Package 'CornerstoneR'

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Version 2.0.2

Title Collection of Scripts for Interface Between 'Cornerstone' and 'R'

Description

Collection of generic 'R' scripts which enable you to use existing 'R' routines in 'Cornerstone'. The desktop application 'Cornerstone' (https://existable.com/https:

//www.camline.com/en/products/cornerstone/cornerstone-core.html>)

is a data analysis software provided by 'camLine' that empowers engineering teams to find solutions even faster.

The engineers incorporate intensified hands-on statistics into their projects.

They benefit from an intuitive and uniquely designed graphical Workmap concept: you design experiments (DoE) and explore data, analyze dependencies, and find answers you can act upon, immediately, interactively, and without any programming.

While 'Cornerstone's' interface to the statistical programming language 'R' has been available since version 6.0, the latest interface with 'R' is even much more efficient.

'Cornerstone' release 7.1.1 allows you to integrate user defined 'R' packages directly into the standard 'Cornerstone' GUI.

Your engineering team stays in 'Cornerstone's' graphical working environment and can apply 'R' routines, immediately and without the need to deal with programming code.

Additionally, your 'R' programming team develops corresponding 'R' packages detached from 'Cornerstone' in their favorite 'R' environment.

Learn how to use 'R' packages in 'Cornerstone' 7.1.1 on 'camLineTV' YouTube channel (https://www.youtube.com/watch?v=HEQHwq_laXU) (available in German).

URL https://gitlab.com/camLine/CornerstoneR/-/issues

BugReports https://gitlab.com/camLine/CornerstoneR/-/issues

Language en-US

License GPL-3

Encoding UTF-8

Depends R (>= 3.2.1)

Imports checkmate (>= 1.9.1), data.table (>= 1.10), minpack.lm, ranger, SpatialTools, vcd

Suggests ggplot2, knitr, prettydoc, rmarkdown, roxygen2, testthat

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Description

Collection of generic 'R' scripts which enable you to use existing 'R' routines in 'Cornerstone'.

The desktop application 'Cornerstone' (https://www.camline.com/en/products/cornerstone/cornerstone-core.html) is a data analysis software provided by 'camLine' that empowers engineering teams to find solutions even faster. The engineers incorporate intensified hands-on statistics into their projects. They benefit from an intuitive and uniquely designed graphical Workmap concept: you design experiments (DoE) and explore data, analyze dependencies, and find answers you can act upon, immediately, interactively, and without any programming.

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Learn how to use 'R' packages in 'Cornerstone' 7.1.1 on 'camLineTV' YouTube channel (https://www.youtube.com/watch? (available in German).

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See Also

Useful links:

- https://gitlab.com/camLine/CornerstoneR/-/issues
- Report bugs at https://gitlab.com/camLine/CornerstoneR/-/issues

carstats

Data from carstats

Description

Dataset of different cars and various values.

Format

A data.table object with 406 observations and 9 variables. The variables and their scale of measurement are as follows:

Model: nominal Origin: nominal MPG: interval

Cylinders: ordinalDisplacement: intervalHorsepower: interval

• Weight: interval

Acceleration: intervalModel. Year: interval

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Source

Cornerstone sample dataset

fitFunction

Fit Function to Data via Nonlinear Regression

Description

Fit predefined functions to data via nonlinear least squares using Levenberg-Marquardt algorithm via nlsLM.

Usage

```
fitFunction(
  dataset = cs.in.dataset(),
  preds = cs.in.predictors(),
  resps = cs.in.responses(),
  groups = cs.in.groupvars(),
  auxs = cs.in.auxiliaries(),
  scriptvars = cs.in.scriptvars(),
  return.results = FALSE,
  ...
)
```

Arguments

[data.frame] dataset Dataset with named columns. The names correspond to predictors and responses. [character] preds Character vector of predictor variables. [character] resps Character vector of response variables. groups [character] Character vector of group variables. auxs [character] Character vector of auxiliary variables. scriptvars [list] Named list of script variables set via the Cornerstone "Script Variables" menu. For details see below. return.results [logical(1)] If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results. Default is FALSE. [ANY] Additional arguments to be passed to nls. Please consider possible script vari-

ables (scriptvars) to prevent duplicates.

