Linear-QuadraticDiscriminantAnalysis.R

vijaykalmath

2022-01-04

```
# Linear Discriminant Analysis

library(MASS)
library(ISLR)


# Subset Condition = Year < 2005

subset_condition  = (Smarket$Year < 2005 )

Smarket.2005  = Smarket[!subset_condition,]

lda.fit = lda(Direction~Lag1+Lag2+Lag1:Lag2,data=Smarket,subset= subset_condition )

lda.fit
```

```
## Call:
## lda(Direction ~ Lag1 + Lag2 + Lag1:Lag2, data = Smarket, subset = subset_condition)
##
## Prior probabilities of groups:
##     Down       Up
## 0.491984 0.508016
##
## Group means:
##             Lag1        Lag2   Lag1:Lag2
## Down  0.04279022  0.03389409 -0.03771779
## Up   -0.03954635 -0.03132544 -0.02657971
##
## Coefficients of linear discriminants:
##                    LD1
## Lag1      -0.64613664
## Lag2      -0.51385562
## Lag1:Lag2 -0.02432895
```

```
lda.pred = predict(lda.fit,Smarket.2005)

names(lda.pred)
```

```
## [1] "class"     "posterior" "x"
```

```r
lda.class = lda.pred$class

table(lda.class,Smarket.2005$Direction)
```

```
##
## lda.class Down  Up
##      Down   35  35
##      Up     76 106
```

```r
mean(lda.class == Smarket.2005$Direction)
```

```
## [1] 0.5595238
```

```r
# Quadratic Discriminant Analysis


qda.fit = qda(Direction~Lag1+Lag2,data=Smarket,subset= subset_condition )

qda.fit
```

```
## Call:
## qda(Direction ~ Lag1 + Lag2, data = Smarket, subset = subset_condition)
##
## Prior probabilities of groups:
##     Down       Up
## 0.491984 0.508016
##
## Group means:
##             Lag1        Lag2
## Down  0.04279022  0.03389409
## Up   -0.03954635 -0.03132544
```

```r
qda.pred = predict(qda.fit,Smarket.2005)

names(qda.pred)
```

```
## [1] "class"     "posterior"
```

```r
qda.class = qda.pred$class

table(qda.class,Smarket.2005$Direction)
```

```
##
## qda.class Down  Up
##      Down   30  20
##      Up     81 121
```

```r
mean(qda.class == Smarket.2005$Direction)
```

```
## [1] 0.5992063
```