TP2-2

Slim Kammoun

```
###Q1###
mydata=read.table("Contacts-Média.csv",sep=",", head=T,encoding='latin1')
head(mydata)
```

```
##      X radio Tel QuotN QuotR PMag PMTV
## 1 AGRI    96 118     2    71   50   17
## 2 PEPA   122 136    11    76   49   41
## 3 PRCS   193 184    74    63  103   79
## 4 PRIN   360 365    63   145  141  184
## 5 EMPL   511 593    57   217  172  306
## 6 OUQU   385 457    42   174  104  220
```

```
rownames(mydata)<-mydata$X
mydata<-mydata[,-1]
head(mydata)
```

```
##      radio Tel QuotN QuotR PMag PMTV
## AGRI    96 118     2    71   50   17
## PEPA   122 136    11    76   49   41
## PRCS   193 184    74    63  103   79
## PRIN   360 365    63   145  141  184
## EMPL   511 593    57   217  172  306
## OUQU   385 457    42   174  104  220
```

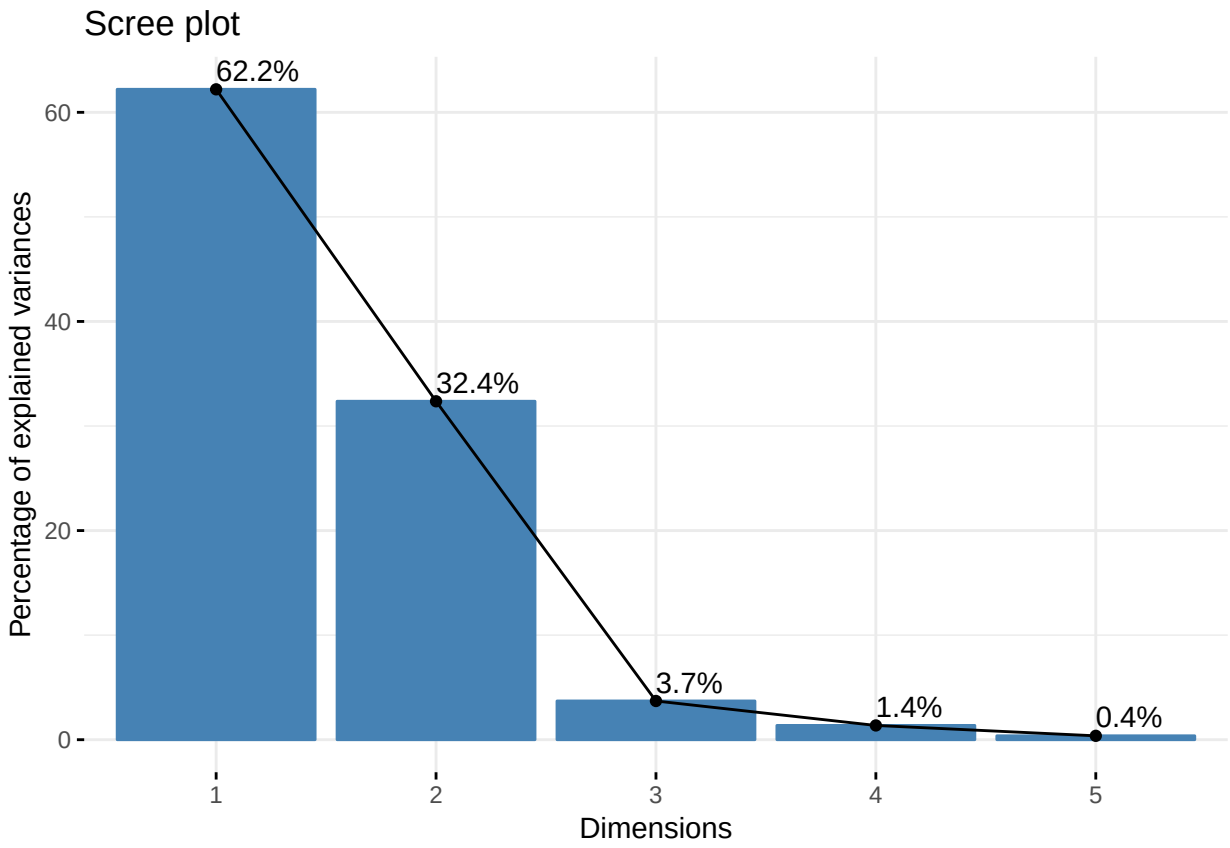
```
## Loading required package: ggplot2
```

```
## Welcome! Related Books: `Practical Guide To Cluster Analysis in R` at https://goo.gl/13EFCZ
```

```
mydata.ca = CA(mydata, graph=FALSE,row.sup = c(9:19))
####Q3#####
library(plyr)
### RQ nombre de valeurs prpres = min(n,p)-1
mydata.ca$eig
```

```
##         eigenvalue percentage of variance
## dim 1 1.385729e-02             62.1981806
## dim 2 7.210685e-03             32.3650288
## dim 3 8.247314e-04              3.7017919
## dim 4 3.038516e-04              1.3638326
## dim 5 8.269302e-05              0.3711661
##       cumulative percentage of variance
## dim 1                          62.19818
## dim 2                          94.56321
## dim 3                          98.26500
## dim 4                          99.62883
## dim 5                         100.00000
```

