Ex No: 7 Roll No: 210701162

Implement Linear and Logistic Regression in R

Aim:

To Implement Linear and Logistic Regression using R

Procedure:

1. Collect and load the dataset from sources like CSV files or databases.
2. Clean and preprocess the data, including handling missing values and encodingcategorical variables.
3. Split the dataset into training and testing sets to evaluate model performance.
4. Normalize or standardize the features to ensure consistent scaling.
   5.Choose the appropriate model: Linear Regression for continuous outcomes.
5. Train the model on the training data using the `fit` method.
6. Make predictions on the testing data using the `predict` method.
7. Evaluate the model using metrics like Mean Squared Error (MSE) for LinearRegression or accuracy and confusion matrix for Logistic Regression.
8. Visualize the results with plots, such as scatter plots for Linear Regression ordecision boundaries for Logistic Regression.
9. Fine-tune the model by adjusting hyperparameters or applying regularizationTechniques.

Code:

LinearRegression.R

```
# Sample data
heights <- c(150, 160, 165, 170, 175, 180, 185)
weights <- c(55, 60, 62, 68, 70, 75, 80)
# Create a data frame
data <- data.frame(heights, weights)
# Fit a linear regression model
linear_model <- lm(weights ~ heights, data = data)
# Print the summary of the model
print(summary(linear_model))
# Plotting the data and regression line
plot(data$heights, data$weights,
    main = "Linear Regression: Weight vs. Height",
    xlab = "Height (cm)",
```

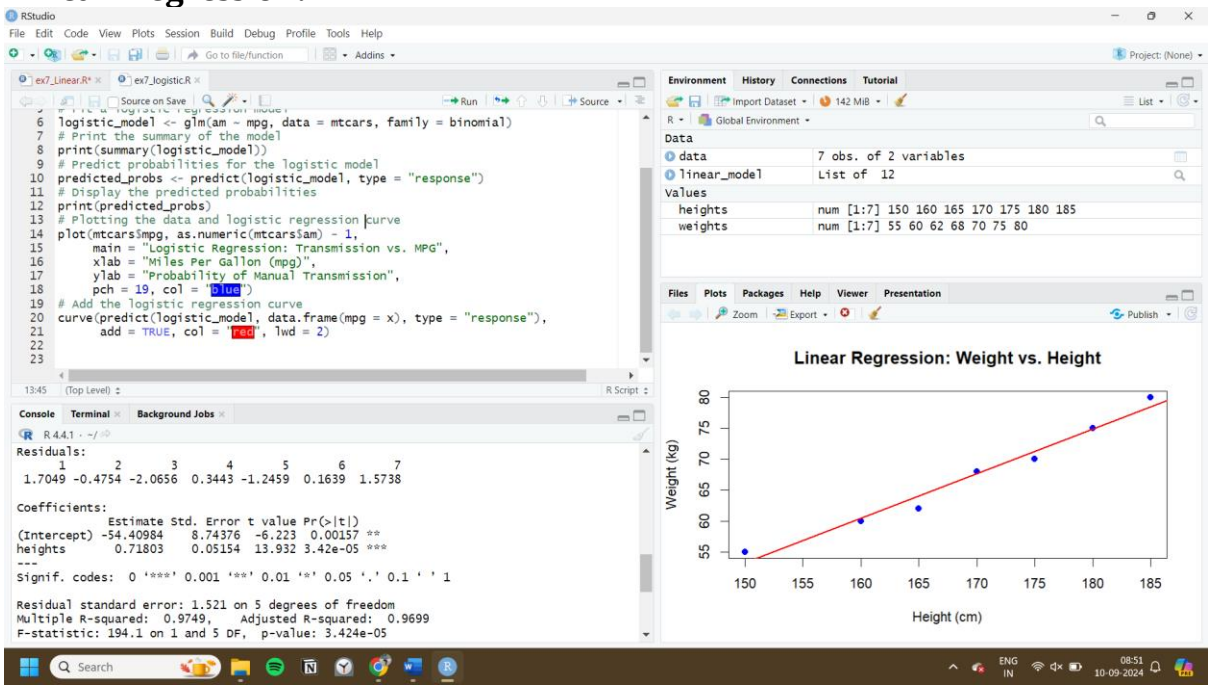
```
    ylab = "Weight (kg)",
    pch = 19, col = "blue")
# Add regression line
abline(linear_model, col = "red", lwd = 2)
```

