Package ‘relimp’

October 14, 2022

Version 1.0-5
Date 2016-03-19
Title Relative Contribution of Effects in a Regression Model
Author David Firth with contributions from Heather Turner and John Fox
Maintainer David Firth <d.firth@warwick.ac.uk>

URL http://warwick.ac.uk/relimp

Description Functions to facilitate inference on the relative importance of predictors in a linear or generalized linear model, and a couple of useful Tcl/Tk widgets.

Depends R (>= 2.0.0)
Suggests tcltk, nnet, MASS, Rcmdr
Imports stats, utils
License GPL (>= 2)
NeedsCompilation no
Repository CRAN
Date/Publication 2016-03-30 20:35:30

R topics documented:

pickFrom .................................................. 2
R.to.Tcl .................................................. 4
relimp .................................................... 4
relrelimp ................................................ 6
showData .................................................. 8
Tcl.to.R .................................................. 10

Index 11
pickFrom  

Pick Subsets from a Vector

Description

Provides a Tk dialog or a text-based menu for interactive selection of one or more subsets from a vector.

Usage

```r
pickFrom(vec, nsets = 1, return.indices = FALSE,
          setlabels = NULL, edit.setlabels = TRUE,
          subset = TRUE,
          warningText = "one or more selections empty",
          title = "Subset picker",
          items.label = "Pick from",
          labels.prompt = "Your label for this set",
          list.height = 20,
          items.scrollbar = TRUE,
          preserve.order = TRUE,
          graphics = TRUE,
          listFont = "Courier 12",
          labelFont = "Helvetica 11",
          windowPos = "+150+30")
```

Arguments

- `vec`  
a vector
- `nsets`  
a positive integer, the number of subsets to be selected
- `return.indices`  
logical, whether indices (TRUE) or vector contents (FALSE) are to be returned
- `setlabels`  
a character vector of labels for the subsets
- `edit.setlabels`  
logical, determines whether a textbox is provided for editing the label of each subset
- `subset`  
logical, character or numeric vector indicating which elements of `vec` should be made available for selection. Default is to make all elements available.
- `warningText`  
character, text to use as a warning in situations where no selection is made into one or more of the specified sets
- `title`  
character, title of the Tk dialog window
- `items.label`  
character, a label for the set of items to be selected from
- `labels.prompt`  
character, a prompt for textual set label(s)
- `list.height`  
maximum number of elements of `vec` to display at once
- `items.scrollbar`  
logical, whether a scrollbar is to be provided when `vec` is longer than `list.height`
pickFrom

preserve.order logical: should the order of items in vec be maintained in all of the returned subsets?
graphics logical: should a dialog be used, if possible?
listFont a Tk font specification for the items list and subsets
labelFont a Tk font specification for the labels entrybox
windowPos position of the Tk dialog, in pixels from top left of display

Details
If graphics = TRUE and the tcltk package is operational, a Tk dialog is used, otherwise a text menu.
If return.indices is used together with subset, the indices returned relate to vec, not to vec[subset].

Value
EITHER (in the case of a text menu or if the dialog is ended with "OK") a list, with nsets components. Each component is a selected sub-vector, or a numeric vector of indices for a selected sub-vector (if return.indices is TRUE). The component names are as specified in setlabels, or as specified interactively.
OR (if the dialog is ended either "Cancel" or the close-window control button is used) NULL.

Author(s)
David Firth, with contributions from Heather Turner

Examples
## These examples cannot be run by example() but should be OK when pasted
## into an interactive R session
## Not run:
pickFrom(c("apple", "banana", "plum", "grapefruit"), nsets = 2,
         preserve.order = FALSE,
         setlabels = c("Fruits I like", "Fruits I tolerate"))

## End(Not run)
## Not run:
## Type selections as e.g. 1:2, 4
pickFrom(c("apple", "banana", "plum", "grapefruit"), nsets = 2,
         preserve.order = FALSE,
         setlabels = c("Fruits I like", "Fruits I tolerate"),
         graphics = FALSE)

## End(Not run)
R.to.Tcl  

Convert a Character Vector to Tcl Format

Description

Converts a character vector into a brace-delimited Tcl list

Usage

R.to.Tcl(character.vector)

Arguments

character.vector

A character vector

Value

A character vector of length 1

Author(s)

David Firth, <d.firth@warwick.ac.uk>

See Also

Tcl.to.R

Examples

R.to.Tcl(c("apple","banana"))

relimp  

Relative Importance of Predictors in a Regression Model

Description

Produces a summary of the relative importance of two predictors or two sets of predictors in a fitted model object.

Usage

relimp(object, set1=NULL, set2=NULL, label1="set1", label2="set2",
       subset=TRUE,
       response.cat=NULL, ...)