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Details

The following script variables are summarized in scriptvars list:

```
math.fun [character(1)]
```

Function selection for fitting data. It is possible to choose a predefined model, or compose a model manually by selecting User Defined.

Default is User Defined

```
preds.frml [character(1)]
```

Required if math. fun is set to User Defined. Valid R formula for the right hand side (predictors) of the model equation.

```
resp.frml [character(1)]
```

Required if math.fun is set to User Defined. Valid R formula for the left hand side (response) of the model equation.

```
limits [character(1)]
```

Optional if math. fun is set to User Defined. Specifies minimum and maximum value for function math. fun as a comma separated list of min and max. It is possible to assign variables, e.g. min=a, which need start values in start.vals, as well as real numbers, e.g. min=4.5, with a period as decimal separator.

```
start.vals [character(1)]
```

Required if math. fun is set to User Defined. Specify starting values for all terms of the right hand side as a comma separated list with a period as decimal separator.

```
weights [character(1)]
```

Select a weighting variable from the auxiliary variables.

max.iter Maximum number of iterations. For details see link[minpack.lm]{nls.lm.control}

max.ftol Maximum relative error desired in the sum of squares. If 0, the default is used. For details
see link[minpack.lm]{nls.lm.control}

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame objects:

coeff Estimated coefficients and standard errors for each group. Convergence infor-

mation is available for every group (for details see link[minpack.lm]{nls.lm}).

vcov Variance-Covariance matrix of the main coefficients for the fitted model of each

group (for details see link[stats]{vcov}).

predictions Dataset to brush with predictions and residuals added to original values and

groups, if available.

Examples

```
# Generate data from logistic function:
fun = function(x, a, b, c, d, sigma = 1) {
   a+(b-a) / (1+exp(-d*(x-c))) + rnorm(length(x), sd = sigma)
   }
library(data.table)
```

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LocalInterface

Local Interface Functions

Description

CS-R interface functions are defined in package namespace via this file. Each function overwrites itself with the corresponding counterpart defined in the global environment from CS.

Usage

```
invokeFromR()
cs.in.auxiliaries(quote = FALSE)
cs.in.brushed()
cs.in.dataset()
cs.in.excluded()
cs.in.groupvars(quote = FALSE)
cs.in.predictors(quote = FALSE)
cs.in.responses(quote = FALSE)
cs.in.Robject(name = NA)
cs.in.scriptvars(name = NA)
```

matchNearestNeighbor

```
cs.in.subsets()

cs.in.subsets.current()

cs.quote(x)

cs.out.dataset(data, name = NA, brush = FALSE)

cs.out.emf(name = NULL, width = 10, height = 10)

cs.out.png(name = NULL, width = 480, height = 480)

cs.out.Robject(R_object, name = NA)
```

Arguments

quote	[logical(1)] Quote all variables to cover invalid names. Use make.names as an alternative.
name	[character(1)] Name for output to Cornerstone.
Х	[character(1)] String to check for invalid characters related to make.names. Add backticks, if necessary.
data	[data.frame] Dataset with named columns. The names correspond to predictors and responses.
brush	[logical(1)] Brushing of output dataset in Cornerstone across the R object.
width	<pre>[numeric(1)] Width of exported plotting object. See pdf.</pre>
height	[numeric(1)] Height of exported plotting object. See pdf.
R_object	[list] List of exported R objects to Cornerstone.

matchNearestNeighbor Match Nearest Neighbor Between Two Datasets

Description

Match the nearest neighbor from a redirected Cornerstone Robject dataset (redirectDataset) to corresponding selected predictor variables. Predictor variables from both datasets are supposed to be numeric to apply the Euclidean distance calculated by dist2. The function returns a dataset with the nearest neighbor to every observation, matched by the predictor variables. Available response, group, and auxiliary variables from the redirected datasets are passed through, as well as, selected auxiliary variables. The calculated distance is attached.

