Package 'pv'

January 3, 2022

Type Package

Title Principal Variables

Version 0.1.0

Description This package provides methods for reducing the number of features within a data set.

License MIT + file LICENSE

Imports methods, Rdpack

RdMacros Rdpack

Encoding UTF-8

LazyData true

URL https://github.com/Ronho/pla

BugReports https://github.com/Ronho/pla/issues

RoxygenNote 7.1.1.9001

Collate 'block.R'
'cor.R'
'explained-variance.R'
'get-blocks.R'
'pla-package.R'
'thresholding.R'
'scale.R'
'utils.R'
'pla.R'

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

R topics documented:

Block-class *Block*

Description

Class used within the package to keep the structure and information about the generated blocks.

Slots

`features` a vector of numeric which contains the indices of the block.

`explained_varaiance` a numeric which contains the variance explained of the blocks variables based on the whole data set.

`is_valid` a logical which indicates if the block structure is valid.

pla *Principal Loading Analysis*

Description

This function performs a principal loading analysis on the given data matrix.

Usage

```
pla(
  x,
  cor = FALSE,
  scaled_ev = FALSE,
  thresholds = 0.33,
  threshold_mode = "cutoff",
  expvar = "approx",
  check = "rnc",
  ...
)
```

Arguments

`x`	a numeric matrix or data frame which provides the data for the principal loading analysis.
`cor`	a logical value indicating whether the calculation should use the correlation or the covariance matrix.
`scaled_ev`	a logical value indicating whether the eigenvectors should be scaled.
`thresholds`	a numeric value or list of numeric values used to determine "small" values inside the eigenvectors. If multiple values are given, a list of pla results will be returned.
`threshold_mode`	a character string indicating how the threshold is determined and used. `cutoff` indicates that the threshold value is used as a general maximum for all elements. `percentage` indicates that the cutoff value is determined by the maximum element of each vector multiplied with the threshold value. The default is set to `cutoff`.

expvar	a character string indicating the method used for calculating the explained variance. approx uses the explained variances of each eigenvectors i.e. their eigenvalues. exact uses the variance of each variable.
check	a character string indicating if only rows, or if rows as well as columns are used to detect the underlying block structure. rows checks if the rows fullfill the required structure. rnc checks if rows and columns fullfill the required structure.
...	further arguments passed to or from other methods.

Value

single or list of pla class containing the following attributes:

x	a numeric matrix or data frame which equals the input of x.
c	a numeric matrix or data frame which is the covariance or correlation matrix based on the input of cov.
loadings	a matrix of variable loadings (i.e. a matrix containing the eigenvectors of the dispersion matrix).
threshold	a numeric value which equals the input of thresholds.
threshold_mode	a character string which equals the input of threshold_mode.
blocks	a list of blocks which are identified by principal loading analysis.

See https://www.sciencedirect.com/science/article/pii/S0047259X21000324 and https://dl.acm.org/doi/10.1145/3475827.3475832 for more information.

Examples

```
data <- data.frame(
a = c(1:3),
b = c(4:6),
c = c(7:9)
)
pla(data)
```

---

pla.drop_blocks *Drop Blocks Used to remove each variable from the original data set which is part of any of the blocks according to the passed indices.*

Description

Drop Blocks

Used to remove each variable from the original data set which is part of any of the blocks according to the passed indices.

Usage

```
pla.drop_blocks(object, blocks, ...)
```

Arguments

object	a pla object.
blocks	a list of numeric values indicating the indices of the blocks that should be removed.
...	further arguments passed to or from other methods.

Value

list of the following attributes:

x	a numeric matrix or data frame which equals the input data for the pla object without any feature that is not part of the blocks that should be removed.
cc_matrix	a numeric matrix or data frame which contains either the conditional covariance or correlation matrix.

Examples

```
data <- data.frame(
a = c(1:3),
b = c(4:6),
c = c(7:9),
d = c(10:12)
)
obj <- pla(data)
data <- pla.drop_blocks(obj, c(1))
```

---

pla.keep_blocks *Keep Blocks Used to only keep each variable of the original data set which is part of any of the blocks according to the passed indices.*

Description

Keep Blocks

Used to only keep each variable of the original data set which is part of any of the blocks according to the passed indices.

Usage

```
pla.keep_blocks(object, blocks, ...)
```

Arguments

object	a pla object.
blocks	a list of numeric values indicating the indices of the blocks that should be kept.
...	further arguments passed to or from other methods.

Value

list of the following attributes:

x	a numeric matrix or data frame which equals the input data for the pla object without any feature that is not part of the blocks that should be kept.
cc_matrix	a numeric matrix or data frame which contains either the conditional covariance or correlation matrix.

Examples

```
data <- data.frame(
a = c(1:3),
b = c(4:6),
c = c(7:9),
d = c(10:12)
)
obj <- pla(data)
data <- pla.keep_blocks(obj, c(1))
```

`print.pla` *Print Function for pla S3 Prints the blocks, threshold, threshold_mode and the loadings.*

Description

Print Function for pla S3

Prints the blocks, threshold, threshold_mode and the loadings.

Usage

```
## S3 method for class 'pla'
print(x, ...)
```

Arguments

x	a pla object.
...	further arguments passed to or from other methods.

Examples

```
data <- data.frame(
a = c(1:3),
b = c(4:6),
c = c(7:9)
)
obj <- pla(data)
print(obj)
```

show,Block-method *Block - Show Prints the blocks structure.*

Description

Block - Show

Prints the blocks structure.

Usage

```
## S4 method for signature 'Block'
show(object)
```

Arguments

object	block.

Examples

```
block <- new("Block", features = c(2, 5), explained_variance = 0.03)
print(block)
```

str,Block-method *Block - str Generic function to create a string out of the blocks structure.*

Description

Block - str

Generic function to create a string out of the blocks structure.

Usage

```
## S4 method for signature 'Block'
str(object)
```

Arguments

object	block.

Examples

```
block <- new("Block", features = c(2, 5), explained_variance = 0.03)
str(block)
```

Index