```
fviz_eig(mydata.ca, addlabels = TRUE)
```




```
eig=mydata.ca$eig
write.xlsx(as.data.frame(eig),file="TP2-2.xlsx",sheetName="eig")
```

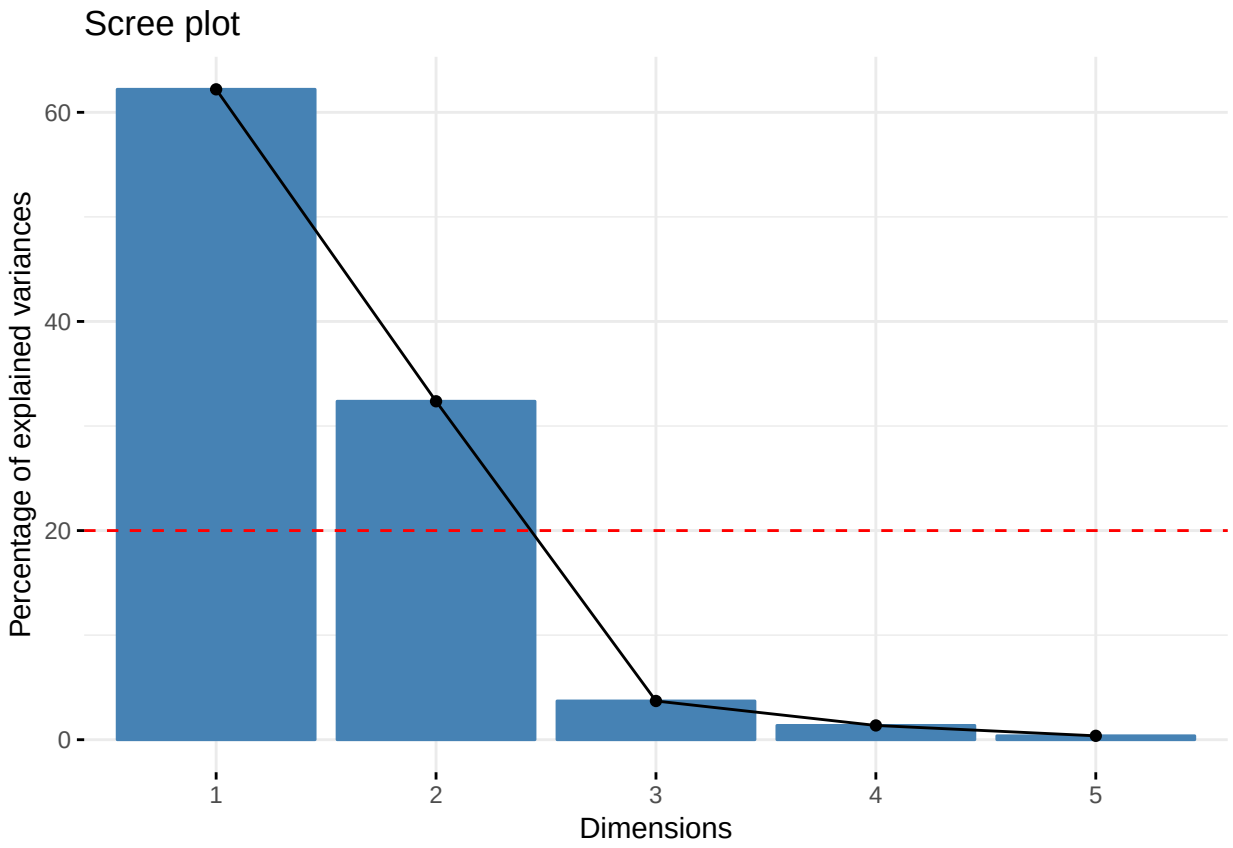
```
## inercie moyenne (Critère de Kaiser)

# code
## les commandes sont équivalents
sum(mydata.ca$eig[,2]>(100/nrow(mydata.ca$eig)), na.rm=TRUE)
```

```
## [1] 2
```

```
sum(mydata.ca$eig[,1]>(sum(mydata.ca$eig[,1])/nrow(mydata.ca$eig)), na.rm=TRUE)
```

```
## [1] 2
```

```
### graphiquement
fviz_screeplot (mydata.ca) +
  geom_hline (yintercept = 100/nrow(mydata.ca$eig), linetype = 2, color = "red")
```



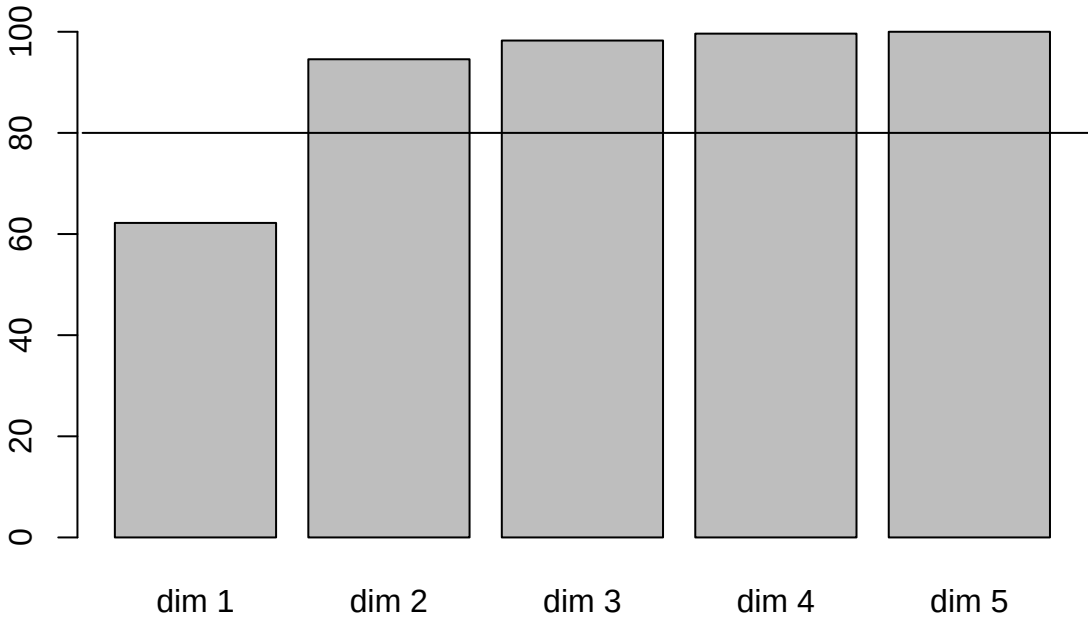

```
png("eig11.png", height=1000, width=1200, res=250, pointsize=8)
fviz_screeplot (mydata.ca) +
  geom_hline (yintercept = 100/nrow(mydata.ca$eig), linetype = 2, color = "red")

dev.off()
```

```
## pdf
##   2
```

```
## inercie totale,

# code
which(mydata.ca$eig[,3]>80)[1]
```

```
## dim 2
##     2
```

```
##graphiquement
##graphiquement
barplot(mydata.ca$eig[,3])
lines(c(0,20),c(80,80))
```




```
png("eig12.png", height=1000, width=1200, res=250, pointsize=8)
barplot(mydata.ca$eig[,3])
lines(c(0,20),c(80,80))
dev.off()
```

```
## pdf
##   2
```

```
# 4.a
mydata.ca = CA(mydata, graph=FALSE,ncp=3,row.sup = c(9:19))
poids=rowSums(mydata[1:8,])/sum(mydata[1:8,])
poids
```

```
##       AGRI       PEPA       PRCS       PRIN       EMPL       OUQU
## 0.02857604 0.03511463 0.05618340 0.10154989 0.14982241 0.11155957
##       ONQU       INAC
## 0.04399419 0.47319987
```

```
write.xlsx(poids,file="TP2-2.xlsx",sheetName="poids_rows",append=T)