## S3 method for class 'relimp'
print(x, digits=3, ...)

Arguments

object A model object of class \texttt{lm, glm, coxph, survreg, multinom, polr} or \texttt{gls}
set1 An index or vector of indices for the effects to be included in the numerator of the comparison
set2 An index or vector of indices for the effects to be included in the denominator of the comparison
label1 A character string; mnemonic name for the variables in \texttt{set1}
label2 A character string; mnemonic name for the variables in \texttt{set2}
subset Either a vector of numeric indices for the cases to be included in the standardization of effects, or a vector of logicals (TRUE for inclusion) whose length is the same as the number of rows in the model frame, \texttt{object$model}. The default choice is to include all cases in the model frame.
response.cat If \texttt{object} is of class \texttt{multinom}, this is a character string used to specify which regression is of interest (i.e., the regression which predicts the log odds on \texttt{response.cat} versus the model’s reference category). The \texttt{response.cat} argument should be an element of \texttt{object$lab}; or \texttt{NULL} if \texttt{object} is not of class \texttt{multinom}.

... For models of class \texttt{glm}, one may additionally set the dispersion parameter for the family (for example, \texttt{dispersion=1.69}). By default it is obtained from \texttt{object}. Supplying it here permits explicit allowance for over-dispersion, for example.

x an object of class \texttt{relimp}
digits The number of decimal places to be used in the printed summary. Default is 3.

Details

If \texttt{set1} and \texttt{set2} both have length 1, relative importance is measured by the ratio of the two standardized coefficients. Equivalently this is the ratio of the standard deviations of the two contributions to the linear predictor, and this provides the generalization to comparing two sets rather than just a pair of predictors.

The computed ratio is the square root of the variance-ratio quantity denoted as ‘omega’ in Silber, J H, Rosenbaum, P R and Ross, R N (1995). Estimated standard errors are calculated by the delta method, as described in that paper for example.

If \texttt{set1} and \texttt{set2} are unspecified, and if the \texttt{tcltk} package has been loaded, a dialog box is provided (by a call to \texttt{pickFrom}) for the choice of \texttt{set1} and \texttt{set2} from the available model coefficients.

Value

An object of class \texttt{relimp}, with at least the following components:

model The call used to construct the model object summarized
sets The two sets of indices specified as arguments
log.ratio The natural logarithm of the ratio of effect standard deviations corresponding to the two sets specified
se.log.ratio An estimated standard error for \texttt{log.ratio}
If dispersion was supplied as an argument, its value is stored as the dispersion component of the resultant object.

**Author(s)**

David Firth <d.firth@warwick.ac.uk>

**References**


**See Also**

relrelimp

**Examples**

```r
set.seed(182) ## an arbitrary number, just for reproducibility
x <- rnorm(100)
z <- rnorm(100)
w <- rnorm(100)
y <- 3 + (2 * x) + z + w + rnorm(100)
test <- lm(y ~ x + z + w)
print(test)
relimp(test, 2, 3) # compares effects of x and z
relimp(test, 2, 3:4) # compares effect of x with that of (z,w) combined
##
## Data on housing and satisfaction, from Venables and Ripley
## -- multinomial logit model
library(MASS)
library(nnet)
data(housing)
house.mult <- multinom(Sat ~ Infl + Type + Cont, weights = Freq, data = housing)
relimp(house.mult, set1 = 2:3, set2 = 7, response.cat = "High")
```

**relrelimp**

*Comparison of Relative Importances in a Multinomial Logit Model*

**Description**

Produces a summary of the relative importance of two predictors or two sets of predictors in a fitted *multinom* model object, and compares relative importances across two of the fitted logit models.

**Usage**

```r
relrelimp(object, set1=NULL, set2=NULL, label1="set1", label2="set2", subset=TRUE, response.cat1=NULL, response.cat2=NULL)
```
Arguments

- `object`: A model object of class `multinom`.
- `set1`: An index or vector of indices for the effects to be included in the numerator of the comparison.
- `set2`: An index or vector of indices for the effects to be included in the denominator of the comparison.
- `label1`: A character string; mnemonic name for the variables in `set1`.
- `label2`: A character string; mnemonic name for the variables in `set2`.
- `subset`: Either a vector of numeric indices for the cases to be included in the standardization of effects, or a vector of logicals (TRUE for inclusion) whose length is the same as the number of rows in the model frame, `object$model`. The default choice is to include all cases in the model frame.
- `response.cat1`: A character string used to specify the first regression of interest (i.e., the regression which predicts the log odds on `response.cat1` versus the model’s reference category). The `response.cat1` argument should be an element of `object$lab`.
- `response.cat2`: A character string used to specify the second regression of interest (i.e., the regression which predicts the log odds on `response.cat2` versus the model’s reference category). The `response.cat2` argument should be an element of `object$lab`.

