Package ‘miceFast’

December 13, 2020

Title Fast Imputations Using 'Rcpp' and 'Armadillo'

Version 0.6.9

Description Fast imputations under the object-oriented programming paradigm.

Moreover there are offered a few functions built to work with popular R packages such as 'data.table' or 'dplyr'.

The biggest improvement in time performance could be achieve for a calculation where a grouping variable have to be used.

A single evaluation of a quantitative model for the multiple imputations is another major enhancement.

A new major improvement is one of the fastest predictive mean matching in the R world because of presorting and binary search.

Depends R (>= 3.6.0)

License GPL (>= 2)

URL https://github.com/Polkas/miceFast

BugReports https://github.com/Polkas/miceFast/issues

Encoding UTF-8

Imports methods, data.table, dplyr, magrittr, Rcpp (>= 0.12.12),

UpSetR, ggplot2, tidyR, assertthat

Suggests knitr, rmarkdown, pacman, testthat, mice, broom, car

VignetteBuilder knitr

LinkingTo Rcpp, RcppArmadillo

RcppModules miceFast, corrData

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miceFast-package

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miceFast-package  miceFast package for fast multiple imputations.

Description

Fast imputations under the object-oriented programming paradigm. There was used quantitative models with a closed-form solution. Thus package is based on linear algebra operations. The biggest improvement in time performance could be achieve for a calculation where a grouping variable have to be used. A single evaluation of a quantitative model for the multiple imputations is another major enhancement. Moreover there are offered a few functions built to work with popular R packages such as ’data.table’.

Details

read vignette for additional information

Author(s)

Maciej Nasinski

References

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See Also

.
Examples

```r
## Not run:
.
## End(Not run)
```

### Description

Air quality dataset with additional variables.

#### Usage

```r
air_miss
```

#### Format

A data frame and data table with 154 observations on 11 variables.

- **Ozone** numeric Ozone (ppb) - Mean ozone in parts per billion from 1300 to 1500 hours at Roosevelt Island
- **Solar.R** numeric Solar R (lang) - Solar radiation in Langleys in the frequency band 4000–7700 Angstroms from 0800 to 1200 hours at Central Park
- **Wind** numeric Wind (mph) - Average wind speed in miles per hour at 0700 and 1000 hours at LaGuardia Airport
- **Temp** numeric Temperature (degrees F) - Maximum daily temperature in degrees Fahrenheit at LaGuardia Airport.
- **Day** numeric Day of month (1–31)
- **Intercept** numeric a constant
- **index** numeric id
- **weights** numeric positive values weights
- **groups** factor Month (1–12)
- **x_character** character discrete version of Solar.R (5-levels)
- **Ozone_chac** character discrete version of Ozone (7-levels)
- **Ozone_f** factor discrete version of Ozone (7-levels)
- **Ozone_high** logical Ozone higher than its mean

#### Details

Daily readings of the following air quality values for May 1, 1973 (a Tuesday) to September 30, 1973.
Source

The data were obtained from the New York State Department of Conservation (ozone data) and the National Weather Service (meteorological data).

References


Examples

```r
## Not run:
library(data.table)
data(airquality)
data <- cbind(as.matrix(airquality[, -5]),
  Intercept = 1, index = 1:nrow(airquality),
  # a numeric vector - positive values
  weights = rnorm(nrow(airquality), 1, 0.01),
  # months as groups
  groups = airquality[, 5]
)
# data.table
air_miss <- data.table(data)
air_miss$groups <- factor(air_miss$groups)

# Distribution of Ozone - close to log-normal
# hist(air_miss$Ozone)
# Additional vars
# Make a character variable to show package capabilities
air_miss$x_character <- as.character(cut(air_miss$Solar.R, seq(0, 350, 70)))
# Discrete version of dependent variable
air_miss$Ozone_chac <- as.character(cut(air_miss$Ozone, seq(0, 160, 20)))
air_miss$Ozone_f <- cut(air_miss$Ozone, seq(0, 160, 20))
air_miss$Ozone_high <- air_miss$Ozone > mean(air_miss$Ozone, na.rm = T)
## End(Not run)
```

