Multivariate-sec17-DA

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12/1/2021

part1:

```
library(haven)
library(klaR)

## Warning: package 'klaR' was built under R version 4.1.2

## Loading required package: MASS

library(MASS)
data = read_sav("F:/lessons/Multi Countios Variate2/data/Table 8.3
football.sav")
#View(data)
m1<-manova(cbind(data$WDIM,data$CIRCUM,data$FBEYE,data$EYEHD,
                 data$EARHD,data$JAW)~data$group)
(s_m1 = summary(m1))

##            Df  Pillai approx F num Df den Df    Pr(>F)
## data$group  1 0.45505   11.551      6     83 2.318e-09 ***
## Residuals  88
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

E_matrix = s_m1$SS$Residuals
```

در اینجا می‌خواهیم مقادیر در اینجا می‌خواهیم مقادیر err هارو بدست بیاوریم.

```
(err = diag(E_matrix / 87))

## [1] 0.4284368 3.3791052 0.5515260 2.0932050 0.7514221 0.3774489

m2 = lda(group~. ,data = data ,method = "moment")
a1 = m2$scaling
```

حال میخواهیم مقادیر ضرایب استاندارد شده جدید را مشاهده بکنیم

```
round((a_star= sqrt(err) * a1[,1]) ,digits = 3)

##   WDIM CIRCUM  FBEYE  EYEHD  EARHD    JAW
##  0.621 -0.007 -0.005 -0.937 -0.437 -0.509
```

```
#for froward method we have:
m2

## Call:
## lda(group ~ ., data = data, method = "moment")
##
## Prior probabilities of groups:
##         1         2         3
## 0.3333333 0.3333333 0.3333333
##
## Group means:
##    WDIM   CIRCUM    FBEYE    EYEHD    EARHD      JAW
## 1 15.20 58.93700 20.10833 13.08333 14.73333 12.26667
## 2 15.42 57.37967 19.80333 10.08000 13.45333 11.94333
## 3 15.58 57.77000 19.81000 10.94667 13.69667 11.80333
##
## Coefficients of linear discriminants:
##                 LD1           LD2
## WDIM    0.948423100  1.4067750094
## CIRCUM -0.003639865 -0.0005126312
## FBEYE  -0.006439599 -0.0286176430
## EYEHD  -0.647483088  0.5402700415
## EARHD  -0.504360916 -0.3839132257
## JAW    -0.828535064 -1.5288556226
##   مقدار واریانس هایی که هرکدام از توابع ممیزی ما به خود اختصاص میدهند را در پایین با رنگ سبز نشان دادهایم.
## Proportion of trace:
##   LD1   LD2
## 0.943 0.057

(M1 = greedy.wilks(group~ . , data = data))

## Formula containing included variables:
##
## group ~ EYEHD + WDIM + JAW + EARHD
## <environment: 0x00000000126b09b0>
##
##
## Values calculated in each step of the selection procedure:
##
##    vars Wilks.lambda F.statistics.overall p.value.overall
F.statistics.diff
## 1 EYEHD    0.4278892            58.16183    9.181503e-17
58.161826
## 2  WDIM    0.4003001            24.96348    2.604034e-16
2.963612
## 3   JAW    0.3382838            20.38104    6.677444e-18
7.791368
## 4 EARHD    0.3071512            16.89162    2.888334e-18
4.257081
```

```
##   p.value.diff
## 1 9.181503e-17
## 2 5.686808e-02
## 3 7.765645e-04
## 4 1.729878e-02

pp= predict(m2)
head(pp$x)

##          LD1        LD2
## 1 -1.7152350 -0.5295425
## 2 -1.3461862 -0.3263871
## 3  0.5355641 -1.6034251
## 4 -1.8066103  0.8965488
## 5 -2.6834723 -0.9723178
## 6 -2.5978793 -3.1988809

plot(m2)
```