write.xlsx(mydata.ca$row,file="TP2-2.xlsx",sheetName="row",append=T)

mydata.ca$row$contrib
```

```
##           Dim 1     Dim 2       Dim 3
## AGRI  5.6927723 37.989221 17.88131756
## PEPA  1.1847619  9.979255 17.67013832
## PRCS 74.9579010  2.887188  0.06218227
## PRIN  8.3279108  1.496416 11.75524260
## EMPL  0.2674713 18.937575  0.47006138
## OUQU  1.5382978 15.900944  5.05078817
## ONQU  4.4053909  5.490645  8.41929638
## INAC  3.6254941  7.318755 38.69097331
```

```
mydata.ca$row$cos2
```

```
##           Dim 1      Dim 2        Dim 3
```

```
## AGRI 0.21351182 0.74140722 3.991461e-02
## PEPA 0.15383515 0.67424994 1.365522e-01
## PRCS 0.97818335 0.01960542 4.829518e-05
## PRIN 0.80220729 0.07500692 6.739326e-02
## EMPL 0.02521427 0.92894899 2.637291e-03
## OUQU 0.13827479 0.74374460 2.702067e-02
## ONQU 0.55568018 0.36038123 6.320488e-02
## INAC 0.37220445 0.39097583 2.364059e-01
```

```
mydata.ca$row$coord
```

```
##            Dim 1       Dim 2        Dim 3
## AGRI -0.16614986  0.30961174 -0.071838125
## PEPA -0.06837709  0.14315064 -0.064421704
## PRCS  0.42997558  0.06087258 -0.003021242
## PRIN  0.10660251 -0.03259679 -0.030898140
## EMPL -0.01572857 -0.09546893 -0.005086806
## OUQU -0.04371252 -0.10137860 -0.019323350
## ONQU -0.11779685 -0.09486419 -0.039727982
## INAC -0.03258370  0.03339524  0.025968017
```

```
sign(mydata.ca$col$coord)
```

```
##       Dim 1 Dim 2 Dim 3
## radio     1    -1    -1
## Tel      -1    -1     1
## QuotN     1     1     1
## QuotR    -1     1     1
## PMag      1     1     1
## PMTV     -1    -1     1
```

```
