

PAM

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```
#_____ PARTITION AROUND MEDOIDS (PAM)_____
library(cluster)
```

Cargar la matriz de datos.

```
X<-as.data.frame(state.x77)
colnames(X)

## [1] "Population" "Income"      "Illiteracy" "Life Exp"    "Murder"
## [6] "HS Grad"    "Frost"       "Area"
```

Transformacion de datos

#1.- Transformacion de las variables x1,x3 y x8 con la funcion de logaritmo.

```
X[,1]<-log(X[,1])
colnames(X)[1]<-"Log-Population"

X[,3]<-log(X[,3])
colnames(X)[3]<-"Log-Illiteracy"

X[,8]<-log(X[,8])
colnames(X)[8]<-"Log-Area"
```

Metodo PAM

#1.- Separacion de filas y columnas.

```
dim(X)

## [1] 50  8

n<-dim(X)[1]
p<-dim(X)[2]
```

2.- Estandarizacion univariante

```
X.s<-scale(X)
```

3.- Aplicacion del algoritmo

```
pam.3<-pam(X.s,3)
```

4.- Clusters

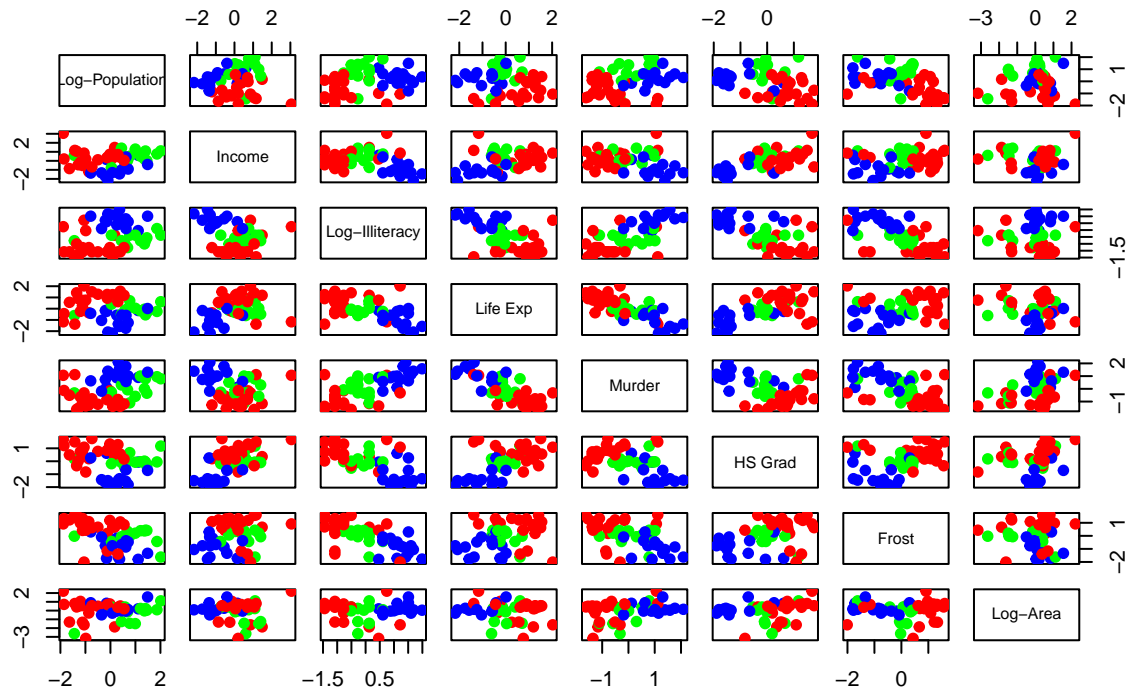
```
cl.pam<-pam.3$clustering  
cl.pam
```

##	Alabama	Alaska	Arizona	Arkansas	California
##	1	2	1	1	3
##	Colorado	Connecticut	Delaware	Florida	Georgia
##	2	2	3	1	1
##	Hawaii	Idaho	Illinois	Indiana	Iowa
##	2	2	3	3	2
##	Kansas	Kentucky	Louisiana	Maine	Maryland
##	2	1	1	2	3
##	Massachusetts	Michigan	Minnesota	Mississippi	Missouri
##	3	3	2	1	3
##	Montana	Nebraska	Nevada	New Hampshire	New Jersey
##	2	2	2	2	3
##	New Mexico	New York	North Carolina	North Dakota	Ohio
##	1	3	1	2	3
##	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina
##	3	2	3	2	1
##	South Dakota	Tennessee	Texas	Utah	Vermont
##	2	1	1	2	2
##	Virginia	Washington	West Virginia	Wisconsin	Wyoming
##	1	2	1	2	2

#5.- Scatter plot de la matriz con los grupos

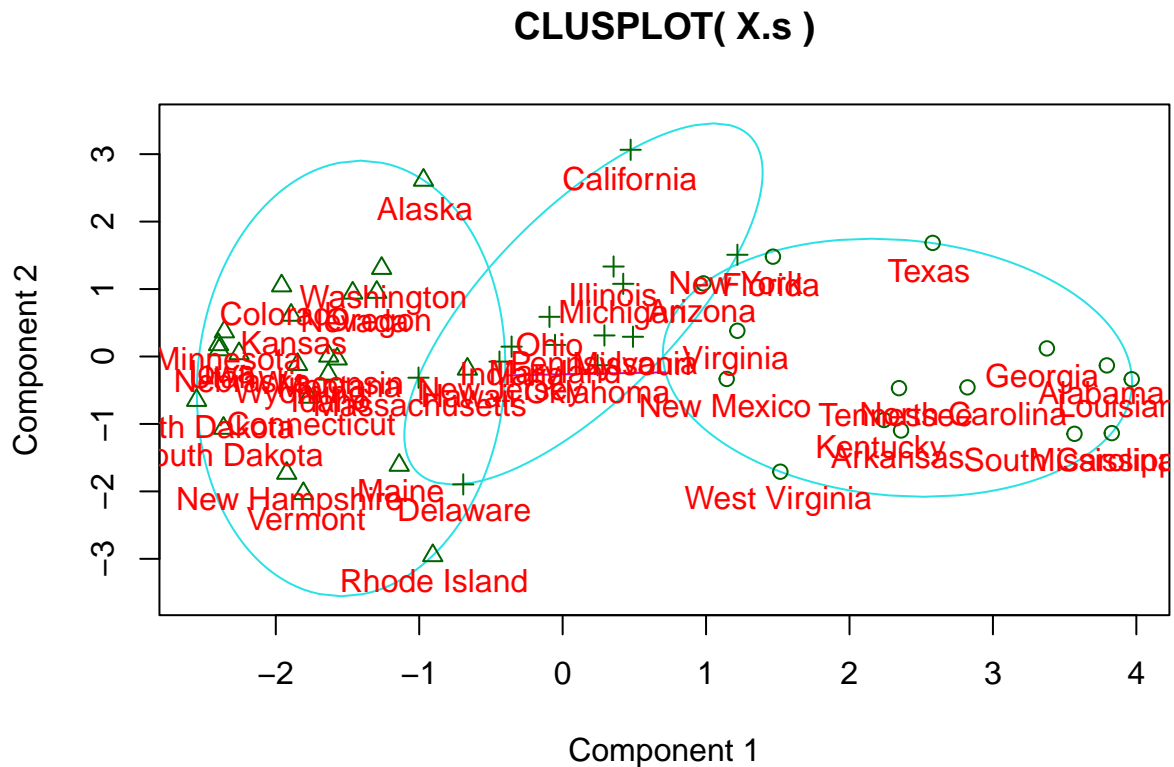
```
col.cluster<-c("blue","red","green")[cl.pam]  
pairs(X.s, col=col.cluster, main="PAM", pch=19)
```

PAM



Visualizacion con Componentes Principales