---

`compare_imp`  
Compared imputations and original data distributions

Description

ggplot2 visualization to support which imputation method choose

Usage

`compare_imp(df, origin, target)`
Arguments

`df` data.frame with origin variable and the new one with imputations

`origin` character value - the name of origin variable with values before any imputations

`target` character vector - names of variables with applied imputations

Value

`ggplot2` object

Examples

```r
data(air_miss)
air_miss$Ozone_imp <- fill_NA(
  x = air_miss,
  model = "lm_bayes",
  posit_y = 1,
  posit_x = c(4, 6),
  logreg = TRUE
)

air_miss$Ozone_imp2 <- fill_NA_N(
  x = air_miss,
  model = "pmm",
  posit_y = 1,
  posit_x = c(4, 6),
  logreg = TRUE
)

compare_imp(air_miss, origin = "Ozone", "Ozone_imp")
compare_imp(air_miss, origin = "Ozone", c("Ozone_imp", 'Ozone_imp2'))
```

Description

Regular imputations to fill the missing data. Non missing independent variables are used to approximate a missing observations for a dependent variable. Quantitative models were built under Rcpp packages and the C++ library Armadillo.

Usage

```r
fill_NA(x, model, posit_y, posit_x, w = NULL, logreg = FALSE, ridge = 1e-06)
```

## S3 method for class 'data.frame'

```r
fill_NA(x, model, posit_y, posit_x, w = NULL, logreg = FALSE, ridge = 1e-06)
```

## S3 method for class 'data.table'

```r
fill_NA(x, model, posit_y, posit_x, w = NULL, logreg = FALSE, ridge = 1e-06)
```
fill_NA(x, model, posit_y, posit_x, w = NULL, logreg = FALSE, ridge = 1e-06)

## S3 method for class 'matrix'
fill_NA(x, model, posit_y, posit_x, w = NULL, logreg = FALSE, ridge = 1e-06)

**Arguments**

- **x**: a numeric matrix or data.frame/data.table (factor/character/numeric/logical) - variables
- **model**: a character - possible options ("lda","lm_pred","lm_bayes","lm_noise")
- **posit_y**: an integer/character - a position/name of dependent variable
- **posit_x**: an integer/character vector - positions/names of independent variables
- **w**: a numeric vector - a weighting variable - only positive values, Default:NULL
- **logreg**: a boolean - if dependent variable has log-normal distribution (numeric). If TRUE log-regression is evaluated and then returned exponential of results., Default: FALSE
- **ridge**: a numeric - a value added to diagonal elements of the x’x matrix, Default:1e-5

**Value**

load imputations in a numeric/logical/character/factor (similar to the input type) vector format

**Methods (by class)**

- data.frame: S3 method for data.frame
- data.table: 3 method for data.table
- matrix: S3 method for matrix

**Note**

There is assumed that users add the intercept by their own. The miceFast module provides the most efficient environment, the second recommended option is to use data.table and the numeric matrix data type. The lda model is assessed only if there are more than 15 complete observations and for the lms models if number of independent variables is smaller than number of observations.

**See Also**

fill_NA_N VIF

**Examples**

library(miceFast)
library(dplyr)
library(data.table)
### Data
# airquality dataset with additional variables
data(air_miss)
### Intro: data.table

# IMPUTATIONS

# Imputations with a grouping option (models are separately assessed for each group)
# taking into account provided weights

```r
air_miss[, Solar_R_imp := fill_NA_N(
  x = .SD,
  model = "lm_bayes",
  posit_y = "Solar.R",
  posit_x = c("Wind", "Temp", "Intercept"),
  w = .SD["weights"],
  k = 100
), by = .(groups)]
```

# Imputations - discrete variable

```r
.[, x_character_imp := fill_NA(
  x = .SD,
  model = "lda",
  posit_y = "x_character",
  posit_x = c("Wind", "Temp", "groups"))]
```

# logreg was used because almost log-normal distribution of Ozone
# imputations around mean

```r
.[, Ozone_imp1 := fill_NA(
  x = .SD,
  model = "lm_bayes",
  posit_y = "Ozone",
  posit_x = c("Intercept"),
  logreg = TRUE)
)
```

