Package 'iNZightMR'

May 5, 2020

Type Package

Title Tools for Exploring Multiple Response Data

Version 2.2.5

BugReports https://github.com/iNZightVIT/iNZightMR/issues

Contact inzight_support@stat.auckland.ac.nz

URL https://www.stat.auckland.ac.nz/~wild/iNZight/

Depends R (>= 2.13)

Imports grid, grDevices, graphics, stats, utils

Suggests iNZightPlots, testthat, covr

Additional_repositories https://r.docker.stat.auckland.ac.nz

LazyData true

Description Interaction and analysis of multiple response data,
along with other tools for analysing these types of data including
missing value analysis and calculation of standard errors for
a range of covariance matrix results (proportions, multinomial,
independent samples, and multiple response).

License GPL-3

Encoding UTF-8

Language en-GB

RoxygenNote 7.1.0

NeedsCompilation no

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Repository CRAN

Date/Publication 2020-05-05 16:50:03 UTC

R topics documented:

`iNZightMR-package` *iNZightMR: Multiple Response Data Analysis*

Description

The iNZightMR package provides a suite of functions which can be used in the analysis of multiple response data. It is used in the iNZight software package.

Author(s)

Junjie Zeng, Tom Elliott

`barplotMR` *Multiple response barplot*

Description

Draws a barplot of a multiple response object (MRO), showing response rates for each option along with confidence intervals and comparison intervals.

Usage

```
barplotMR(obj, ...)

## S3 method for class 'mrocalc'
barplotMR(obj, ...)

## S3 method for class 'bymrocalc'
barplotMR(obj, g1.level = NULL, g2.level = "_MULTI", ...)

## S3 method for class 'between'
barplotMR(obj, ...)

## S3 method for class 'b2'
barplotMR(obj, g1.level = NULL, ...)
```

Arguments

obj	an mrocalc object (from mroPara())
...	additional parameters, currently not used
g1.level	vector of subset variable 1 levels to show
g2.level	vector of subset variable 2 levels to show

Methods (by class)

- mrocalc: method for class mrocalc
- bymrocalc: method for class bymrocalc
- between: method for class between
- b2: method for class b2

Author(s)

Junjie Zheng

Examples

```
if (requireNamespace("iNZightPlots")) {
    mr <- iNZightMR(online ~ onlinegame + onlinevideo + onlinemusic,
        data = census.at.school.5000)
    barplotMR(mroPara(mr))

    barplotMR(byMRO(mr, ~gender, mroPara))
}
```

between *Compute Between se's*

Description

Between SEs

Usage

```
between(bymro)
```

Arguments

bymro	a bymro object

Value

something about between.

Author(s)

Junjie Zheng

Examples

```
mr <- iNZightMR(online ~ onlinegame + onlinevideo + onlinemusic,
    data = census.at.school.5000)
(bt <- between(byMRO(mr, ~gender, mroPara)))

if (requireNamespace("iNZightPlots"))
    barplotMR(bt)
```

byMRO *Calculate MRO inference for subsets*

Description

Constructs a multiple response object (MRO) subset by another explanatory variable.

Usage

```
byMRO(mro.obj, formula, FUN, ...)
```

Arguments

mro.obj	an mro object (created by iNZightMR)
formula	variable for subsetting, as a formula (e.g., ~x)
FUN	the function to apply to subsets
...	additional arguments passed to FUN

Value

an object with classes of by and bymrocalc

See Also

mroPara

Examples

```
mr <- iNZightMR(online ~ onlinegame + onlinevideo + onlinemusic,
    data = census.at.school.5000)

byMRO(mr, ~gender, mroPara)
byMRO(mr, ~gender + handed, mroPara)
```

---

calcmissing *Calculate missing observation summary*

Description

Calculates the summary of missingness in a data set.

Usage

```
calcmissing(obj, ...)

## S3 method for class 'data.frame'
calcmissing(obj, MRO.case = FALSE, print = TRUE, final = TRUE, ...)

## S3 method for class 'mro'
calcmissing(obj, ...)
```

Arguments

obj	An object
...	additional arguments
MRO.case	does something with rownames
print	logical, should we print the thing?
final	logical, is this final?

Value

Missing value object

Methods (by class)

- `data.frame`: Method for a dataframe
- `mro`: accepts a whole mr.object , which is first mro.mat, second element labels, third element the input data frame.