Details

Computes a relative importance summary as described in `relimp`, for each of the two regressions specified by `response.cat1` and `response.cat2` (relative to the same reference category); and computes the difference of those two relative importance summaries, along with an estimated standard error for that difference.

Value

An object of class `relrelimp`, with at least the following components:

- `model`: The call used to construct the model object summarized.
- `sets`: The two sets of indices specified as arguments.
- `response.category`: A character vector containing the specified `response.cat1` and `response.cat2`.
- `log.ratio`: The natural logarithm of the ratio of effect standard deviations corresponding to the two sets specified. A vector with three components: the first is for `response.cat1` versus the reference category, the second for `response.cat2` versus the reference category, the third is the difference.
- `se.log.ratio`: Estimated standard errors for the elements of `log.ratio`.

Author(s)

David Firth, <d.firth@warwick.ac.uk>
See Also

relimp

Examples

## Data on housing and satisfaction, from Venables and Ripley

library(MASS)
library(nnet)
data(housing)

house.mult <- multinom(Sat ~ Infl + Type + Cont, weights = Freq,
data = housing)

relrelimp(house.mult, set1 = 2:3, set2 = 7,
        label1 = "Influence", label2 = "Contact",
        response.cat1 = "Medium", response.cat2 = "High")

## Computes the relative contribution of Influence and Contact in
## each of the two logistic regressions (Med/Low and High/Low), and
## compares those two relative-contribution measures.

showData(dataframe, colname.bgcolor = "grey50",
          rowname.bgcolor = "grey50",
          body.bgcolor = "white",
          colname.textcolor = "white",
          rowname.textcolor = "white",
          body.textcolor = "black",
          font = "Courier 12",
          maxheight = 30,
          maxwidth = 80,
          title = NULL,
          rowname.bar = "left",
          colname.bar = "top",
          rownumbers = FALSE,
          placement = "-20-40",
          suppress.X11.warnings = TRUE)
showData

Arguments

dataframe A data frame, or an object to which as.data.frame() can be validly applied
colname.bgcolor A background colour for the variable-names panel
rowname.bgcolor A background colour for the row-names panel
body.bgcolor A background colour for the data
colname.textcolor A colour for the variable names
rowname.textcolor A colour for the row names
body.textcolor A colour for the data
font The text font used – should be a monospaced font
maxheight The maximum number of rows to display
maxwidth The maximum width of display, in characters
title A title for the window. Default is to use the name of the dataframe as given in the call to showData()
rowname.bar position of sidebar for row names, "left" or "right", or c("left", "right"), or NULL
colname.bar position of column names, "top" or "bottom", or c("top", "bottom"), or NULL
rownumbers logical, whether row numbers should be displayed
placement Position of the bottom right corner of the window
suppress.X11.warnings logical, if TRUE then any X11 warnings are suppressed

Value

Invisibly returns the Tk window containing the displayed data frame.

Note

An error results if the printed representation of dataframe exceeds the maximum allowed width of 10000 characters; see options.

Text can be copied from the Tk window to the system clipboard, using <Control-C> or via a right-click pop-up menu.

On some systems the window may take a few seconds to appear if the data frame is very large.

Author(s)

David Firth, <d.firth@warwick.ac.uk>; with Rcmdr-specific features contributed by John Fox
Examples

```r
## This cannot be run by example() but should be OK when pasted
## into an interactive R session
## Not run:
data(mtcars)
showData(mtcars)
## End(Not run)
```

Tcl.to.R

Convert a Tcl List to R Character Vector

Description

Converts a brace-delimited list from Tcl into a character vector

Usage

```r
Tcl.to.R(tcl.list)
```

Arguments

- `tcl.list`: a character string

Value

- A character vector

Author(s)

David Firth, <d.firth@warwick.ac.uk>

See Also

- `R.to.Tcl`

Examples

```r
Tcl.to.R("{apple} {banana} {pear}")
```
Index

* models
  relimp, 4
  relrelimp, 6
* regression
  relimp, 4
  relrelimp, 6
* utilities
  pickFrom, 2
  R.to.Tcl, 4
  showData, 8
  Tcl.to.R, 10

coxph, 5

glm, 5
gls, 5

lm, 5

multinom, 5, 6

options, 9

pickFrom, 2, 5
polr, 5
print.relimp(relimp), 4

R.to.Tcl, 4, 10
relimp, 4, 7, 8
relrelimp, 6, 6

showData, 8
survreg, 5

Tcl.to.R, 4, 10