#4.b
poids=colSums(mydata[1:8,])/sum(mydata[1:8,])
poids
```

```
##     radio       Tel     QuotN     QuotR      PMag      PMTV
## 0.2661447 0.3203907 0.0353568 0.1345657 0.1051824 0.1383597
```

```
write.xlsx(poids,file="TP2-2.xlsx",sheetName="poids_cols",append=T)
write.xlsx(mydata.ca$col,file="TP2-2.xlsx",sheetName="col",append=T)

mydata.ca$col$contrib
```

```
##             Dim 1       Dim 2      Dim 3
## radio  0.42870020  1.80368136 70.3836037
## Tel    6.56412758  0.01924192 10.5160124
## QuotN 74.58771894  0.01888980  1.8090350
## QuotR 11.50112834 22.43564129  0.4460069
## PMag   6.82333790 25.60802747  4.4877188
## PMTV   0.09498704 50.11451815 12.3576232
```

```
mydata.ca$col$cos2
```

```
##             Dim 1        Dim 2       Dim 3
## radio 0.076956173 0.1684798295 0.751961487
## Tel   0.850792093 0.0012977566 0.081120728
## QuotN 0.992981084 0.0001308577 0.001433359
## QuotR 0.486642767 0.4939768850 0.001123171
```

```
## PMag  0.316773320 0.6186231393 0.012399714
## PMTV  0.003491952 0.9586627283 0.027037917
```

```
mydata.ca$col$coord
```

```
##              Dim 1        Dim 2        Dim 3
## radio  0.014940223 -0.022105956 -0.046701748
## Tel   -0.053282876 -0.002081002  0.016452877
## QuotN  0.540675025  0.006206767  0.020542027
## QuotR -0.108828370  0.109645372  0.005228292
## PMag   0.094812573  0.132496594  0.018758472
## PMTV  -0.009753634 -0.161608884  0.027140568
```

```
sign(mydata.ca$col$coord)
```

```
##       Dim 1 Dim 2 Dim 3
## radio     1    -1    -1
## Tel      -1    -1     1
## QuotN     1     1     1
## QuotR    -1     1     1
## PMag      1     1     1
## PMTV     -1    -1     1
```

