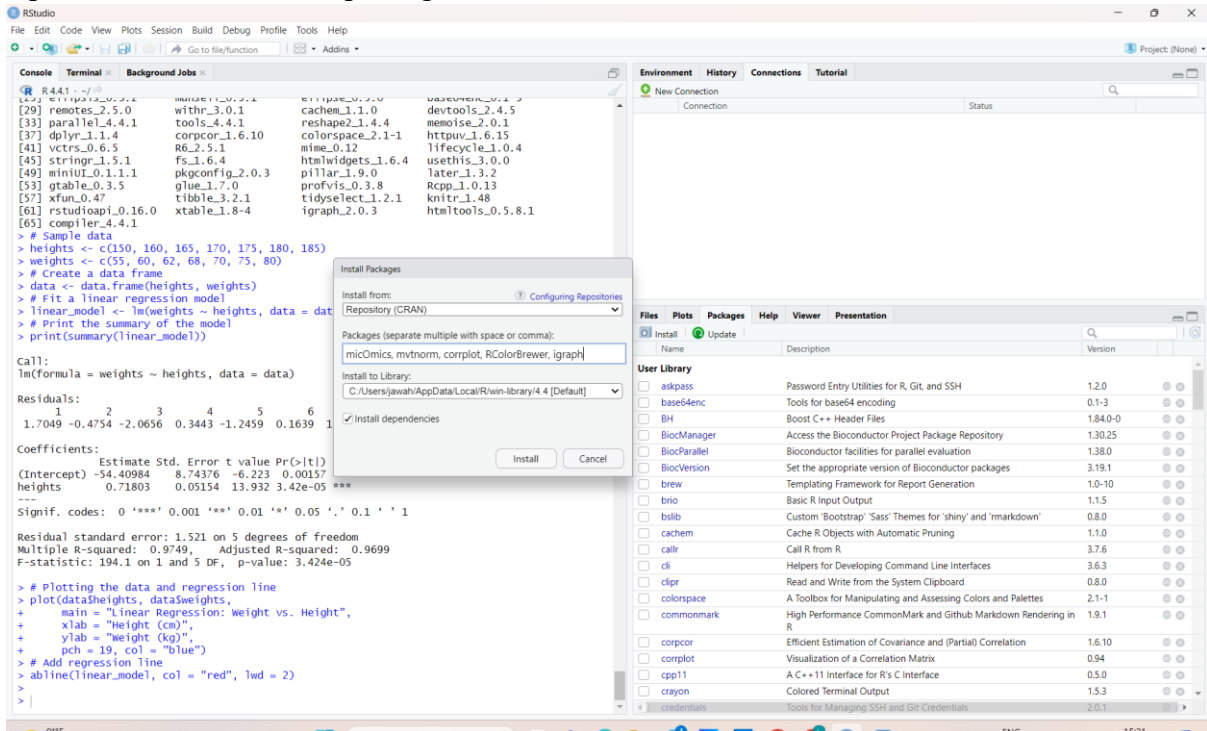
Ex 9 Implement clustering techniques – Hierarchical and K-Means

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) HIERARCHIAL CLUSTERING

Program:

```
# Load the iris dataset
```

```
data(iris)
```

```
# Use only the numeric columns for clustering (exclude the Species column)
```

```
iris_data <- iris[, -5]
```

```
# Standardize the data
```

```
iris_scaled <- scale(iris_data)
```

```
# Compute the distance matrix
```

```
distance_matrix <- dist(iris_scaled, method = "euclidean")
```

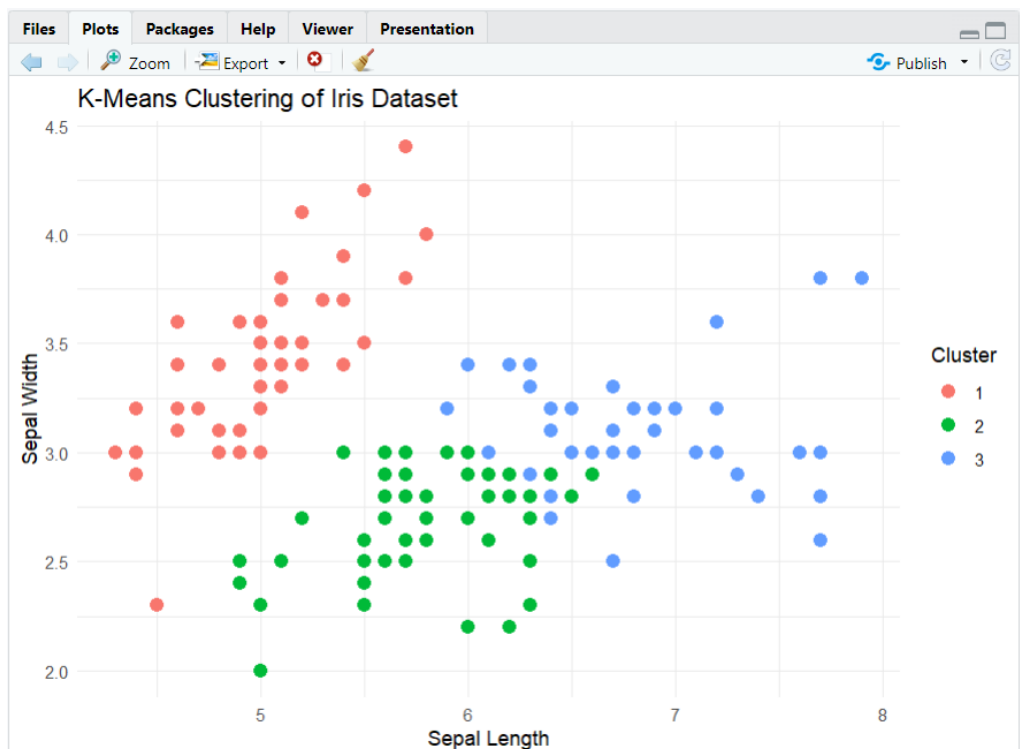
```
# Perform hierarchical clustering using the "complete" linkage method
```

```
hc_complete <- hclust(distance_matrix, method = "complete")
```



```
# Perform K-Means clustering
kmeans_result <- kmeans(iris_scaled, centers = k, nstart = 25)
# Print the K-Means result
print(kmeans_result)
# Print the cluster centers
print(kmeans_result$centers)
# Add the cluster assignments to the original dataset
iris$Cluster <- as.factor(kmeans_result$cluster)
# Display the first few rows of the updated dataset
head(iris)
# Plot the clusters
library(ggplot2)
ggplot(iris, aes(x = Sepal.Length, y = Sepal.Width, color = Cluster)) +
  geom_point(size = 3) +
  labs(title = "K-Means Clustering of Iris Dataset", x = "Sepal Length", y = "Sepal Width") +
  theme_minimal() # Optional: makes the plot look cleaner
```

Output:

[illegible]

Thus the k-means clustering and hierarchical clustering is implemented successfully using R Programming