

Package ‘dobin’

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Type Package

Title Dimension Reduction for Outlier Detection

Version 1.0.4

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Description A dimension reduction technique for outlier detection. DOBIN: a Distance based Outlier BasIs using Neighbours, constructs a set of basis vectors for outlier detection. This is not an outlier detection method; rather it is a pre-processing method for outlier detection. It brings outliers to the fore-front using fewer basis vectors (Kandanaarachchi, Hyndman 2020) <[doi:10.1080/10618600.2020.1807353](https://doi.org/10.1080/10618600.2020.1807353)>.

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Encoding UTF-8

Imports dbscan, ggplot2, pracma

RoxygenNote 7.2.1

Suggests knitr, rmarkdown, OutliersO3, FNN

VignetteBuilder knitr

Depends R (>= 3.4.0)

URL <https://sevvandi.github.io/dobin/>

NeedsCompilation no

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Repository CRAN

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Contents

autoplot.dobin	2
dobin	2
Index	4

<code>autoplot.dobin</code>	<i>Plots the first two components of the dobin space.</i>
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Description

Scatterplot of the first two columns in the dobin space.

Usage

```
## S3 method for class 'dobin'
autoplot(object, ...)
```

Arguments

<code>object</code>	The output of the function ‘dobin’.
<code>...</code>	Other arguments currently ignored.

Value

A ggplot object.

Examples

```
X <- rbind(
  data.frame(x = rnorm(500),
             y = rnorm(500),
             z = rnorm(500)),
  data.frame(x = rnorm(5, mean = 10, sd = 0.2),
             y = rnorm(5, mean = 10, sd = 0.2),
             z = rnorm(5, mean = 10, sd = 0.2))
)
dob <- dobin(X)
autoplot(dob)
```

<code>dobin</code>	<i>Computes a set of basis vectors for outlier detection.</i>
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Description

This function computes a set of basis vectors suitable for outlier detection.

Usage

```
dobin(xx, frac = 0.95, norm = 1, k = NULL)
```

Arguments

<code>xx</code>	The input data in a dataframe, matrix or tibble format.
<code>frac</code>	The cut-off quantile for Y space. Default is 0.95.
<code>norm</code>	The normalization technique. Default is Min-Max, which normalizes each column to values between 0 and 1. <code>norm = 0</code> skips normalization. Other values of <code>norm</code> defaults to Median-IQR normalization.
<code>k</code>	Parameter k for k nearest neighbours with a default value of 5% of the number of observations with a cap of 20.

Value

A list with the following components:

<code>rotation</code>	The basis vectors suitable for outlier detection.
<code>coords</code>	The <code>dobin</code> coordinates of the data <code>xx</code> .
<code>Yspace</code>	The associated Y space.
<code>Ypairs</code>	The pairs in <code>xx</code> used to construct the Y space.
<code>zerosdcols</code>	Columns in <code>xx</code> with zero standard deviation. This is computed only if the number of columns are greater than the number of rows.

Examples

```
# A bimodal distribution in six dimensions, with 5 outliers in the middle.
set.seed(1)
x2 <- rnorm(405)
x3 <- rnorm(405)
x4 <- rnorm(405)
x5 <- rnorm(405)
x6 <- rnorm(405)
x1_1 <- rnorm(mean = 5, 400)
mu2 <- 0
x1_2 <- rnorm(5, mean=mu2, sd=0.2)
x1 <- c(x1_1, x1_2)
X1 <- cbind(x1,x2,x3,x4,x5,x6)
X2 <- cbind(-1*x1_1,x2[1:400],x3[1:400],x4[1:400],x5[1:400],x6[1:400])
X <- rbind(X1, X2)
labs <- c(rep(0,400), rep(1,5), rep(0,400))
dob <- dobin(X)
autoplot(dob)
```

Index

`autoplot.dobin`, [2](#)

`dobin`, [2](#)