# imputations using positions - Intercept, Temp

```r
.[, Ozone_imp2 := fill_NA(
  x = .SD,
  model = "lm_bayes",
  posit_y = 1,
  posit_x = c(4, 6),
  logreg = TRUE)
)
```

# model with a factor independent variable
# multiple imputations (average of x30 imputations)
# with a factor independent variable, weights and logreg options

```r
.[, Ozone_imp3 := fill_NA_N(
  x = .SD,
  model = "lm_noise",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  w = .SD["weights"],
  logreg = TRUE,
  k = 30
)
```

```r
.[, Ozone_imp4 := fill_NA_N(
  x = .SD,
  model = "lm_bayes",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  logreg = TRUE,
  k = 30)
```

```r
.[, Ozone_imp5 := fill_NA_N(
  x = .SD,
  model = "lm_bayes",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  logreg = TRUE,
  k = 30)
```
w = .SD["weights"],
logreg = TRUE,
k = 30
)]

., Ozone_imp5 := fill_NA(
x = .SD, 
model = "lm_pred",
posit_y = "Ozone",
posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"), 
w = .SD["weights"], 
logreg = TRUE
), .(groups) %>%

., Ozone_imp6 := fill_NA_N(
x = .SD, 
model = "pmm",
posit_y = "Ozone",
posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"), 
w = .SD["weights"], 
logreg = TRUE, 
k = 10
), .(groups) %>%

# Average of a few methods
., Ozone_imp_mix := apply(.SD, 1, mean), .SDcols = Ozone_imp1:Ozone_imp6 %>%

# Protecting against collinearity or low number of observations - across small groups
# Be carful when using a data.table grouping option
# because of lack of protection against collinearity or low number of observations.
# There could be used a tryCatch(fill_NA(...),error=function(e) return(...))

., Ozone_chac_imp := tryCatch(fill_NA(
x = .SD, 
model = "lda",
posit_y = "Ozone_chac",
posit_x = c("Intercept", "Month", "Day", "Temp", "x_character_imp"), 
w = .SD["weights"]
),
error = function(e) .SD["Ozone_chac"]
), .(groups)

# Sample of results
air_miss[which(is.na(air_miss[, 1]))[1:5], ]

### Intro: dplyr
# IMPUTATIONS
air_miss <- air_miss %>%
# Imputations with a grouping option (models are separately assessed for each group)
# taking into account provided weights
group_by(groups) %>%
do(mutate(. , Solar_R_imp = fill_NA(
  x = .,
  model = "lm_pred",
  posit_y = "Solar.R",
  posit_x = c("Wind", "Temp", "Intercept"),
  w = .[["weights"]]
)) %>%
ungroup() %>%
# Imputations - discrete variable
mutate(x_character_imp = fill_NA(
  x = .,
  model = "lda",
  posit_y = "x_character",
  posit_x = c("Wind", "Temp")
)) %>%
# logreg was used because almost log-normal distribution of Ozone
# imputations around mean
mutate(Ozone_imp1 = fill_NA(
  x = .,
  model = "lm_bayes",
  posit_y = "Ozone",
  posit_x = c("Intercept"),
  logreg = TRUE
)) %>%
# imputations using positions - Intercept, Temp
mutate(Ozone_imp2 = fill_NA(
  x = .,
  model = "lm_bayes",
  posit_y = 1,
  posit_x = c(4, 6),
  logreg = TRUE
)) %>%
# multiple imputations (average of x30 imputations)
# with a factor independent variable, weights and logreg options
mutate(Ozone_imp3 = fill_NA_N(
  x = .,
  model = "lm_noise",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  w = .[["weights"]],
  logreg = TRUE,
  k = 30
)) %>%
mutate(Ozone_imp4 = fill_NA_N(
  x = .,
  model = "lm_bayes",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  w = .[["weights"]],
  logreg = TRUE,
  k = 30
))
group_by(groups) %>%
do(mutate(., Ozone_imp5 = fill_NA(
  x = .,
  model = "lm_pred",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  w = .[["weights"]],
  logreg = TRUE
))) %>%
do(mutate(., Ozone_imp6 = fill_NA_N(
  x = .,
  model = "pmm",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  w = .[["weights"]],
  logreg = TRUE,
  k = 20
))) %>%
ungs() %>%
# Average of a few methods
mutate(Ozone_imp_mix = rowMeans(select(., starts_with("Ozone_imp")))) %>%
# Protecting against collinearity or low number of observations - across small groups
# Be careful when using a grouping option
# because of lack of protection against collinearity or low number of observations.
# There could be used a tryCatch(fill_NA(...),error=function(e) return(...))