Author(s)

Junjie Zeng

See Also

plotcombn

Examples

```
calcmissing(census.at.school.5000[,1:20])
```

`census.at.school.5000` *Census at School 5000*

Description

A dataset containing 5000 observations from a New Zealand census of school students. It includes binary response variables.

Usage

```
census.at.school.5000
```

Format

A data frame with 72 variables and 5000 rows.

X unique identifier for each observation

gender their biological gender

age their age, years

country The country the student is from

country_en Country code

country_mi A different country code

ethniceng binary for ethnicity english

ethnicmri binary for ethnicity maori

ethnicwsm binary for ethnicity wsm
ethniccok binary for ethnicity cok
ethnicton binary for ethnicity tonga
ethnicniu binary for ethnicity niue
ethnicchn binary for ethnicity china
ethnicind binary for ethnicity india
ethnicother factor for other ethnicity
ethnicother_en factor for other ethnicity_en
ethnicother_mi factor for other ethnicity_mi
languages how many languages they know
handed left, right, or ambi
height height measurement, cm
rightfoot length of the right foot, mm
armspan their armspan measurement, cm
wrist wrist measurement
neck neck measurement
popliteal another measurement
indexfinger index finger measurement
ringfinger ring finger measurement
hairlength the length of their hair
travel travel method used to get to school
timetravel how long they spend travelling
bagweightraw the weight of the bag
bagweight weight of the bag
bagcarry factor of how they're carrying
favlearning their favourite subject
favlearningmo their favourite subject?
memory a memory score
reaction a reaction score
sport what sport they play
sport_en what sport they play
techtv binary for use of TV
techmp3 binary for use of mp3
techinternet binary for use of the internet
techmobinternet binary for use of mobile internet
techfacebook binary for use of facebook
techtwitter binary for use of twitter

techbebo binary for use of bebo

techmyspace binary for use of myspace

techskype binary for use of skype

techconsole binary for use of a console

technone binary for use of no technology

cellmonths how many months they've had a cellphone?

onlinemusic binary for if they listen to music online

onlinevideo binary for if they watch video online

onlinegame binary for if they play games online

onlinefriend binary for if they talk to friends online

onlineschool binary for if they access school online

onlineother binary for if they do anything else online

onlinenone binary for if they do nothing online

bedtime hours spent in bed

waketime hours spent awake

favtvshow the name of their favourite TV show

favtvshow_en the name of their favourite TV show

importwarm binary about warm

importpollution binary about pollution

importrecycling binary about recycling

importwater binary about water

importlifestyle binary about lifestyle

importenergy binary about energy

importgovern binary about government

importcomputer binary about computer

region number of the region they're in

year their school year

Source

http://new.censusatschool.org.nz/

iNZightMR *Create iNZightMR multiple response object (MRO)*

Description

Creates a multiple response object (MRO) containing binary response matrix (zeros and ones) as well as the input data source.

Usage

```
iNZightMR(frm, data, Labels = NULL, inverse = FALSE, ...)
```

Arguments

frm	formula containing the response variables
data	a data.frame containing response and explanatory variables
Labels	labels for the response categories; by default, the function will attempt to. Can also be the function substrsplit, which will detect a common base in the variables (see Details)
inverse	if TRUE, binary responses will be reversed (see details)
...	additional arguments, passed to model.frame

Details

The individual response variable names can be detected from the variable name by passing Labels = substrsplit. For example, in ‘ethniceng‘ and ‘ethnicmri‘, ‘ethnic‘ is common to both, so the labels will be ‘eng‘ and ‘mri‘.

If a user wants to inverse the response (zeros becomes ones), then pass inverse = TRUE. This is useful when the responses are characters (such as "correct" and "wrong", where correct would be given a zero) and the order needs reversing (so that correct is 1 instead).

Value

An mro object containing a multiple response binary matrix and input data source

See Also

barplotMR, mroPara

Examples

```
mr <- iNZightMR(online ~ onlinegame + onlinevideo + onlinemusic,
    data = census.at.school.5000)

# users can also override the variable names
iNZightMR(online ~ onlinegame + onlinevideo + onlinemusic,
    Labels = c("gaming", "youtube", "spotify"),
```

```
    data = census.at.school.5000
)
```

`moecalc` *Margin of Error Calculation*

Description

Computes the margin of error for various objects.

