

Package ‘dobin’

September 20, 2019

Type Package

Title Dimension Reduction for Outlier Detection

Version 1.0.0

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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 2019) <doi:10.13140/RG.2.2.15437.18403>.

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Encoding UTF-8

LazyData true

Imports pracma, FNN

RoxygenNote 6.1.1

Suggests knitr, rmarkdown, OutliersO3, mbgraphic, ggplot2

VignetteBuilder knitr

Depends R (>= 3.4.0)

NeedsCompilation no

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Repository CRAN

Date/Publication 2019-09-20 08:50:06 UTC

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`dobin` *Computes a set of basis vectors for outlier detection.*

Description

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

Usage

```
dobin(xx, frac = 0.95, norm = 1, vis = TRUE)
```

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 Median-IQR, which normalizes each column of median 0 and IQR 1.
<code>vis</code>	If visualization is an aim of the exercise, certain adjustments are made.

Value

A list with the following components:

<code>vec</code>	The basis vectors suitable for outlier detection.
<code>coords</code>	The <code>dobin</code> coordinates of the data <code>xx</code> .
<code>Y</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))
```

```
out <- dobin(X)
plot(out$coords[ , 1:2], col=as.factor(labs), pch=20)
```

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