group_by(groups) %>%
do(mutate(., Ozone_chac_imp = tryCatch(fill_NA(
  x = .,
  model = "lda",
  posit_y = "Ozone_chac",
  posit_x = c("Intercept", "Month", "Day", "Temp", "x_character_imp" ),
  w = .[["weights"]],
  error = function(e) .[["Ozone_chac"]]
))) %>%
ungs() %>%

# Sample of results
air_miss[which(is.na(air_miss[, 1]))[1:5], ]
Description

Multiple imputations to fill the missing data. Non missing independent variables are used to approximate a missing observations for a dependent variable. Quantitative models were built under Rcpp packages and the C++ library Armadillo.

Usage

fill_NA_N(
  x,
  model,
  posit_y,
  posit_x,
  w = NULL,
  logreg = FALSE,
  k = 10,
  ridge = 1e-06
)

## S3 method for class 'data.frame'
fill_NA_N(
  x,
  model,
  posit_y,
  posit_x,
  w = NULL,
  logreg = FALSE,
  k = 10,
  ridge = 1e-06
)

## S3 method for class 'data.table'
fill_NA_N(
  x,
  model,
  posit_y,
  posit_x,
  w = NULL,
  logreg = FALSE,
  k = 10,
  ridge = 1e-06
)

## S3 method for class 'matrix'
fill_NA_N(
  x,
  model,
  posit_y,
  posit_x,
w = NULL,
logreg = FALSE,
k = 10,
ridge = 1e-06
)

Arguments

x a numeric matrix or data.frame/data.table (factor/character/numeric/logical) - variables
model a character - possible options ("lm_bayes", "lm_noise", "pmm")
posit_y an integer/character - a position/name of dependent variable
posit_x an integer/character vector - positions/names of independent variables
w a numeric vector - a weighting variable - only positive values, Default: NULL
logreg a boolean - if dependent variable has log-normal distribution (numeric). If TRUE log-regression is evaluated and then returned exponential of results., Default: FALSE
k an integer - a number of multiple imputations or for pmm a number of closest points from which a one random value is taken, Default: 10
ridge a numeric - a value added to diagonal elements of the x’x matrix, Default: 1e-5

Value

load imputations in a numeric/character/factor (similar to the input type) vector format

Methods (by class)

• data.frame: S3 method for data.frame
• data.table: S3 method for data.table
• matrix: S3 method for matrix

Note

There is assumed that users add the intercept by their own. The miceFast module provides the most efficient environment, the second recommended option is to use data.table and the numeric matrix data type. The lda model is assessed only if there are more than 15 complete observations and for the lms models if number of variables is smaller than number of observations.

See Also

fill_NA VIF
Examples

library(miceFast)
library(dplyr)
library(data.table)

### Data
# airquality dataset with additional variables
data(air_miss)

### Intro: data.table
### IMPUTATIONS
# Imputations with a grouping option (models are separately assessed for each group)
# taking into account provided weights
air_miss[, Solar_R_imp := fill_NA_N(  
x = .SD,
model = "lm_bayes",
posit_y = "Solar.R",
posit_x = c("Wind", "Temp", "Intercept"),
w = .SD["weights"],
k = 100
), by = .(groups)]

# Imputations - discrete variable
.[, x_character_imp := fill_NA(  
x = .SD,
model = "lda",
posit_y = "x_character",
posit_x = c("Wind", "Temp", "groups")
)]

# logreg was used because almost log-normal distribution of Ozone
# imputations around mean
.[, Ozone_imp1 := fill_NA(  
x = .SD,
model = "lm_bayes",
posit_y = "Ozone",
posit_x = c("Intercept"),
logreg = TRUE
)]

