A5

A00829752

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```
library(ISLR)
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.3     v readr     2.1.4
## v forcats   1.0.0     v stringr   1.5.0
## v ggplot2   3.4.3     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.0
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
dataSP <- Weekly
```

```
head(Weekly)
```

```
##   Year   Lag1   Lag2   Lag3   Lag4   Lag5    Volume  Today Direction
## 1 1990  0.816  1.572 -3.936 -0.229 -3.484 0.1549760 -0.270      Down
## 2 1990 -0.270  0.816  1.572 -3.936 -0.229 0.1485740 -2.576      Down
## 3 1990 -2.576 -0.270  0.816  1.572 -3.936 0.1598375  3.514        Up
## 4 1990  3.514 -2.576 -0.270  0.816  1.572 0.1616300  0.712        Up
## 5 1990  0.712  3.514 -2.576 -0.270  0.816 0.1537280  1.178        Up
## 6 1990  1.178  0.712  3.514 -2.576 -0.270 0.1544440 -1.372      Down
```

```
summary(Weekly)
```

```
##       Year           Lag1               Lag2               Lag3          
##  Min.   :1990   Min.   :-18.1950   Min.   :-18.1950   Min.   :-18.1950  
##  1st Qu.:1995   1st Qu.: -1.1540   1st Qu.: -1.1540   1st Qu.: -1.1580  
##  Median :2000   Median :  0.2410   Median :  0.2410   Median :  0.2410  
##  Mean   :2000   Mean   :  0.1506   Mean   :  0.1511   Mean   :  0.1472  
##  3rd Qu.:2005   3rd Qu.:  1.4050   3rd Qu.:  1.4090   3rd Qu.:  1.4090  
##  Max.   :2010   Max.   : 12.0260   Max.   : 12.0260   Max.   : 12.0260  
##       Lag4               Lag5              Volume            Today          
##  Min.   :-18.1950   Min.   :-18.1950   Min.   :0.08747   Min.   :-18.1950  
##  1st Qu.: -1.1580   1st Qu.: -1.1660   1st Qu.:0.33202   1st Qu.: -1.1540  
##  Median :  0.2380   Median :  0.2340   Median :1.00268   Median :  0.2410  
##  Mean   :  0.1458   Mean   :  0.1399   Mean   :1.57462   Mean   :  0.1499  
##  3rd Qu.:  1.4090   3rd Qu.:  1.4050   3rd Qu.:2.05373   3rd Qu.:  1.4050  
##  Max.   : 12.0260   Max.   : 12.0260   Max.   :9.32821   Max.   : 12.0260  
##  Direction
##  Down:484
```

```
##  Up  :605
##
##
##
##
```

```
cor(Weekly[, -9])
```

```
##               Year         Lag1        Lag2        Lag3         Lag4
## Year    1.00000000 -0.032289274 -0.03339001 -0.03000649 -0.031127923
## Lag1   -0.03228927  1.000000000 -0.07485305  0.05863568 -0.071273876
## Lag2   -0.03339001 -0.074853051  1.00000000 -0.07572091  0.058381535
## Lag3   -0.03000649  0.058635682 -0.07572091  1.00000000 -0.075395865
## Lag4   -0.03112792 -0.071273876  0.05838153 -0.07539587  1.000000000
## Lag5   -0.03051910 -0.008183096 -0.07249948  0.06065717 -0.075675027
## Volume  0.84194162 -0.064951313 -0.08551314 -0.06928771 -0.061074617
## Today  -0.03245989 -0.075031842  0.05916672 -0.07124364 -0.007825873
##                Lag5      Volume        Today
## Year   -0.030519101  0.84194162 -0.032459894
## Lag1   -0.008183096 -0.06495131 -0.075031842
## Lag2   -0.072499482 -0.08551314  0.059166717
## Lag3    0.060657175 -0.06928771 -0.071243639
## Lag4   -0.075675027 -0.06107462 -0.007825873
## Lag5    1.000000000 -0.05851741  0.011012698
## Volume -0.058517414  1.00000000 -0.033077783
## Today   0.011012698 -0.03307778  1.000000000
```

#Generacion del modelo

```
modelo.log.m <- glm(Direction ~ .-Today, data = Weekly, family = binomial)
summary(modelo.log.m)
```

