Package 'MKMeans'

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Type Package

Title A Modern K-Means (MKMeans) Clustering Algorithm

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Depends methods

Description It's a Modern K-Means clustering algorithm allowing data of any number of dimensions, any initial center, and any number of clusters to expect.

Collate AllClasses.R MKMeans.R C.f.R Dist.R

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NeedsCompilation no

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Description

It's a Modern K-Means clustering algorithm allowing data of any number of dimensions, any initial center, and any number of clusters to expect.

Details

Package:	MKMeans
Type:	Package
Version:	3.1
Date:	2024-10-09
License:	GPL-2

Author(s)

Yarong Yang, Nader Ebrahimi, Yoram Rubin, and Jacob Zhang

References

Yarong Yang and Jacob Zhang.(2024) MKMeans: A Modern K-Means Clustering Algorithm.

Examples

```
x<-rnorm(20,0,1)
y<-rnorm(20,1,1)
data.test<-cbind(x,y)
Res<-MKMeans(data.test,3,1,iteration=1000,tol=.9,type=1)
Ress<-Res
names(Ress@Classes[[1]])<-rep("red",length(Res@Classes[[1]]))
names(Ress@Classes[[2]])<-rep("blue",length(Res@Classes[[2]]))
names(Ress@Classes[[3]])<-rep("green",length(Res@Classes[[3]]))
Cols<-names(sort(c(Ress@Classes[[1]],Ress@Classes[[2]],Ress@Classes[[3]])))
plot(x,y,type="p",col=Cols,lwd=2)
points(Res@Centers,pch=15,col=c("red","blue","green"))
```

C.f	*Finding the center of a cluster.*

Description

It's a function of finding the center of a cluster.

Usage

```
C.f(dat, type)
```

Arguments

dat	Numeric. A cluster matrix with each row being an observaion.
type	Integer. The type of distance between observations. 1 for Euclidean distance. 2 for Manhattan distance. 3 for maximum deviation along dimensions.

Value

A vector.

Author(s)

Yarong Yang

References

Yarong Yang and Jacob Zhang.(2024) MKMeans: A Modern K-Means Clustering Algorithm.

Examples

```
x<-rnorm(5,0,1)
y<-rnorm(5,1,1)
data<-cbind(x,y)
Res<-C.f(dat=data,type=1)
```

Dist	*Finding the distance between two observations.*

Description

It's a function of finding the distance between two observations.

Usage

```
Dist(x,y,type)
```

Arguments

`x`	Numeric. A vector denoting an observation.
`y`	Numeric. A vector denoting an observation.
`type`	Integer. The type of distance between observations. 1 for Euclidean distance. 2 for Manhattan distance. 3 for maximum deviation among dimensions.

Value

A numeric number.

Author(s)

Yarong Yang

References

Yarong Yang and Jacob Zhang.(2024) MKMeans: A Modern K-Means Clustering Algorithm.

Examples

```
x<-rnorm(10,0,1)
y<-rnorm(10,1,1)
z<-rnorm(10,2,1)
data<-cbind(x,y,z)
Res<-Dist(data[1,],data[2,],type=1)
```

MKMean   *Class to contain the results from function MKMeans.*

Description

The function MKMeans return object of class MKMean that contains the number of clusters, the center of each cluster, and the observations in each cluster.

Objects from the Class

new("MKMean",K=new("numeric"),Centers=new("matrix"),Classes=new("list"),Clusters=new("list"))

Slots

`K`: An integer being the number of clusters.

`Centers`: A numeric matrix with each row being center of a cluster.

`Classes`: An integer list showing the original indexes of the observations in each cluster.

`Clusters`: A numeric list showing the observations in each cluster.

Author(s)

Yarong Yang

References

Yarong Yang and Jacob Zhang.(2024) MKMeans: A Modern K-Means Clustering Algorithm.

Examples

```
showClass("MKMean")
```

MKMeans   *Modern K-Means clustering.*

Description

It's a Modern K-Means clustering algorithm allowing data of any number of dimensions, any initial center, and any number of clusters to expect.

Usage

```
MKMeans(data, K, initial, iteration, tol, type)
```

Arguments

data	Numeric. An observation matrix with each row being an oberservation.
K	Integer. The number of clusters expected.
initial	Numeric. Either the selected initial center matrix with each row being an observation, or 1 for the first K rows of the data matrix being the intial center.
iteration	Integer. The number of the most iterations wanted for the clustering process.
tol	Numeric. The minimum acceptable percentage of stable observations to stop the clustering process, basically greater than 0.5 to guarantee the value of the results.
type	Integer. The type of distance between observations. 1 for Euclidean distance. 2 for Manhattan distance. 3 for maximum deviation among dimensions.

Value

An object of class MKMean.

Author(s)

Yarong Yang

References

Yarong Yang and Jacob Zhang.(2024) MKMeans: A Modern K-Means Clustering Algorithm.

Examples

```
x<-rnorm(20,0,1)
y<-rnorm(20,1,1)
data.test<-cbind(x,y)
Res<-MKMeans(data.test,3,1,iteration=1000,tol=.95,type=1)
Ress<-Res
names(Ress@Classes[[1]])<-rep("red",length(Res@Classes[[1]]))
names(Ress@Classes[[2]])<-rep("blue",length(Res@Classes[[2]]))
names(Ress@Classes[[3]])<-rep("green",length(Res@Classes[[3]]))
Cols<-names(sort(c(Ress@Classes[[1]],Ress@Classes[[2]],Ress@Classes[[3]])))
plot(x,y,type="p",col=Cols,lwd=2)
points(Res@Centers,pch=15,col=c("red","blue","green"))
```

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