~~~
---
title: "TP4 : Classification Ascendante Hiérarchique sous R"
output: pdf_document
author: Slim Kammoun
---
```{r, echo=T}
mydata=read.table("Race-canine.txt",sep="\t", head=T,encoding = "latin1", colClasses = "factor" )
## encoding pour lire les accents
##head(mydata)
```
```{r}
rownames(mydata)<-mydata$Race
mydata<-mydata[,-1]
#head(mydata)
```
```{r, include= F}
library(plyr)
#install.packages("philentropy")
library(philentropy)
library(FactoMineR)
library(factoextra)
library(ggplot2)
```
Avec 4 facteurs
```{r, include= F ,echo=FALSE}
mydata.mca = MCA(mydata,quali.sup=7,ncp=4)
hcpc=HCPC(mydata.mca,nb.clust=4,proba=1)
```
```{r}
tab1=hcpc$call
plot(hcpc,choice="bar")
plot(hcpc,choice="tree")
plot(hcpc,choice="map",draw.tree = F)
plot(hcpc,choice="3D.map")
~~~

~~~
```

```{r,include=F}

png("plot11.png", height=1200, width=1200, res=250, pointsize=8)

plot(hcpc,choice="bar")

dev.off()

png("plot12.png", height=1200, width=1200, res=250, pointsize=8)

plot(hcpc,choice="tree")

dev.off()

png("plot13.png", height=1200, width=1200, res=250, pointsize=8)

plot(hcpc,choice="map",draw.tree = F)

dev.off()

png("plot14.png", height=1200, width=1200, res=250, pointsize=8)

plot(hcpc,choice="3D.map")

dev.off()

```

```{r}

#mydata.mca = MCA(mydata,quali.sup=7,ncp=10)

#hcpc=HCPC(mydata.mca,nb.clust=6)

tab2=hcpc$call

```

```{r}

hcpc$data.clust

hcpc$desc.ind

hcpc$desc.var

```

```{r}

pl1=fviz_cluster(hcpc, ellipse=F)

fviz_add(pl1,mydata.mca$quali.sup$coord)

```

```{r}

mydata1<-cbind(mydata,hcpc$call$X[,5][match(rownames(mydata), rownames(hcpc$call$X))])

colnames(mydata1)<-c(colnames(mydata),"Classe")

```

```{r}
~~~

~~~
 par(mfrow=c(3,4))
for( i in  1:4)
{for (j in 1:7)
{ cl = as.data.frame(mydata1[which(mydata1["Classe"]==i),])
barplot(table(factor(cl[,j]))/sum(table(factor(cl[,j]))), main= paste("classe ", as.character(i), colnames(cl)[j]))}
}
```
```{r,include=F}
library(xlsx)
write.xlsx(hcpc$data.clust,file="TP4-4facteurs-RC.xlsx",sheetName="clust")
for (i in 1:4)
{
 write.xlsx(hcpc$desc.axes$quanti[i],file="TP4-4facteurs-RC.xlsx",sheetName=paste("axe",as.character(i)),append=T)
 write.xlsx(hcpc$desc.var$category[i],file="TP4-4facteurs-RC.xlsx",sheetName=paste("var",as.character(i)),append=T)
 write.xlsx(hcpc$desc.ind$para[i],file="TP4-4facteurs-RC.xlsx",sheetName=paste("distances",as.character(i)),append=T)

}
#write.xlsx(poids,file="TP4.xlsx",sheetName="",append=T)
```
avec 10 facteurs
```{r, include= F ,echo=FALSE}
mydata.mca = MCA(mydata,quali.sup=7,ncp=10)
hcpc=HCPC(mydata.mca,nb.clust=4,proba=1)
```
```{r}
tab1=hcpc$call
plot(hcpc,choice="bar")
plot(hcpc,choice="tree")
plot(hcpc,choice="map",draw.tree = F)
plot(hcpc,choice="3D.map")

tab2=hcpc$call
```
```{r}
~~~

~~~
hcpc$data.clust
hcpc$desc.ind
hcpc$desc.var
```
```{r}
pl1=fviz_cluster(hcpc, ellipse=F)
fviz_add(pl1,mydata.mca$quali.sup$coord)
```

```{r}
mydata1<-cbind(mydata,hcpc$call$X[,11][match(rownames(mydata), rownames(hcpc$call$X))])

colnames(mydata1)<-c(colnames(mydata),"Classe")
```
```{r}
  par(mfrow=c(3,4))
for( i in  1:4)
{for (j in 1:7)
{ cl = as.data.frame(mydata1[which(mydata1["Classe"]==i),])
barplot(table(factor(cl[,j]))/sum(table(factor(cl[,j]))), main= paste("classe ", as.character(i), colnames(cl)[j]))}
}
```
```{r,include=F}
library(xlsx)
write.xlsx(hcpc$data.clust,file="TP4-10facteurs-RC.xlsx",sheetName="clust")
for (i in 1:4)
{
  write.xlsx(hcpc$desc.axes$quanti[i],file="TP4-10facteurs-RC.xlsx",sheetName=paste("axe",as.character(i)),append=T)
  write.xlsx(hcpc$desc.var$category[i],file="TP4-10facteurs-RC.xlsx",sheetName=paste("var",as.character(i)),append=T)
  write.xlsx(hcpc$desc.ind$para[i],file="TP4-10facteurs-RC.xlsx",sheetName=paste("distances",as.character(i)),append=T)
}
#write.xlsx(poids,file="TP4.xlsx",sheetName="",append=T)
```
```{r,include=F}
~~~

```
png("plot21.png", height=1200, width=1200, res=250, pointsize=8)

plot(hcpc,choice="bar")

dev.off()

png("plot22.png", height=1200, width=1200, res=250, pointsize=8)

plot(hcpc,choice="tree")

dev.off()

png("plot23.png", height=1200, width=1200, res=250, pointsize=8)

plot(hcpc,choice="map",draw.tree = F)

dev.off()

png("plot24.png", height=1200, width=1200, res=250, pointsize=8)

plot(hcpc,choice="3D.map")

dev.off()
```