```
##
## Call:
## glm(formula = Direction ~ . - Today, family = binomial, data = Weekly)
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) 17.225822  37.890522   0.455   0.6494
## Year        -0.008500   0.018991  -0.448   0.6545
## Lag1        -0.040688   0.026447  -1.538   0.1239
## Lag2         0.059449   0.026970   2.204   0.0275 *
## Lag3        -0.015478   0.026703  -0.580   0.5622
## Lag4        -0.027316   0.026485  -1.031   0.3024
## Lag5        -0.014022   0.026409  -0.531   0.5955
## Volume       0.003256   0.068836   0.047   0.9623
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 1496.2  on 1088  degrees of freedom
## Residual deviance: 1486.2  on 1081  degrees of freedom
## AIC: 1502.2
##
## Number of Fisher Scoring iterations: 4
```

```r
confint(object = modelo.log.m, level = 0.95)
```

```
## Waiting for profiling to be done...
```

```
##                     2.5 %      97.5 %
## (Intercept) -56.985558236 91.66680901
## Year         -0.045809580  0.02869546
## Lag1         -0.092972584  0.01093101
## Lag2          0.007001418  0.11291264
## Lag3         -0.068140141  0.03671410
## Lag4         -0.079519582  0.02453326
## Lag5         -0.066090145  0.03762099
## Volume       -0.131576309  0.13884038
```

#Division de la base de datos

```r
train_data <- Weekly[Weekly$Year < 2009, ]
test_data <- Weekly[Weekly$Year %in% c(2009, 2010), ]
```

```r
model_significant <- glm(Direction ~ Lag1 + Lag2 + Lag4, data = train_data, family = binomial)
summary(model_significant)
```

```
##
## Call:
## glm(formula = Direction ~ Lag1 + Lag2 + Lag4, family = binomial,
##     data = train_data)
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)  0.21393    0.06471   3.306 0.000946 ***
## Lag1        -0.05551    0.02891  -1.920 0.054848 .
## Lag2         0.05530    0.02913   1.898 0.057676 .
## Lag4        -0.02094    0.02866  -0.731 0.464886
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 1354.7  on 984  degrees of freedom
## Residual deviance: 1346.4  on 981  degrees of freedom
## AIC: 1354.4
##
## Number of Fisher Scoring iterations: 4
```

```r
library(caret)
```

```
## Loading required package: lattice
```

```
##
## Attaching package: 'caret'
```

```
## The following object is masked from 'package:purrr':
##
##     lift
```

```r
predictions <- predict(model_significant, newdata = test_data, type = "response")
predictions <- factor(ifelse(predictions > 0.5, "Up", "Down"), levels = c("Down", "Up"))
```

```r
conf_matrix <- confusionMatrix(predictions, test_data$Direction)
conf_matrix
```

```
## Confusion Matrix and Statistics
##
##           Reference
## Prediction Down Up
##       Down    9  7
##       Up     34 54
##
##                Accuracy : 0.6058
##                  95% CI : (0.5051, 0.7002)
##     No Information Rate : 0.5865
##     P-Value [Acc > NIR] : 0.3847
##
##                   Kappa : 0.1042
##
##  Mcnemar's Test P-Value : 4.896e-05
##
##             Sensitivity : 0.20930
##             Specificity : 0.88525
##          Pos Pred Value : 0.56250
##          Neg Pred Value : 0.61364
##              Prevalence : 0.41346
##          Detection Rate : 0.08654
##    Detection Prevalence : 0.15385
##       Balanced Accuracy : 0.54727
##
##        'Positive' Class : Down
##
```

```r
observed <- table(predictions, test_data$Direction)
chi_squared_test <- chisq.test(observed)
print(chi_squared_test)
```

```
##
##  Pearson's Chi-squared test with Yates' continuity correction
##
## data:  observed
## X-squared = 1.0818, df = 1, p-value = 0.2983
```

```r
coeficientes <- coef(model_significant)
print(coeficientes)
```

```
## (Intercept)        Lag1        Lag2        Lag4
##  0.21393356 -0.05550915  0.05529514 -0.02094275
```

El modelo no nos brindo los mejores resultados por lo que seria recomendado continuar haciendo ajustes.