Ex no: 7 **210701171**

Implement Linear and Logistic Regression

Aim:

To implement Linear and Logistic Regression using R and RStudio.

Procedure:

a)Linear regression

```
# 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)
```

E:\Admin\Documents\Linear_regression_1.R - R Editor

```r
# Sample data
Exercise_time <- c(50, 30, 45, 17, 25, 34, 22)
Calories_burnt <- c(500, 310, 450, 175, 260, 340, 210)

# Create a data frame
data <- data.frame(Exercise_time, Calories_burnt)

# Fit a linear regression model
linear_model <- lm(Calories_burnt ~ Exercise_time, data = data)

# Print the summary of the model
print(summary(linear_model))

# Plotting the data and regression line
plot(data$Exercise_time, data$Calories_burnt,
main = "Linear Regression: Calories_burntvs. Exercise_time",
xlab = "Exercise_time(minutes)",
ylab = "Calories_burnt(kcal)",
pch = 19, col = "blue")

# Add regression line
abline(linear_model, col = "green", lwd = 2)
```

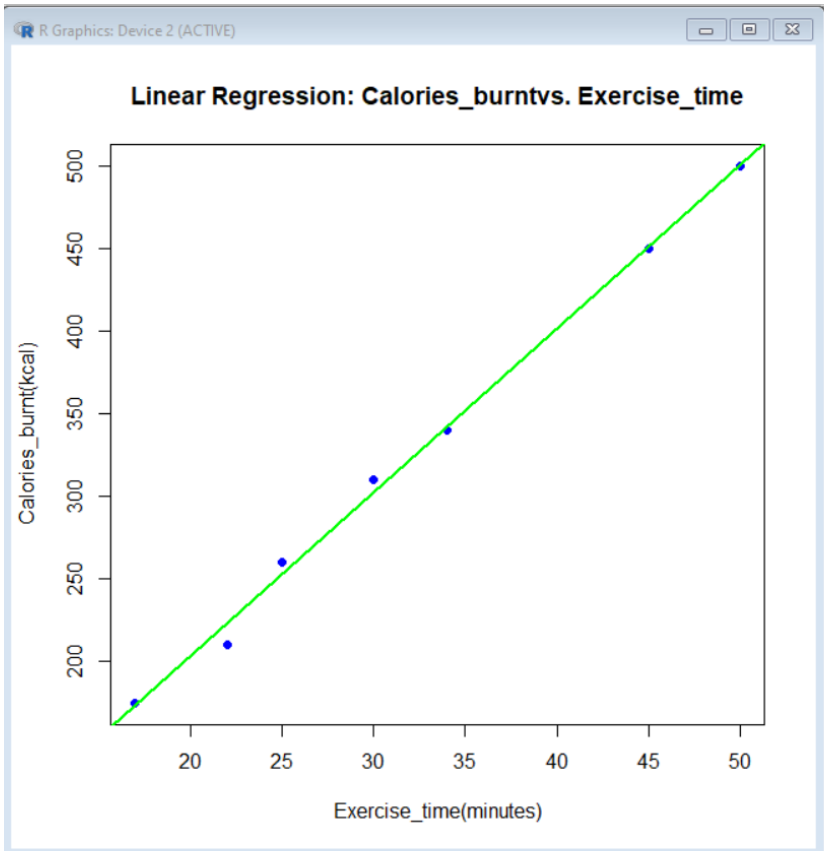
Output:

```
Call:
lm(formula = Calories_burnt ~ Exercise_time, data = data)

Residuals:
       1        2        3        4        5        6        7
 -0.8393   7.7237  -1.1986   1.7897   7.3645  -1.9889 -12.8511

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)     4.4317     8.6681   0.511    0.631
Exercise_time   9.9282     0.2567  38.670 2.18e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.594 on 5 degrees of freedom
Multiple R-squared:  0.9967,	Adjusted R-squared:  0.996
F-statistic:  1495 on 1 and 5 DF,  p-value: 2.179e-07
```



b) Logistic regression

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",

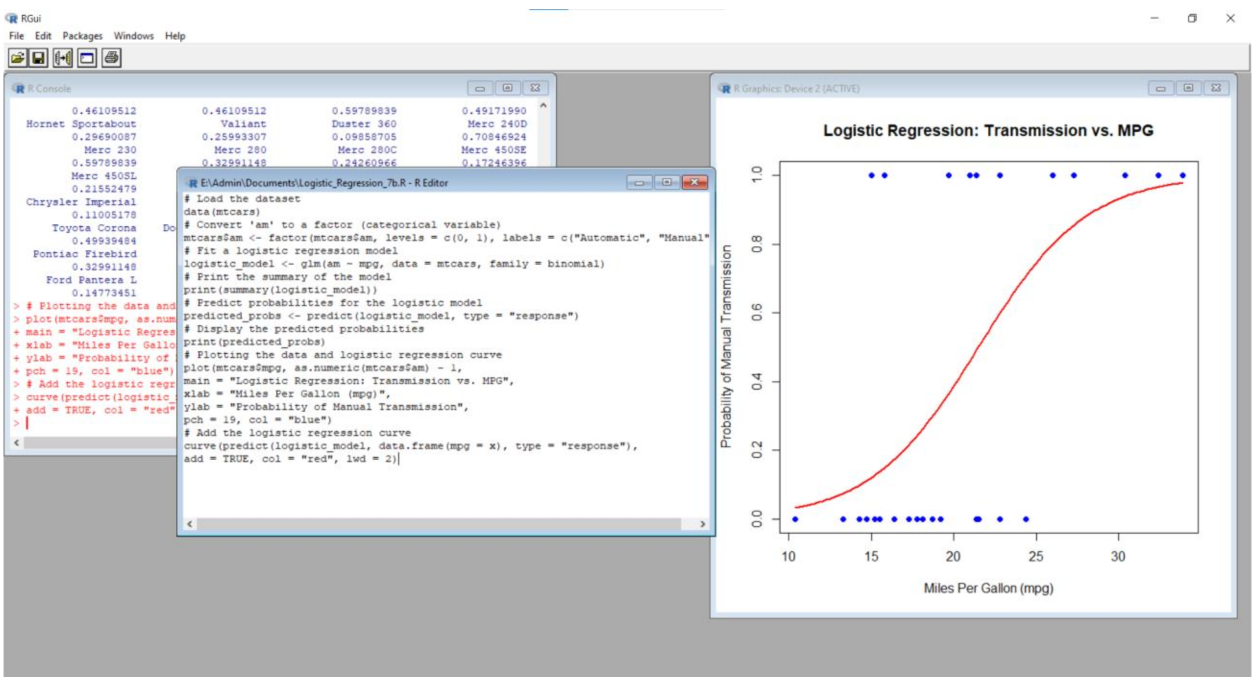
pch = 19, col = "blue")

Add the logistic regression curve

curve(predict(logistic_model, data.frame(mpg = x), type = "response"),

add = TRUE, col = "red", lwd = 2)

Output:



Result:

Thus, Linear and Logistic Regression using R and RStudio was completed successfully.