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Usage

```
matchNearestNeighbor(
  dataset = cs.in.dataset(),
  preds = cs.in.predictors(),
  auxs = cs.in.auxiliaries(),
  robject = cs.in.Robject(),
  return.results = FALSE
)
```

Arguments

dataset [data.frame]

Dataset with named columns. The names correspond to predictors and re-

sponses.

preds [character]

Character vector of predictor variables.

auxs [character]

Character vector of auxiliary variables.

robject [list]

Named list of one redirectDataset object(s) set via Cornerstone menu "Input

R Objects".

return.results [logical(1)]

If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results.

Default is FALSE.

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame objects:

nearest.neighbor

Matched nearest neighbor which consists of predictor and available response, group, and auxiliary variables. The calculated distance is attached to this dataset.

runtimes Run times for every input R object.

mosaicPlot Mosaic Plot

Description

Plots (extended) mosaic displays via mosaic. The last response variable is highlighted. A high-dimensional contingency table is calculated via structable from the given dataset. Flat contingency table splits predictors horizontally and optional responses vertically.

randomForest 9

Usage

```
mosaicPlot(
  dataset = cs.in.dataset(),
  preds = cs.in.predictors(),
  resps = cs.in.responses(),
  return.results = FALSE,
  ...
)
```

Arguments

dataset [data.frame]

Dataset with named columns. The names correspond to predictors and re-

sponses.

preds [character]

Character vector of predictor variables.

resps [character]

Character vector of response variables.

return.results [logical(1)]

If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results.

Default is FALSE.

... [ANY]

Additional arguments to be passed to mosaic. Please consider possible script

variables (scriptvars) to prevent duplicates.

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame objects:

long.contingency

Contingency table in long format.

Examples

```
# Draw mosaic plot from 'titanic' data:
mosaicPlot(titanic, c("Class", "Age", "Sex", "Survived"))
res = mosaicPlot(titanic, c("Class", "Age"), c("Sex", "Survived"), return.results = TRUE)
print(res)
```

randomForest

Random Forest

Description

Random Forest via ranger. Predicts response variables or brushed set of rows from predictor variables, using Random Forest classification or regression.

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Usage

```
randomForest(
  dataset = cs.in.dataset(),
  preds = cs.in.predictors(),
  resps = cs.in.responses(),
  brush = cs.in.brushed(),
  scriptvars = cs.in.scriptvars(),
  return.results = FALSE,
  ...
)
```

Arguments

dataset [data.frame]

Dataset with named columns. The names correspond to predictors and re-

sponses.

preds [character]

Character vector of predictor variables.

resps [character]

Character vector of response variables.

brush [logical]

Logical vector of length nrow(dataset). Flags brushed rows in Cornerstone.

scriptvars [list]

Named list of script variables set via the Cornerstone "Script Variables" menu.

For details see below.

return.results [logical(1)]

If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results.

Default is FALSE.

... [ANY]

Default is 500.

Additional arguments to be passed to ranger. Please consider possible script

variables (scriptvars) to prevent duplicates.

Details

The following script variables are summarized in scriptvars list:

```
brush.pred [logical(1)]
    Use brush vector as additional predictor.
    Default is FALSE.

use.rows [character(1)]
    Rows to use in model fit. Possible values are all, non-brushed, or brushed.
    Default is all.

num.trees [integer(1)]
    Number of trees to fit in ranger.
```

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```
importance.mode [character(1)]
```

Variable importance mode. For details see ranger.

Default is permutation.

respect.unordered.factors [character(1)]

Handling of unordered factor covariates. For details see ranger.

Default is NULL.

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame objects:

statistics	General statistics about the random forest.
importances	Variable importance of prediction variables in descending order of importance (most important first)
predictions	Dataset to brush with predicted values for dataset. The original input and other columns can be added to this dataset through the menu Columns \rightarrow Add from Parent
confusion	For categorical response variables or brush state only. A table with counts of each distinct combination of predicted and actual values.
rgobjects	List of ranger. forest objects with fitted random forests.

See Also

 ${\tt randomForestPredict}$

Examples

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randomForestPredict

Random Forest Prediction

Description

Random Forest prediction via predict.ranger. Predicts response variables from predictor variables, using ranger objects. All ranger objects have to work on the same set of prediction variables. These variables are exactly available in the prediction dataset. A response is not necessary, it will be predicted via this function.

Usage

