

Package ‘CHsharp’

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Title Choi and Hall Clustering in 3d

Version 0.2

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Description Functions that cluster 3 dimensional data into their local modes. Based on a convergent form of Choi and Hall’s (1999) data sharpening method. Note: sharp3dB is much faster than sharp3d if data is ordered in at least one dimension.

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d *A really neat data set*

Description

This revolutionizes the scientific community’s worldview.

Usage

data(d)

Author(s)

Douglas G. Woolford

sharp3d

Identify Cluster Centres for 3-dimensional Data via Data Sharpening

Description

Identifies the centres of clusters for 3-dimensional data using a convergent form of Choi and Hall's (1999) data sharpening method.

Usage

```
sharp3d(x, y, z, hspace = 1, htime = 1, v = 1)
```

Arguments

x	the x coordinates of the data
y	the y coordinates of the data
z	the z coordinates of the data
hspace	the bandwidth for sharpening in the direction of the x-y plane
htime	the bandwidth for sharpening in the z direction
v	a positive integer representing the number of iterations to perform

Details

Identifies the centres of clusters based on a convergent form of Choi and Hall's data sharpening method. This function was originally built for identifying clusters in space-time where space is the x-y plane and time is the z-axis.

Value

Returns a (number of data points x 3) data frame containing the sharpened points x.sharp, y.sharp and z.sharp, respectively.

Author(s)

Douglas G. Woolford, W. John Braun

References

Woolford, D. G. and Braun, W. J. (2004) Exploring lightning and fire ignition data as point processes. 2004 Proceeding of the American Statistical Association, Statistics and the Environment Section [CD-ROM], Alexandria, VA: American Statistical Association.

Choi, E. and Hall, P. (1999) Data sharpening as a prelude to density estimation. *Biometrika* 86, 941-947.

See Also

sharp3dB

Examples

```
#library(scatterplot3d)
#x <- 1:200
#y <- c(rnorm(50,-1,1),rnorm(50,2,2), rnorm(100,0,.5))
#z <- c(sample(1:50,50), sample(26:75,50), sample(51:150,100))
#data.sharp5 <- sharp3d(x,y,z,5,10,5)
#data.sharp10 <- sharp3d(x,y,z,5,10,10)
# original data:
#dataPlot <- scatterplot3d(x,y,z)
# sharpened data after 5 iterations:
#dataPlot$points3d(data.sharp5$x.sharp, data.sharp5$y.sharp,
#data.sharp5$z.sharp, col=2,pch=19)
# sharpened data after 10 iterations:
#dataPlot$points3d(data.sharp10$x.sharp, data.sharp10$y.sharp,
#data.sharp10$z.sharp, col=4, pch=19)
```

sharp3dB

*Identify Cluster Centres for 3-dimensional Data via Data Sharpening***Description**

Identifies the centres of clusters for 3-dimensional data using a convergent form of Choi and Hall's (1999) data sharpening method. For use when the data is such that the z coordinates are in increasing order.

Usage

```
sharp3dB(x, y, z, hspace = 1, htime = 1, v = 1)
```

Arguments

x	the x coordinates of the data
y	the y coordinates of the data
z	the z coordinates of the data, in increasing order
hspace	the bandwidth for sharpening in the direction of the x-y plane
htime	the bandwidth for sharpening in the z direction
v	a positive integer representing the number of iterations to perform

Details

Identifies the centres of clusters based on a convergent form of Choi and Hall's data sharpening method. This function was originally built for identifying clusters in space-time where space is the x-y plane and time is the z-axis. Provided the z-data is in increasing order, this function is significantly faster than sharp3d().

Value

Returns a (number of data points x 3) data frame containing the sharpened points *x.sharp*, *y.sharp* and *z.sharp*, respectively.

Author(s)

Douglas G. Woolford, W. John Braun

References

Woolford, D. G. and Braun, W. J. (2004) Exploring lightning and fire ignition data as point processes. 2004 Proceeding of the American Statistical Association, Statistics and the Environment Section [CD-ROM], Alexandria, VA: American Statistical Association.

Choi, E. and Hall, P. (1999) Data sharpening as a prelude to density estimation. *Biometrika* 86, 941-947.

See Also

sharp3d

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