Exp. No : 7

Implementing Linear and Logistic Regression

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)
```

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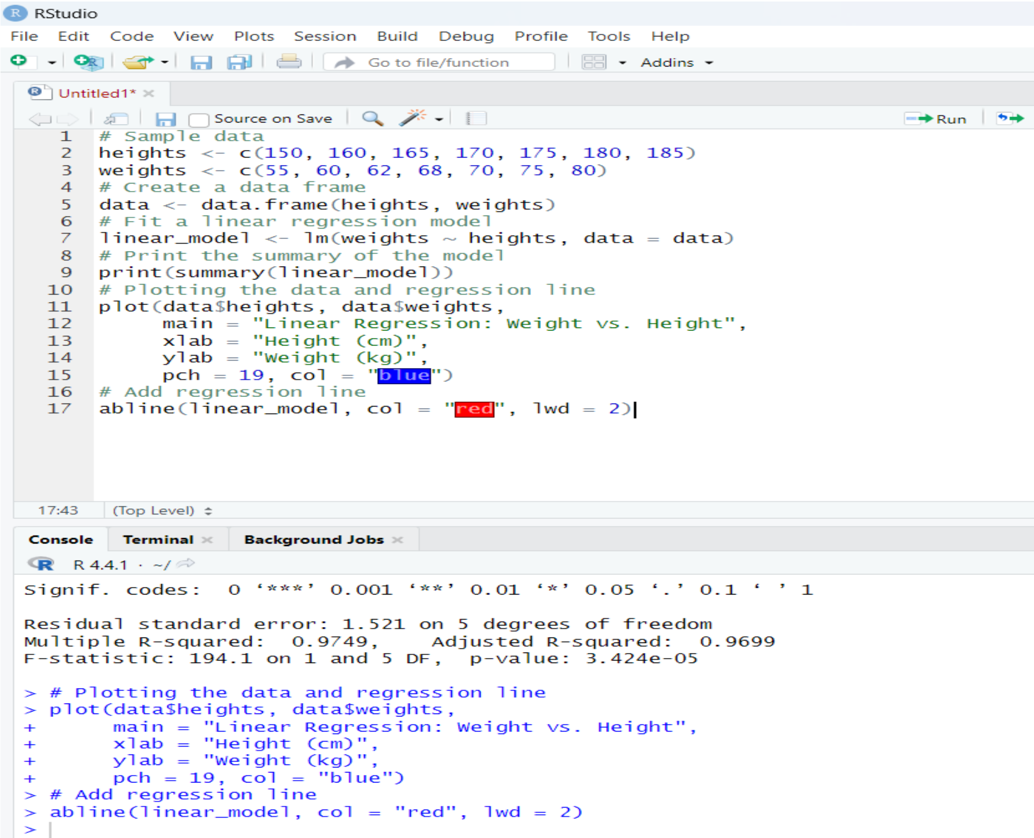
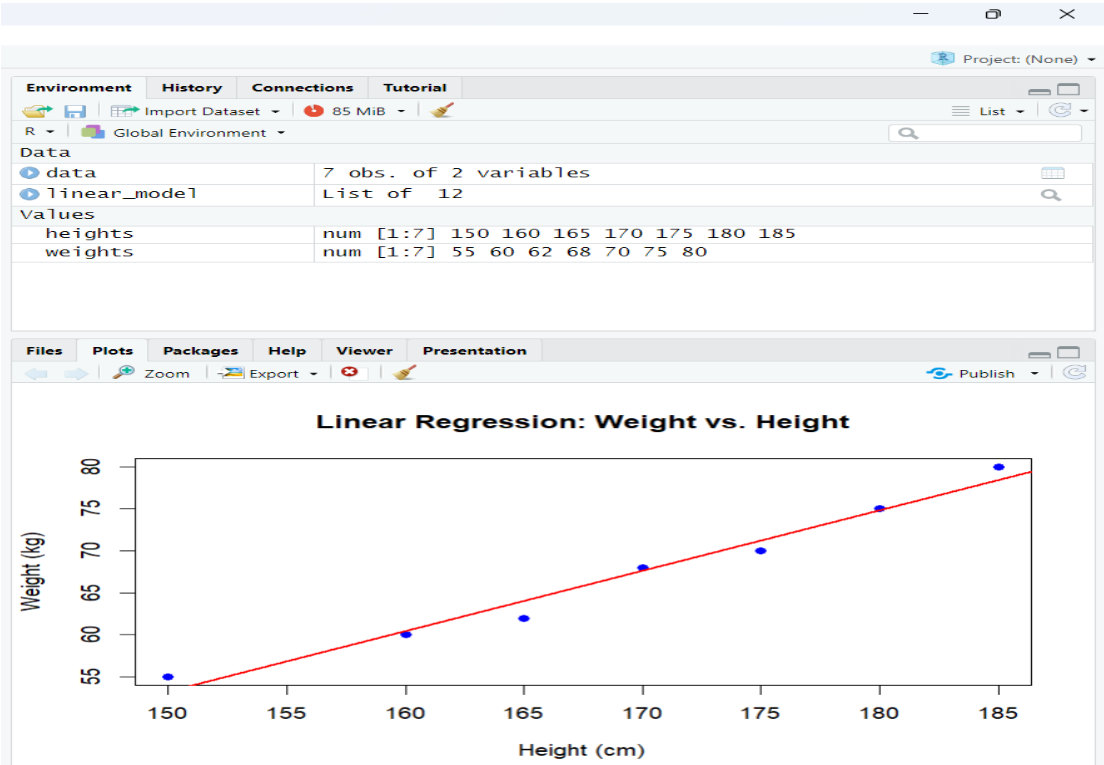
Output:

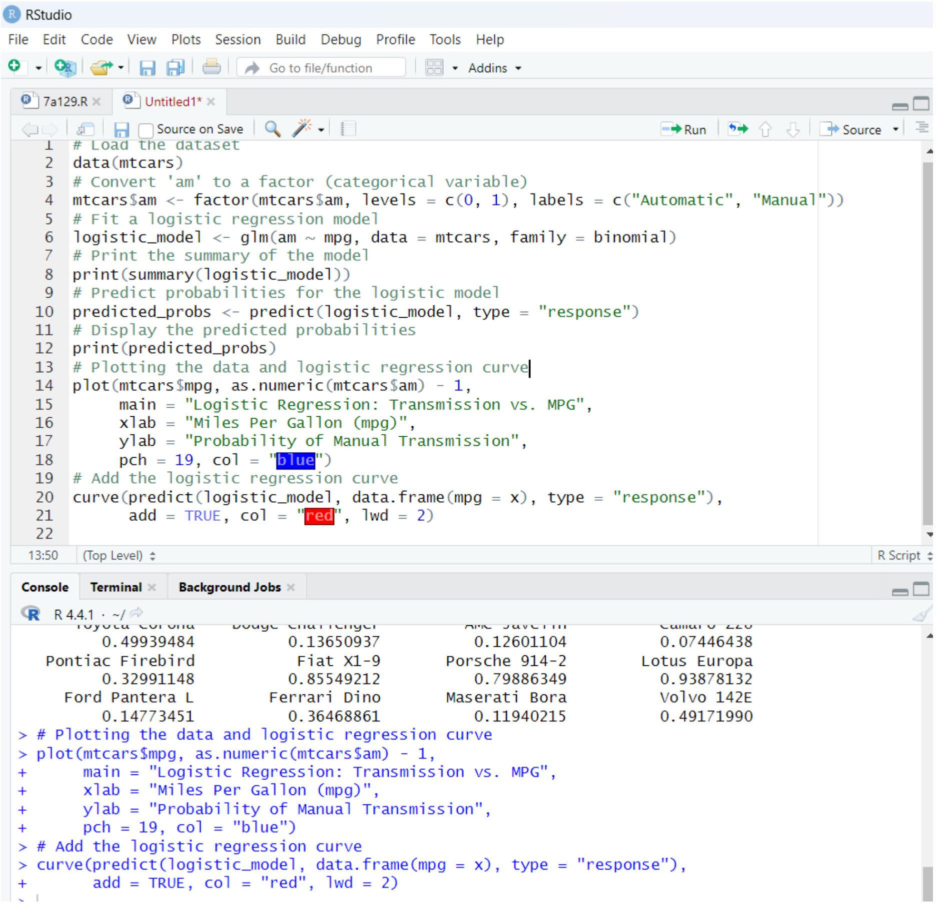




b) Logistic Regression

```
# 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:


RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
7a129.R
Untitled1*
Source on Save
Run
Source
# Load the dataset
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13:50
(Top Level)