```
randomForestPredict(
  dataset = cs.in.dataset(),
  preds = cs.in.predictors(),
  robject = cs.in.Robject(),
  return.results = FALSE,
  ...
)
```

Arguments

dataset [data.frame]

Dataset with named columns. The names correspond to predictors and re-

sponses.

preds [character]

Character vector of predictor variables.

robject [list]

Named list of ranger object(s) set via Cornerstone menu "Input R Objects".

return.results [logical(1)]

If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results.

Default is FALSE.

.. [ANY]

Additional arguments to be passed to ranger. Please consider possible script

variables (scriptvars) to prevent duplicates.

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame objects:

predictions

Dataset to brush with predicted values for dataset. The original input and other columns can be added to this dataset through the menu Columns -> Add from Parent

See Also

randomForest

redirectDataset 13

redirectDataset Redirec	edirectDataset	Redirect Dataset
-------------------------	----------------	------------------

Description

Redirect input dataset to an output R object.

Usage

```
redirectDataset(
  dataset = cs.in.dataset(),
  preds = cs.in.predictors(),
  resps = cs.in.responses(),
  groups = cs.in.groupvars(),
  auxs = cs.in.auxiliaries(),
  scriptvars = cs.in.scriptvars(),
  return.results = FALSE
)
```

Arguments

dataset	[data.frame] Dataset with named columns. The names correspond to predictors and responses.
preds	[character] Character vector of predictor variables.
resps	[character] Character vector of response variables.
groups	[character] Character vector of group variables.
auxs	[character] Character vector of auxiliary variables.
scriptvars	[list] Named list of script variables set via the Cornerstone "Script Variables" menu. For details see below.
return.results	[logical(1)] If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results. Default is FALSE.

Details

The following script variables are summarized in scriptvars list:

```
remove.pattern [character(1)]
```

The given pattern is removed in all variable names via gsub. Leading and / or trailing whitespaces are removed using trimws. Default is "".

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Value

Logical [TRUE] invisibly and outputs to Cornerstone cs.out.Robject or, if return.results = TRUE, list of resulting data.frame objects and character(n) vectors:

dataset Input dataset.

predictors Vector of predictors.

responses Vector of responses.

groups Vector of groups.

auxiliaries Vector of auxiliaries.

The list is wrapped in an additional list to get the same return value corresponding to cs.in.Robject.

reshapeLong Reshape Grouped Data to Long

Description

Reshaping grouped data via melt to 'long' format. The responses are merged in one column, with its column name in an additional column. This column is split into multiple columns, if a split character is given. All predictors are merged multiple times corresponding to the number or responses.

Usage

```
reshapeLong(
  dataset = cs.in.dataset(),
  preds = cs.in.predictors(),
  resps = cs.in.responses(),
  scriptvars = cs.in.scriptvars(),
  return.results = FALSE,
  ...
)
```

Arguments

dataset [data.frame]

Dataset with named columns. The names correspond to predictors and re-

sponses.

preds [character]

Character vector of predictor variables.

resps [character]

Character vector of response variables.

scriptvars [list]

Named list of script variables set via the Cornerstone "Script Variables" menu.

For details see below.

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Details

One script variables is summarized in scriptvars list:

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame object:

reshapeLong Dataset with reshaped data.

Examples

reshape Transpose

Transpose Data

Description

Transpose data via transpose. All predictors, responses, groups, and auxiliaries are transpose.

Usage