# imputations using positions - Intercept, Temp
.[, Ozone_imp2 := fill_NA(  
x = .SD,
model = "lm_bayes",
posit_y = 1,
posit_x = c(4, 6),
logreg = TRUE
)]

# model with a factor independent variable
# multiple imputations (average of x30 imputations)
# with a factor independent variable, weights and logreg options
.[, Ozone_imp3 := fill_NA_N(  
x = .SD,
model = "lm_noise",
posit_y = "Ozone",
posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
logreg = TRUE
)]
w = .SD["weights"],
logreg = TRUE,
k = 30
)
] %>%
.
Ozone_imp4 := fill_NA_N(
x = .SD,
model = "lm_bayes",
posit_y = "Ozone",
posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
w = .SD["weights"],
logreg = TRUE,
k = 30
)
] %>%
.
Ozone_imp5 := fill_NA(
x = .SD,
model = "lm_pred",
posit_y = "Ozone",
posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
w = .SD["weights"],
logreg = TRUE
), .(groups)
] %>%
.
Ozone_imp6 := fill_NA_N(
x = .SD,
model = "pmm",
posit_y = "Ozone",
posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
w = .SD["weights"],
logreg = TRUE,
k = 10
), .(groups)
] %>%

# Average of a few methods
.
Ozone_imp_mix := apply(.SD, 1, mean), .SDcols = Ozone_imp1:Ozone_imp6
] %>%

# Protecting against collinearity or low number of observations - across small groups
# Be careful when using a data.table grouping option
# because of lack of protection against collinearity or low number of observations.
# There could be used a tryCatch(fill_NA(...),error=function(e) return(...))
.
Ozone_chac_imp := tryCatch(fill_NA(
x = .SD,
model = "lda",
posit_y = "Ozone_chac",
posit_x = c("Intercept",
"Month",
"Day",
"Temp",
"x_character_imp"
),
w = .SD["weights"],
error = function(e) .SD["Ozone_chac"]
), .(groups)
### Intro: dplyr

#### IMPUTATIONS

```r
air_miss <- air_miss %>%
  # Imputations with a grouping option (models are separately assessed for each group)
  # taking into account provided weights
  group_by(groups) %>%
  do(mutate(., Solar_R_imp = fill_NA(
    x = .,
    model = "lm_pred",
    posit_y = "Solar.R",
    posit_x = c("Wind", "Temp", "Intercept"),
    w = .[['weights']]
  ))) %>%
  ungroup() %>%
  # Imputations - discrete variable
  mutate(x_character_imp = fill_NA(
    x = .,
    model = "lda",
    posit_y = "x_character",
    posit_x = c("Wind", "Temp")
  )) %>%
  # logreg was used because almost log-normal distribution of Ozone
  # imputations around mean
  mutate(Ozone_imp1 = fill_NA(
    x = .,
    model = "lm_bayes",
    posit_y = "Ozone",
    posit_x = c("Intercept"),
    logreg = TRUE
  )) %>%
  # imputations using positions - Intercept, Temp
  mutate(Ozone_imp2 = fill_NA(
    x = .,
    model = "lm_bayes",
    posit_y = 1,
    posit_x = c(4, 6),
    logreg = TRUE
  )) %>%
  # multiple imputations (average of x30 imputations)
  # with a factor independent variable, weights and logreg options
  mutate(Ozone_imp3 = fill_NA_N(
    x = .,
    model = "lm_noise",
    posit_y = "Ozone",
    posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
    w = .[['weights']]
  )
```

