

Implement Linear and Logistic Regression

AIM:

To implement Linear and Logistic Regression using R programming in R Studio.

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)

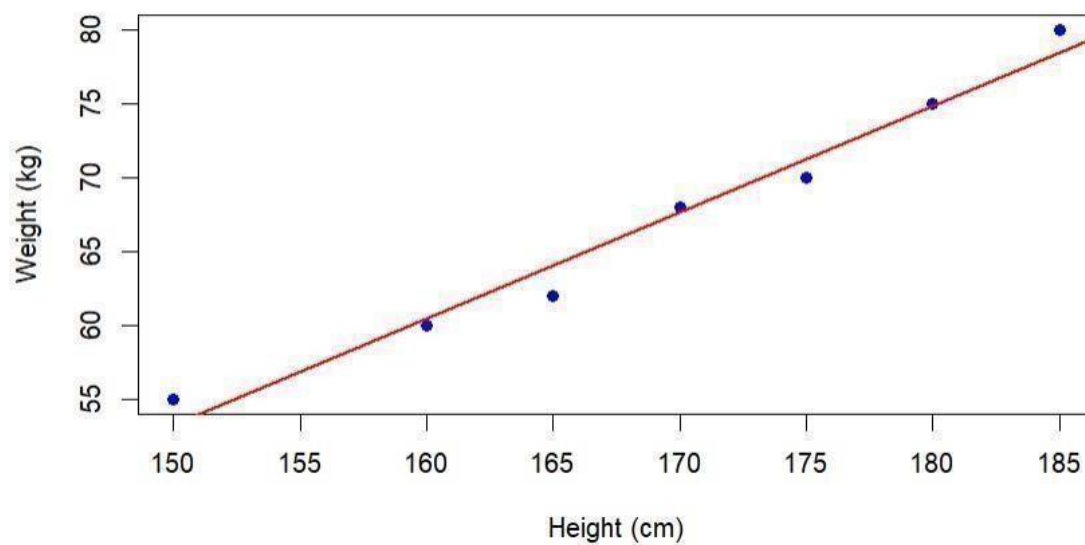
# Print the summary of the model
print(summary(linear_model))

# 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)
```

OUTPUT:

```
linear regression - RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
Run Source
1 # Sample data
2 heights <- c(150, 160, 165, 170, 175, 180, 185)
3 weights <- c(55, 60, 62, 68, 70, 75, 80)
4 # Create a data frame
5 data <- data.frame(heights, weights)
6 # Fit a linear regression model
7 linear_model <- lm(weights ~ heights, data = data)
8 # Print the summary of the model
9 print(summary(linear_model))
10 # Plotting the data and regression line
11 plot(data$heights, data$weights,
12      main = "Linear Regression: weight vs. Height",
13      xlab = "Height (cm)",
14      ylab = "Weight (kg)",
15      pch = 19, col = "blue")
16 # Add regression line
17 abline(linear_model, col = "red", lwd = 2)
18
19
```

Linear Regression: Weight vs. Height

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")
```

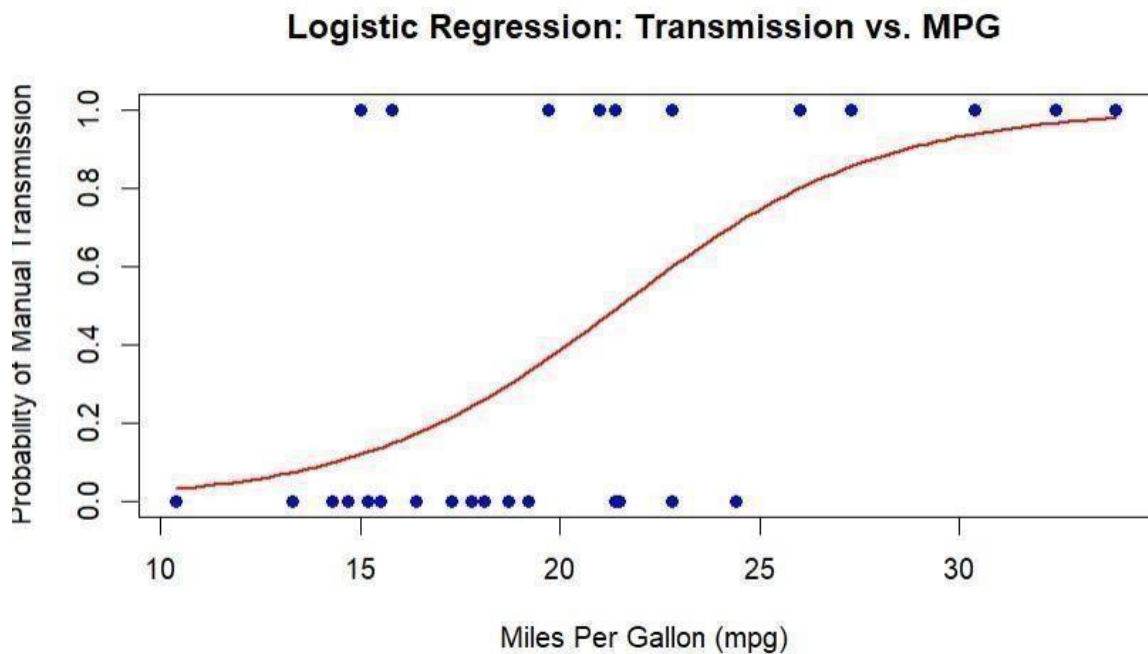
```
# Add the logistic regression curve  
curve(predict(logistic_model, data.frame(mpg = x), type =  
"response"), add = TRUE, col = "red", lwd = 2)
```

OUTPUT:

```

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

```

**RESULT:**

Thus the implementation Linear and Logistic Regression using R programming in R Studio have been successfully executed.