```
# 4.c
poids=rowSums(mydata[9:19,])/sum(mydata[1:8,])
poids
```

```
##       HOM       FEM      AGE1      AGE2      AGE3      AGE4      AGE5
## 0.4896674 0.5100097 0.1817888 0.1828382 0.2629964 0.1930094 0.1792057
##      PRIM      SECO      TECP      SUPE
## 0.3006942 0.2600904 0.2398289 0.1772683
```

```
write.xlsx(poids,file="TP2-2.xlsx",sheetName="poids_row_sup",append=T)
write.xlsx(mydata.ca$row.sup,file="TP2-2.xlsx",sheetName="row_sup",append=T)

mydata.ca$row.sup$cos2
```

```
##             Dim 1       Dim 2        Dim 3
## HOM  0.4813256748 0.110403054 2.148690e-02
## FEM  0.4862488256 0.103125885 1.925344e-02
## AGE1 0.0150399553 0.560853164 7.619160e-02
## AGE2 0.0541545301 0.870390268 9.983138e-03
## AGE3 0.6140366390 0.102612172 7.261105e-02
## AGE4 0.0477766611 0.803025309 1.127843e-03
## AGE5 0.1438329318 0.584012999 1.552426e-01
## PRIM 0.6289413984 0.244556698 2.086121e-02
## SECO 0.0001595581 0.687156914 8.455642e-05
## TECP 0.0132161317 0.461419300 1.867327e-02
## SUPE 0.9881829928 0.003296492 2.352695e-03
```

```
mydata.ca$row.sup$coord
```

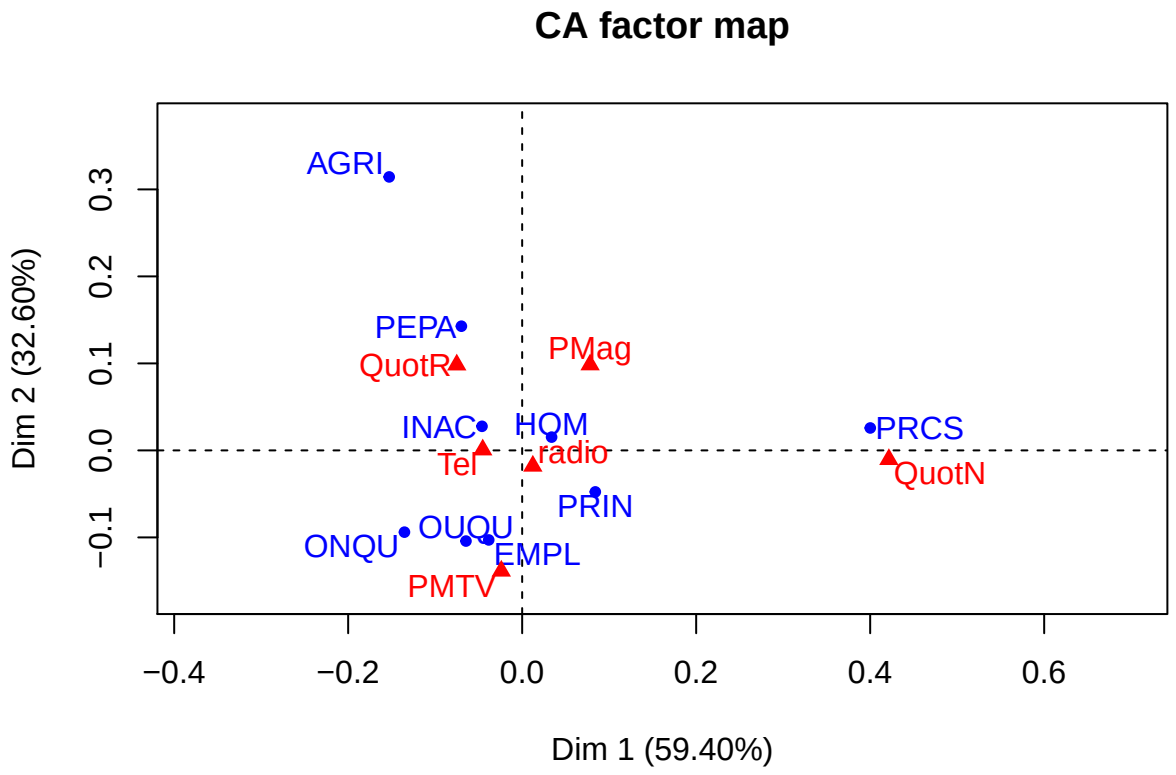
```
##              Dim 1       Dim 2         Dim 3
## HOM   0.0498239399  0.02386212 -0.0105270206
## FEM  -0.0482989506 -0.02224294  0.0096108671
## AGE1  0.0163876318 -0.10007314 -0.0368847177
## AGE2  0.0301220698 -0.12076037 -0.0129330501
## AGE3  0.0306359760 -0.01252374 -0.0105350337
```

```
## AGE4 -0.0244521405  0.10024751 -0.0037569314
## AGE5 -0.0677531954  0.13652490  0.0703892109
## PRIM -0.1290407935  0.08046587  0.0235012904
## SECO -0.0006251352 -0.04102442  0.0004550801
## TECP  0.0311727618 -0.18419209 -0.0370538476
## SUPE  0.2905405017  0.01678085 -0.0141765580
```