---

# Sample of results

```r
air_miss[which(is.na(air_miss[, 1]))[1:5], ]
```
group_by(groups) %>%
do(mutate(., Ozone_imp4 = fill_NA_N(
x = .,
  model = "lm_bayes",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  w = .[["weights"]],
  logreg = TRUE,
  k = 30
)) %>%
group_by(groups) %>%
do(mutate(., Ozone_imp5 = fill_NA(
x = .,
  model = "lm_pred",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  w = .[["weights"]],
  logreg = TRUE
)) %>%
do(mutate(., Ozone_imp6 = fill_NA_N(
x = .,
  model = "pmm",
  posit_y = "Ozone",
  posit_x = c("Intercept", "x_character_imp", "Wind", "Temp"),
  w = .[["weights"]],
  logreg = TRUE,
  k = 20
)) %>%
ungroup()
# Average of a few methods
mutate(Ozone_imp_mix = rowMeans(select(., starts_with("Ozone_imp")))) %>%
# Protecting against collinearity or low number of observations - across small groups
# Be careful when using a grouping option
# because of lack of protection against collinearity or low number of observations.
# There could be used a tryCatch(fill_NA(...),error=function(e) return(...))
group_by(groups) %>%
do(mutate(., Ozone_chac_imp = tryCatch(fill_NA(
x = .,
  model = "lda",
  posit_y = "Ozone_chac",
  posit_x = c("Intercept", "Month", "Day", "Temp", "x_character_imp"),
  w = .[["weights"]],
  error = function(e) .[["Ozone_chac"]]
)) %>%
ungroup()
naive_fill_NA

# Sample of results
air_miss[which(is.na(air_miss[, 1]))[1:5], ]

naive_fill_NA function for the imputations purpose.

Description

Regular imputations to fill the missing data. Non missing independent variables are used to approximate a missing observations for a dependent variable. For numeric columns with any missing data a simple bayesian mean will be used. Next all numeric variables will be utilized to impute character/factor variables by Linear Discriminant Analysis.

Usage

naive_fill_NA(x)

## S3 method for class 'data.frame'
naive_fill_NA(x)

## S3 method for class 'matrix'
naive_fill_NA(x)

Arguments

x a numeric matrix or data.frame/data.table (factor/character/numeric/logical) - variables

Value

load imputations in a similar to the input type

Methods (by class)

- data.frame: S3 method for data.frame
- matrix: S3 method for matrix

Note

this is a very simple and fast solution but not recommended, for more complex solutions check the vignette

See Also

fill_NA fill_NA_N VIF
Examples

```r
## Not run:
library(naive_fill_NAast)
data(air_miss)
aive_fill_NA(air_miss)

## End(Not run)
```

### neibo

*Finding in random manner one of the k closest points in a certain vector for each value in a second vector*

#### Description

This function uses pre-sorting of a `y` and the binary search to find the one of the k closest value for each `miss` is returned.

#### Usage

```r
neibo(y, miss, k)
```

#### Arguments

- `y` numeric vector values to be look up
- `miss` numeric vector a values to be look for
- `k` integer a number of values which should be taken into account during sampling one of the k closest point

#### Value

A numeric vector

### neibo_index

*Finding in random manner one of the k closest points in a certain vector for each value in a second vector*

#### Description

This function using pre-sorting of a `y` and the binary search the one of the k closest value for each `miss` is returned.

#### Usage

```r
neibo_index(y, miss, k)
```
**Rcpp_corrData-class**

**Arguments**

y 
numeric vector values to be look up

miss 
numeric vector a values to be look for

k 
integer a number of values which should be taken into account during sampling one of the k closest point

**Value**

a numeric vector

---

**Rcpp_corrData-class**  
*Class* "Rcpp_corrData"

---

**Description**

This C++ class could be used to build a corrData object by invoking `new(corrData,...)` function.

**Extends**

Class "C+Object", directly.

All reference classes extend and inherit methods from "envRefClass".

**Methods**

initialize(...): ~~

finalize(): ~~

fill(...): generating data

**Note**

This is only frame for building C++ object which could be used to implement certain methods. Check the vignette for more details of implementing methods.

**References**

See the documentation for RcppArmadillo and Rcpp for more details of how this class was built.

**Examples**

```r
#showClass("Rcpp_corrData")
show(corrData)
```
Description

This C++ class could be used to build a miceFast objects by invoking `new(miceFast)` function.

Extends

Class "C++Object", directly.
All reference classes extend and inherit methods from "envRefClass".