R Script
Console
Terminal
Background Jobs
R 4.4.1 · ~/
0.49939484 0.13650937 0.12601104 0.07446438
Pontiac Firebird Fiat X1-9 Porsche 914-2 Lotus Europa
0.32991148 0.85549212 0.79886349 0.93878132
Ford Pantera L Ferrari Dino Maserati Bora Volvo 142E
0.14773451 0.36468861 0.11940215 0.49171990
> # Plotting the data and logistic regression curve
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+ main = "Logistic Regression: Transmission vs. MPG",
+ xlab = "Miles Per Gallon (mpg)",
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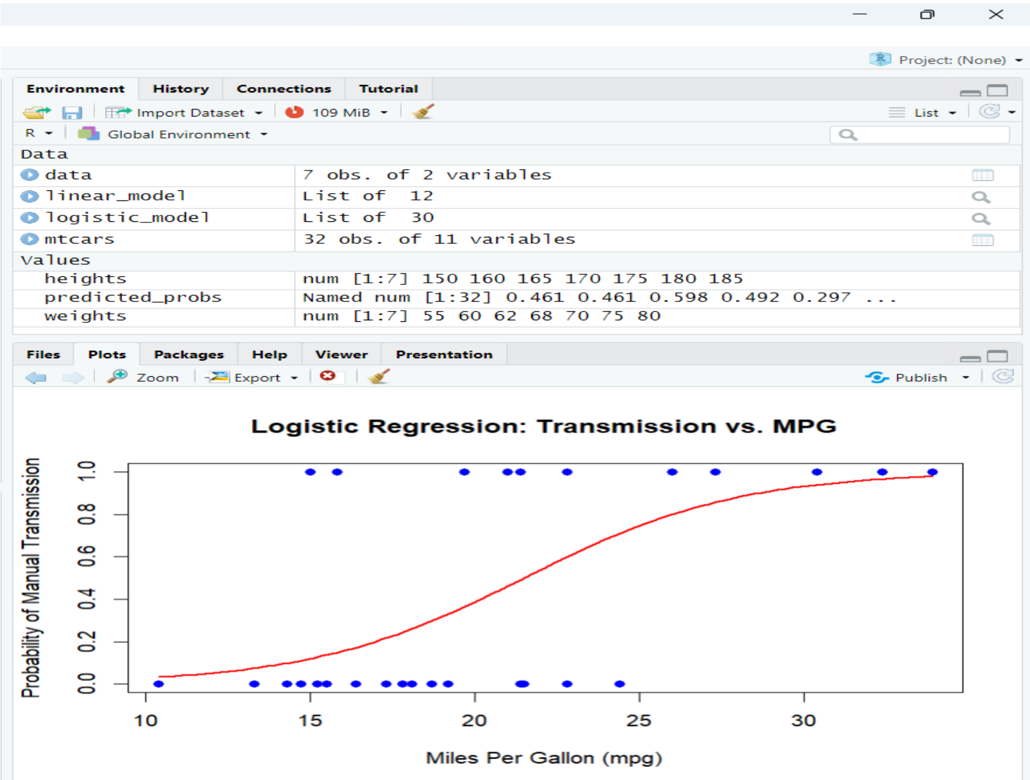
Project: (None)
Environment History Connections Tutorial
Import Dataset
109 MiB
List
R
Global Environment
Data
data 7 obs. of 2 variables
linear_model List of 12
logistic_model List of 30
mtcars 32 obs. of 11 variables
Values
heights num [1:7] 150 160 165 170 175 180 185
predicted_probs Named num [1:32] 0.461 0.461 0.598 0.492 0.297 ...
weights num [1:7] 55 60 62 68 70 75 80
Files Plots Packages Help Viewer Presentation
Zoom
Export
Publish
Logistic Regression: Transmission vs. MPG
Probability of Manual Transmission
0.0 0.2 0.4 0.6 0.8 1.0
10 15 20 25 30
Miles Per Gallon (mpg)