```
sign(mydata.ca$row.sup$coord)
```

```
##      Dim 1 Dim 2 Dim 3
## HOM      1     1    -1
## FEM     -1    -1     1
## AGE1     1    -1    -1
## AGE2     1    -1    -1
## AGE3     1    -1    -1
## AGE4    -1     1    -1
## AGE5    -1     1     1
## PRIM    -1     1     1
## SECO    -1    -1     1
## TECP     1    -1    -1
## SUPE     1     1    -1
```

```
##6
CA(mydata[1:9,], ncp=2, graph=TRUE)
```




```
## **Results of the Correspondence Analysis (CA)**
## The row variable has  9  categories; the column variable has 6 categories
## The chi square of independence between the two variables is equal to 283.9464 (p-value =  1.623691e-3
## *The results are available in the following objects:
##
##    name              description
```

```
## 1  "$eig"            "eigenvalues"
## 2  "$col"            "results for the columns"
## 3  "$col$coord"      "coord. for the columns"
## 4  "$col$cos2"       "cos2 for the columns"
## 5  "$col$contrib"    "contributions of the columns"
## 6  "$row"            "results for the rows"
## 7  "$row$coord"      "coord. for the rows"
## 8  "$row$cos2"       "cos2 for the rows"
## 9  "$row$contrib"    "contributions of the rows"
## 10 "$call"           "summary called parameters"
## 11 "$call$marge.col" "weights of the columns"
## 12 "$call$marge.row" "weights of the rows"
```

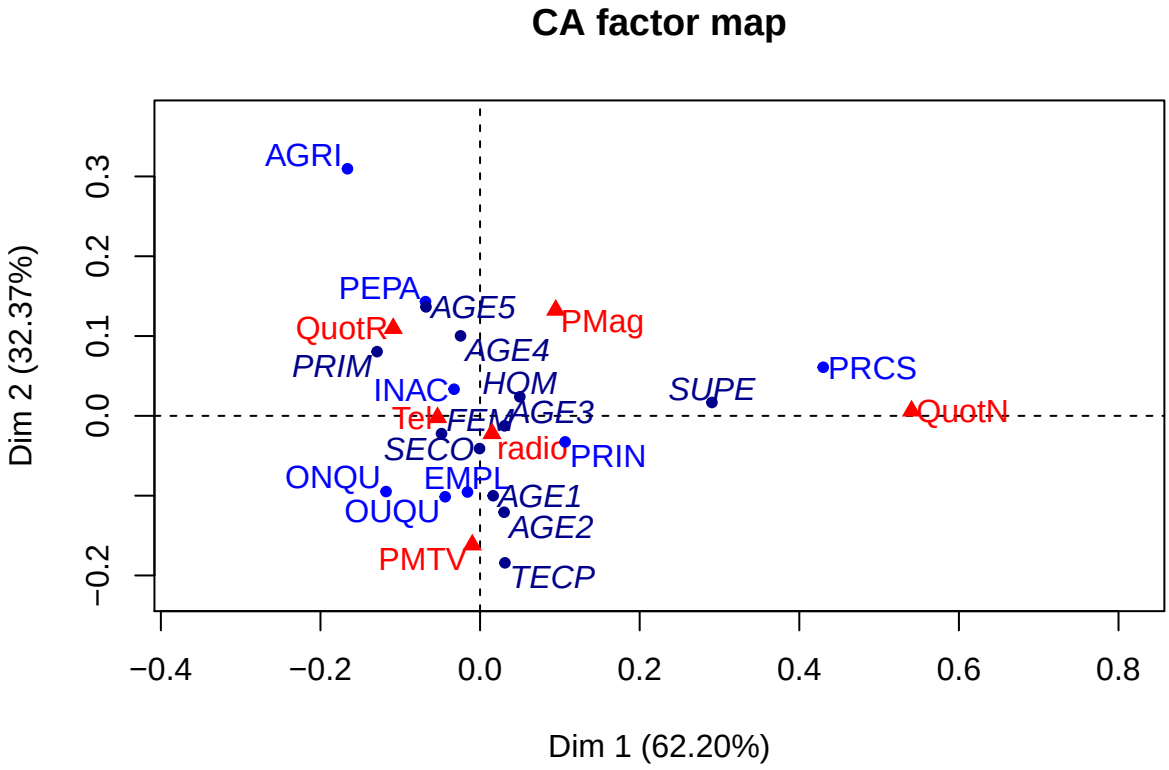
```
png("plot1.png", height=800, width=800, res=250, pointsize=8)

CA(mydata[1:9,], ncp=2, graph=TRUE)
