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Ex No 7

Implement Linear and Logistic Regression in R

AIM:

To Implement Linear and Logistic Regression using R

PROCEDURE:

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

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)
```

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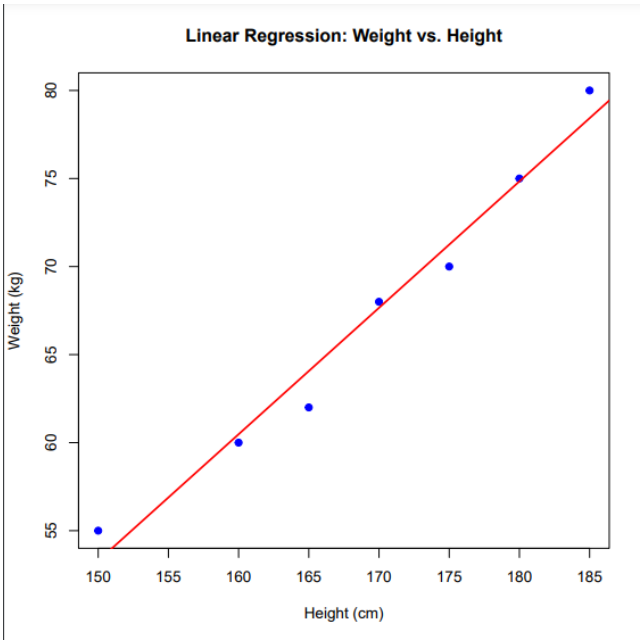
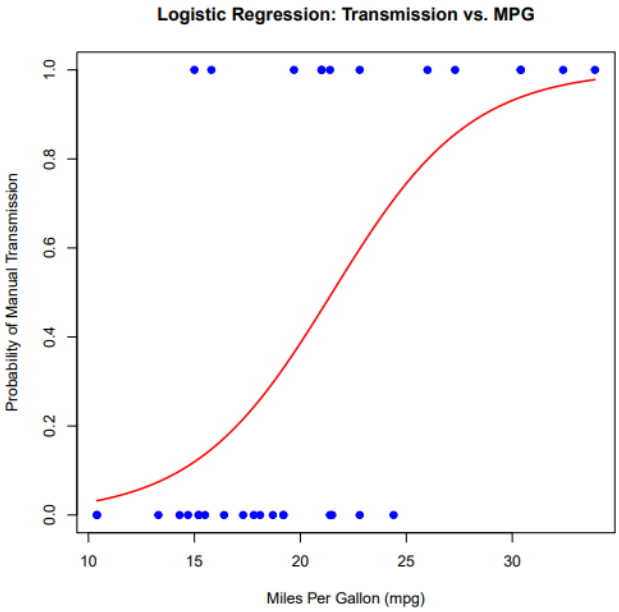
OUTPUT:

Linear Regression:



Logistic Regression:



RESULT:

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