```
clusplot(X.s,cl.pam)
text(princomp(X.s)$scores[,1:2],
     labels=rownames(X.s),pos=1, col="red")
```



These two components explain 62.5 % of the point variability.

Silhouette

Representacion grafica de la eficacia de clasificacion de una observacion dentro de un grupo.

1.- Generacion de los calculos

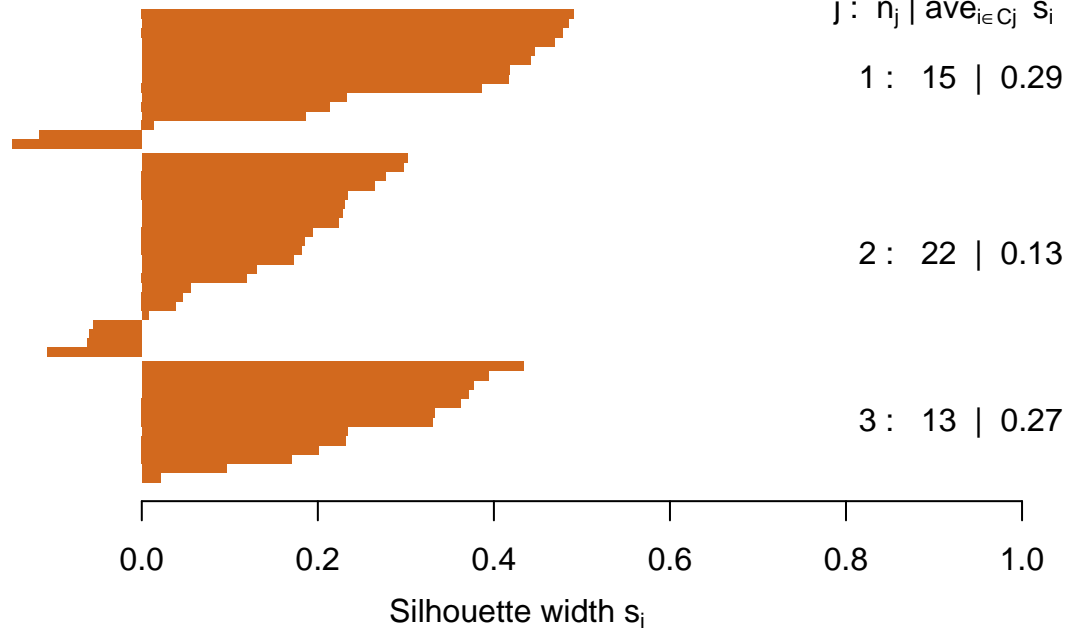
```
dist.Euc<-dist(X.s, method = "euclidean")
Sil.pam<-silhouette(cl.pam, dist.Euc)
```

#2.- Generacion del grafico

```
plot(Sil.pam, main="Silhouette for PAM",
     col="chocolate")
```

Silhouette for PAM

n = 50



Average silhouette width : 0.22