

Q9.R

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```
#9
# Load libraries
library(caTools)    # For splitting data
library(e1071)      # For Naive Bayes classifier
library(caret)      # For confusion matrix and model evaluation

## Loading required package: ggplot2

## Loading required package: lattice

# Load mtcars dataset
data(mtcars)

#a
set.seed(7916025)
ind = sample(c(1,2),nrow(mtcars),replace = T, prob = c(0.7,0.3))
train_9 <- mtcars[ind == 1,]
test_9 <- mtcars[ind == 2,]

# b
# Logistic Regression Model
lm.model <- glm(am ~ mpg + disp + hp + wt, data = train_9, family = binomial)

# Naive Bayes Classification Model
nb.model <- naiveBayes(am ~ mpg + disp + hp + wt, data = train_9)

# c
test_9$pred_lm <- predict(lm.model, newdata = test_9, type = "response")
test_9$pred_lm <- factor(ifelse(test_9$pred_lm > 0.5, 1, 0), levels = c(0, 1))

test_9$pred_nb <- predict(nb.model, newdata = test_9)

# Interpretation:

# d
# Confusion matrix and evaluation for Logistic Regression Model
confusion_matrix_lm <- confusionMatrix(table(test_9$pred_lm, test_9$am))
sensitivity_lm <- confusion_matrix_lm$byClass[1]
specificity_lm <- confusion_matrix_lm$byClass[2]

# Confusion matrix and evaluation for Naive Bayes Model
```

```

confusion_matrix_nb <- confusionMatrix(table(test_9$pred_nb, test_9$am))
sensitivity_nb <- confusion_matrix_nb$byClass[1]
specificity_nb <- confusion_matrix_nb$byClass[2]

```

```

# e
cat("Logistic Regression Model:\n")

```

```

## Logistic Regression Model:

```

```

cat("Confusion Matrix:\n")

```

```

## Confusion Matrix:

```

```

print(confusion_matrix_lm$table)

```

```

##
##      0 1
##      0 7 0
##      1 0 5

```

```

cat("\nSensitivity:", sensitivity_lm, "\n")

```

```

##
## Sensitivity: 1

```

```

cat("Specificity:", specificity_lm, "\n\n")

```

```

## Specificity: 1

```

```

cat("Naive Bayes Model:\n")

```

```

## Naive Bayes Model:

```

```

cat("Confusion Matrix:\n")

```

```

## Confusion Matrix:

```

```

print(confusion_matrix_nb$table)

```

```

##
##      0 1
##      0 6 1
##      1 1 4

```

```

cat("\nSensitivity:", sensitivity_nb, "\n")

```

```

##
## Sensitivity: 0.8571429

```

```

cat("Specificity:", specificity_nb, "\n\n")

```

```

## Specificity: 0.8

```