

# Package ‘MKMeans’

January 20, 2025

**Type** Package

**Title** A Modern K-Means (MKMeans) Clustering Algorithm

**Version** 3.1

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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

**License** GPL-2

**NeedsCompilation** no

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MKMeans-package

*Modern K-Means (MKMeans) Clustering.*

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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)
Res<-Res
names(Res@Classes[[1]])<-rep("red",length(Res@Classes[[1]]))
names(Res@Classes[[2]])<-rep("blue",length(Res@Classes[[2]]))
names(Res@Classes[[3]])<-rep("green",length(Res@Classes[[3]]))
Cols<-names(sort(c(Res@Classes[[1]],Res@Classes[[2]],Res@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)
```

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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.*


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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.

**Usage**

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

**Arguments**

|           |   |
|-----------|---|
| data      | Numeric. An observation matrix with each row being an observation.  |
| 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 initial 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)
Res<-Res
names(Res@Classes[[1]])<-rep("red",length(Res@Classes[[1]]))
names(Res@Classes[[2]])<-rep("blue",length(Res@Classes[[2]]))
names(Res@Classes[[3]])<-rep("green",length(Res@Classes[[3]]))
Cols<-names(sort(c(Res@Classes[[1]],Res@Classes[[2]],Res@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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