Methods

- `set_data(...)`: providing data by a reference - a numeric matrix
- `set_g(...)`: providing a grouping variable by a reference - a numeric vector - positive values
- `set_w(...)`: providing a weightinh variable by a reference - a numeric vector - positive values
- `get_data(...)`: retrieving the data
- `get_w(...)`: retrieving the weighting variable
- `get_g(...)`: retrieving the grouping variable
- `get_index(...)`: getting the index
- `impute(...)`: impute data under characteristics from the object like a optional grouping or weighting variable
- `impute_N(...)`: multiple imputations - impute data under characteristics from the object like a optional grouping or weighting variable
- `update_var(...)`: permanently update the variable at the object and data. Use it only if you are sure about model parameters
- `get_models(...)`: get possible quantitative models for a certain type of dependent variable
- `get_model(...)`: get a recommended quantitative model for a certain type of dependent variable
- `which_updated(...)`: which variables at the object was modified by `update_var`
- `sort_byg(...)`: sort data by the grouping variable
- `is_sorted_byg(...)`: check if data is sorted by the grouping variable
- `vifs(...)`: Variance inflation factors (VIF) - helps to check when the predictor variables are not linearly related
- `initialize(...)`: ...
- `finalize():` ...

Note

This is only frame for building C++ object which could be used to implement certain methods. Check the vignette for more details of implementing these methods.

Vignette: https://CRAN.R-project.org/package=miceFast
References

See the documentation for RcppArmadillo and Rcpp for more details of how this class was built.

Examples

```r
#showClass("Rcpp_miceFast")
show(miceFast)
new(miceFast)
```

```
upset_NA  upset plot for NA values
```

Description

wrapper around UpSetR::upset for visualization of NA values
Visualization of set intersections using novel UpSet matrix design.

Usage

```r
upset_NA(...)```

Arguments

```r
... all arguments accepted by UpSetR::upset where the first one is expected to be a data.
```

Details

Visualization of set data in the layout described by Lex and Gehlenborg in [https://www.nature.com/articles/nmeth.3033](https://www.nature.com/articles/nmeth.3033). UpSet also allows for visualization of queries on intersections and elements, along with custom queries queries implemented using Hadley Wickham’s apply function. To further analyze the data contained in the intersections, the user may select additional attribute plots to be displayed alongside the UpSet plot. The user also has the the ability to pass their own plots into the function to further analyze data belonging to queries of interest. Most aspects of the UpSet plot are customizable, allowing the user to select the plot that best suits their style. Depending on how the features are selected, UpSet can display between 25-65 sets and between 40-100 intersections.

Note

Data set must be formatted as described on the original UpSet github page: [https://github.com/VCG/upset/wiki](https://github.com/VCG/upset/wiki).

References

Examples

upset_NA(airquality)
upset_NA(air_miss, 6)

VIF function for assessing VIF.

Description

VIF measure how much the variance of the estimated regression coefficients are inflated. It helps to identify when the predictor variables are linearly related. You have to decide which variable should be delete. Values higher than 10 signal a potential collinearity problem.

Usage

VIF(x, posit_y, posit_x, correct = FALSE)

## S3 method for class 'data.frame'
VIF(x, posit_y, posit_x, correct = FALSE)

## S3 method for class 'data.table'
VIF(x, posit_y, posit_x, correct = FALSE)

## S3 method for class 'matrix'
VIF(x, posit_y, posit_x, correct = FALSE)

Arguments

x a numeric matrix or data.frame/data.table (factor/character/numeric) - variables
posit_y an integer/character - a position/name of dependent variable
posit_x an integer/character vector - positions/names of independent variables
correct a boolean - basic or corrected - Default: FALSE

Value

load a numeric vector with VIF for all variables provided by posit_x

Methods (by class)

• data.frame:
• data.table:
• matrix:

Note

vif_corrected = vif_basic^(1/(2*df))
See Also

fill_NA fill_NA_N

Examples

```r
# Not run:
library(miceFast)
library(data.table)

airquality2 <- airquality
airquality2$Temp2 <- airquality2$Temp**2
# install.packages("car")
# car::vif(lm(Ozone ~ ., data=airquality2))

data_DT <- data.table(airquality2)
data_DT[, .(vifs = VIF(
    x = .SD,
    posit_y = "Ozone",
    correct = FALSE
))][["vifs"]]
data_DT[, .(vifs = VIF(
    x = .SD,
    posit_y = 1,
    posit_x = c(2, 3, 4, 5, 6, 7),
    correct = TRUE
))][["vifs"]]

# End(Not run)
```
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