```

```
## **Results of the Correspondence Analysis (CA)**
## The row variable has  9  categories; the column variable has 6 categories
## The chi square of independence between the two variables is equal to 283.9464 (p-value =  1.623691e-
## *The results are available in the following objects:
##
##    name              description
## 1  "$eig"            "eigenvalues"
## 2  "$col"            "results for the columns"
## 3  "$col$coord"      "coord. for the columns"
## 4  "$col$cos2"       "cos2 for the columns"
## 5  "$col$contrib"    "contributions of the columns"
## 6  "$row"            "results for the rows"
## 7  "$row$coord"      "coord. for the rows"
## 8  "$row$cos2"       "cos2 for the rows"
## 9  "$row$contrib"    "contributions of the rows"
## 10 "$call"           "summary called parameters"
## 11 "$call$marge.col" "weights of the columns"
## 12 "$call$marge.row" "weights of the rows"
```

```
dev.off()
```

```
## pdf
##   2
```

```
##7
CA(mydata, ncp=2, graph=TRUE,row.sup =c(9:19))
```




```
## **Results of the Correspondence Analysis (CA)**
## The row variable has  8  categories; the column variable has 6 categories
## The chi square of independence between the two variables is equal to 275.9953 (p-value =  3.150917e-3
## *The results are available in the following objects:
##
##    name              description
## 1  "$eig"            "eigenvalues"
## 2  "$col"            "results for the columns"
## 3  "$col$coord"      "coord. for the columns"
## 4  "$col$cos2"       "cos2 for the columns"
## 5  "$col$contrib"    "contributions of the columns"
## 6  "$row"            "results for the rows"
## 7  "$row$coord"      "coord. for the rows"
## 8  "$row$cos2"       "cos2 for the rows"
## 9  "$row$contrib"    "contributions of the rows"
## 10 "$row.sup$coord"  "coord. for supplementary rows"
## 11 "$row.sup$cos2"   "cos2 for supplementary rows"
## 12 "$call"           "summary called parameters"
## 13 "$call$marge.col" "weights of the columns"
## 14 "$call$marge.row" "weights of the rows"
```

```
png("plot2.png", height=800, width=800, res=250, pointsize=8)

CA(mydata, ncp=2, graph=TRUE,row.sup =c(9:19))
```

```
## **Results of the Correspondence Analysis (CA)**
## The row variable has  8  categories; the column variable has 6 categories
## The chi square of independence between the two variables is equal to 275.9953 (p-value =  3.150917e-3
## *The results are available in the following objects:
##
```

```
##    name              description
## 1  "$eig"            "eigenvalues"
## 2  "$col"            "results for the columns"
## 3  "$col$coord"      "coord. for the columns"
## 4  "$col$cos2"       "cos2 for the columns"
## 5  "$col$contrib"    "contributions of the columns"
## 6  "$row"            "results for the rows"
## 7  "$row$coord"      "coord. for the rows"
## 8  "$row$cos2"       "cos2 for the rows"
## 9  "$row$contrib"    "contributions of the rows"
## 10 "$row.sup$coord"  "coord. for supplementary rows"
## 11 "$row.sup$cos2"   "cos2 for supplementary rows"
## 12 "$call"           "summary called parameters"
## 13 "$call$marge.col" "weights of the columns"
## 14 "$call$marge.row" "weights of the rows"
```

```
dev.off()
```

```
## pdf
##   2
```