```
reshapeTranspose(
  dataset = cs.in.dataset(),
  groups = cs.in.groupvars(),
  scriptvars = cs.in.scriptvars(),
  return.results = FALSE,
  ...
)
```

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Arguments

dataset [data.frame]

Dataset with named columns. The names correspond to predictors and re-

sponses.

groups [character]

Character vector of group variables.

scriptvars [list]

Named list of script variables set via the Cornerstone "Script Variables" menu.

For details see below.

return.results [logical(1)]

If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results.

Default is FALSE.

... [ANY]

Additional arguments to be passed to transpose . Please consider possible

script variables (scriptvars) to prevent duplicates.

Details

One script variables is summarized in scriptvars list:

```
split [character(1)]
```

Split character to split response names into multiple columns. Default is "_".

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame object:

reshape Transpose

Dataset with transposed data.

Examples

```
# Data to transform:
library(data.table)
dtTest = data.table(i_1 = c(1:4, NA, 5), i_2 = c(51, 61, NA, 71, 81, 91))
# Reshape to long format:
reshapeTranspose(dtTest, groups = character(0), list(convert.numeric = TRUE), return.results = TRUE)
```

reshapeWide 17

reshapeWide	Reshape Grouped Data to Wide
-------------	------------------------------

Description

Reshaping grouped data via dcast to 'wide' format with rows for each unique combination of group variables. The response are arranged in separate columns for each datum in predictors. If a combination of groups identifies multiple rows, the number of rows in a group is returned to CS for the whole dataset instead of the response variable value.

Usage

```
reshapeWide(
  dataset = cs.in.dataset(),
  preds = cs.in.predictors(),
  resps = cs.in.responses(),
  groups = cs.in.groupvars(),
  auxs = cs.in.auxiliaries(),
  scriptvars = cs.in.scriptvars(),
  return.results = FALSE,
  ...
)
```

Arguments

dataset [data.frame] Dataset with named columns. The names correspond to predictors and responses. preds [character] Character vector of predictor variables. [character] resps Character vector of response variables. [character] groups Character vector of group variables. auxs [character] Character vector of auxiliary variables. scriptvars [list] Named list of script variables set via the Cornerstone "Script Variables" menu. For details see below. return.results [logical(1)] If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results. Default is FALSE. [ANY] Additional arguments to be passed to dcast. Please consider possible script variables (scriptvars) to prevent duplicates.

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Details

One script variables is summarized in scriptvars list:

```
drop [logical(1)]
```

Drop missing combinations (TRUE) or include all (FALSE). Default is TRUE. For details see dcast.

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame object:

reshapeWide Dataset with reshaped data.

Examples

rundata

Voltage of 26 Different Runs

Description

The datasets contains 26 different runs in each case measuring the voltage over time. The S-shaped curves are different for each run.

Format

A data.table object with 7826 observations and 3 variables. The discrete variable 'FileName' has 26 levels corresponding to the file name of the source data from Cornerstone. The remaining other two variables are continuous.

Source

Cornerstone sample dataset

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showVersions

Show Versions of R and CornerstoneR

Description

Write the versions of R and CornerstoneR in a Cornerstone dataset.

Usage

```
showVersions(return.results = FALSE)
```

Arguments

```
return.results [logical(1)]
```

If FALSE the function returns TRUE invisibly. If TRUE, it returns a list of results. Default is FALSE.

Value

Logical [TRUE] invisibly and outputs to Cornerstone or, if return.results = TRUE, list of resulting data.frame objects:

versions

Dataset with versions of R and CornerstoneR.

Examples

```
res = showVersions(return.results = TRUE)
res$versions
```

titanic

Survival of Passengers on the Titanic

Description

This data set provides information on the fate of passengers on the fatal maiden voyage of the ocean liner Titanic, summarized according to economic status (Class), Age, Sex, and Survival.

Format

A data. table object with 2201 observations and 4 variables. The discrete variables and their levels are as follows:

• Class: 1st, 2nd, 3rd, Crew

Age: Child, AdultSex: Male, FemaleSurvived: Yes, No

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Source

Cornerstone sample dataset

References

Dawson, Robert J. MacG. (1995), The Unusual Episode Data Revisited. *Journal of Statistics Education*, **3**. http://jse.amstat.org/v3n3/datasets.dawson.html

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