Package ‘iNZightMR’

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Contact inzight_support@stat.auckland.ac.nz

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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).

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iNZightMR-package ............................................. 2
barplotMR .......................................................... 2
between ............................................................. 4
byMRO .............................................................. 4
calcmissing ........................................................ 5
census.at.school.5000 ................................................. 6
iNZightMR .......................................................... 9
moecalc .............................................................. 10
mroPara ............................................................ 11
plotcombn .......................................................... 12
seBinprops ......................................................... 12
seCovs .............................................................. 13
seIndepSes ......................................................... 14
seMNprops ........................................................ 14
seMRprops ........................................................ 15
substrsplit ......................................................... 16

Index 17

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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

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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.
barplotMR

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**

```r
between(bymro)
```

**Arguments**

- `bymro` a bymro object

**Value**

something about between.

**Author(s)**

Junjie Zheng

**Examples**

```r
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**

```r
byMRO(mro.obj, formula, FUN, ...)
```
**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
ethiceng binary for ethnicity english
ethicmri binary for ethnicity maori
ethnicwsm binary for ethnicity wsm
ethiccok 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
techn tv binary for use of TV
techmp3 binary for use of mp3
techninternet 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/
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**

```r
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 'ethnircmri', '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**

```r
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"),
  inverse = TRUE)
```
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
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
mroPara

Examples

```r
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

```r
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

```r
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
seCovs

Author(s)

Junjie Zeng

Examples

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

description

seCovs(covs, addbase = FALSE)

seCovs computes the standard error information for a given covariance matrix.

Usage

seCovs(x, addbase = FALSE)

Arguments

covs: covariance matrix

addbase: logical, is there a baseline?

Value

an ses.moealc 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**  

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ses</td>
<td>the standard errors</td>
</tr>
</tbody>
</table>

**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**  

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>the number of observations in each group</td>
</tr>
<tr>
<td>phat</td>
<td>the estimates proportions for each group</td>
</tr>
</tbody>
</table>

**Value**  
an ses.moecalc object
seMRprops

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

*Topic **datasets**
  census.at.school.5000, 6

*Topic **iNZight**
  iNZightMR-package, 2

*Topic **multiple**
  iNZightMR-package, 2

*Topic **response**
  iNZightMR-package, 2

barplotMR, 2, 9
between, 4
by, 11
byMRO, 4

calcmissing, 5
census.at.school.5000, 6

iNZightMR, 9, 11
iNZightMR-package, 2

model.frame, 9
moecalc, 10
mroPara, 5, 9, 11

plotcombn, 12

seBinprops, 12
seCovs, 13
seIndepSes, 14
seMNprops, 14
seMRprops, 15
substrsplit, 16