LogisticRegression.R

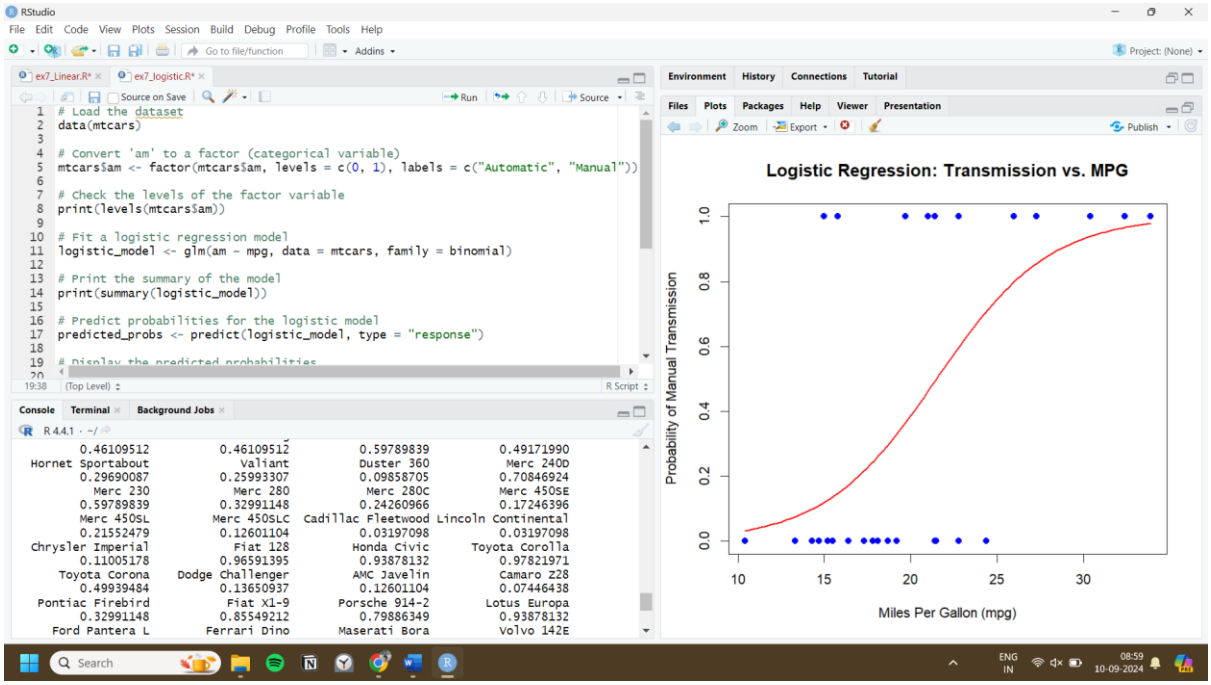
```
# Load the dataset
data(mtcars)
# Convert 'am' to a factor (categorical variable)
mtcars$am <- factor(mtcars$am, levels = c(0, 1), labels = c("Automatic",
"Manual"))
# Fit a logistic regression model
logistic_model <- glm(am ~ mpg, data = mtcars, family = binomial)
# Print the summary of the model
print(summary(logistic_model))
# Predict probabilities for the logistic model
predicted_probs <- predict(logistic_model, type = "response")
# Display the predicted probabilities
print(predicted_probs)
# Plotting the data and logistic regression curve
plot(mtcars$mpg, as.numeric(mtcars$am) - 1,
    main = "Logistic Regression: Transmission vs. MPG",
    xlab = "Miles Per Gallon (mpg)",
    ylab = "Probability of Manual Transmission",
    pch = 19, col = "blue")
# Add the logistic regression curve
curve(predict(logistic_model, data.frame(mpg = x), type = "response"),
     add = TRUE, col = "red", lwd = 2)
```

Output:

Linear Regression:



Logistic Regression:



Result:

Thus to Implement Linear and Logistic Regression using R has beensuccessfully executed.