Usage

```
moecalc(
  x,
  factorname = NULL,
  levelnames = NULL,
  coef.idx = NULL,
  est = NULL,
  ci = NULL,
  base = TRUE,
  basename = "base",
  conf.level = 1.96
)
```

Arguments

`x`	the object for which we compute margins of error
`factorname`	name of factor
`levelnames`	names of factor levels
`coef.idx`	index of coefficient to use
`est`	estimates
`ci`	confidence intervals
`base`	baseline
`basename`	name of baseline
`conf.level`	level of confidence to use

Details

If `x` is a model, must have factorname or coefficient index (coef.idx) If input factorname, will compute ErrBars by factorname (for given model) If input coefficient index, will compute ErrBars simply by index only (even they are not factor) If `x` is `ses.moecalc` object, will compute ErrBars simply by given `ses.moecalc` object

Value

a `moecalc` object

Examples

```
fit <- lm(Sepal.Length ~ Species, data = iris)
(mc <- moecalc(fit, "Species"))
summary(mc)
plot(mc)
```

`mroPara` *Calculate MRO inference*

Description

Calculates required proportions, their differences, variance-covariance matrices, standard errors of differences, and comparison intervals for differences, over all of the data. To compute values over various subsets of another explanatory variable, see by.

Usage

```
mroPara(obj, conf.levels = 1.96, nonparallel = NULL)
```

Arguments

`obj`	an MRO object created by `iNZightMR`
`conf.levels`	confidence level to use, default is 1.96 for 95% intervals
`nonparallel`	Should these things be parallel?

Value

An object of class `mrocalc`

See Also

iNZightMR

Examples

```
mr <- iNZightMR(online ~ onlinegame + onlinevideo + onlinemusic,
    data = census.at.school.5000)
mrp <- mroPara(mr)
```

plotcombn *Missing Value plot*

Description

Plot of Missing Value combinations

Usage

```
plotcombn(obj)
```

Arguments

obj	a calcmissing object

Value

summarised info for plot

Author(s)

Junjie Zeng

Examples

```
plotcombn(census.at.school.5000[,10:25])
```

seBinprops *Independent Binomial Proportions*

Description

Compute SEs for Independent Binomial Proportions

Usage

```
seBinprops(ns, phats)
```

Arguments

ns	the number of observations in the independent groups
phats	the proportions of TRUE/1's etc.

Value

an ses.moecalc object

Author(s)

Junjie Zeng

Examples

```
seBinprops(c(50, 30), c(0.3, 0.7))
```

---

seCovs *Compute standard error for covariance matrix*

Description

Compute the standard error information for a given covariance matrix.

Usage

```
seCovs(covs, addbase = FALSE)
```

Arguments

covs	covariance matrix
addbase	logical, is there a baseline?

Value

an ses.moecalc object

Author(s)

Junjie Zeng

Examples

```
seCovs(cov(iris[,-5]))
```

seIndepSes *Independent Standard errors given*

Description

Returns ses.moecalc for given SEs

Usage

```
seIndepSes(ses)
```

Arguments

ses	the standard errors

Value

an ses.moecalc object

Author(s)

Junjie Zeng

Examples

```
seIndepSes(c(0.02, 0.05, 0.1))
```

seMNprops *Compute SE for Multinomial proportions*

Description

SEs for Multinomial Proportions

Usage

```
seMNprops(n, phat)
```

Arguments

n	the number of observations in each group
phat	the estimates proportions for each group

Value

an ses.moecalc object

Author(s)

Junjie Zeng

Examples

```
phat <- table(iris$Species) / nrow(iris)
seMNprops(nrow(iris), phat)
```

---

seMRprops *Multiple binary response*

Description

SE's for multiple binary response

Usage

```
seMRprops(obj)
```

Arguments

obj	something that can be turned into a matrix

Value

an ses.moecalc object

Author(s)

Junjie Zeng

Examples

```
x <- data.frame(
 v1 = rbinom(20, 1, 0.8),
 v2 = rbinom(20, 1, 0.3),
 v3 = rbinom(20, 1, 0.5)
)
seMRprops(x)
```

substrsplit *Extract Common Name from variables*

Description

Help mro variables extract common name out

Usage

```
substrsplit(obj)
```

Arguments

obj	It can be a vector or data frame, however, substrsplit is usually used in the iNZightMR function.

Value

A list with common character and unique variable name respectively

Examples

```
substrsplit(c("varx", "vary", "varz"))
```

Index