

Package ‘ggmice’

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Title Visualizations for 'mice' with 'ggplot2'

Version 0.1.1

Description Enhance a 'mice' imputation workflow with visualizations for incomplete and/or imputed data. The plotting functions produce 'ggplot' objects which may be easily manipulated or extended. Use 'ggmice' to inspect missing data, develop imputation models, evaluate algorithmic convergence, or compare observed versus imputed data.

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URL <https://amices.org/ggmice/>

BugReports <https://github.com/amices/ggmice/issues>

Imports cli, dplyr, ggplot2, magrittr, mice, purrr, rlang, scales, stats, stringr, tidyverse, tidyselect, utils

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bwplot	<i>Box-and-whisker plot of observed and imputed data</i>
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Description

Box-and-whisker plot of observed and imputed data

Usage

`bwplot(...)`

Arguments

... Any arguments passed to the function.

Value

The output of `mice::bwplot` and a message about the `ggmice` equivalent.

Examples

```
imp <- mice::mice(mice::nhanes, maxit = 1, printFlag = FALSE)
bwplot(imp)
```

densityplot*Densityplot of observed and imputed data*

Description

Densityplot of observed and imputed data

Usage

```
densityplot(...)
```

Arguments

... Any arguments passed to the function.

Value

The output of [mice::densityplot](#) and a message about the [ggmice](#) equivalent.

Examples

```
imp <- mice::mice(mice::nhanes, maxit = 1, printFlag = FALSE)
densityplot(imp)
```

ggmice*Plot incomplete or imputed data*

Description

Plot incomplete or imputed data

Usage

```
ggmice(data = NULL, mapping = ggplot2::aes())
```

Arguments

data An incomplete dataset (of class `data.frame`), or an object of class [mice::mids](#).
mapping A list of aesthetic mappings created with [ggplot2::aes\(\)](#).

Value

An object of class `ggplot2::ggplot`. The `ggmice` function returns output equivalent to `ggplot2::ggplot` output, with a few important exceptions:

- The theme is set to `theme_mice`.
- The color scale is set to the `mice::mdc` colors.
- The colour aesthetic is set to `.where`, an internally defined variable which distinguishes observed data from missing data or imputed data (for incomplete and imputed data, respectively).

See Also

See the `ggmice` vignette to use the `ggmice()` function on [incomplete data](#) or [imputed data](#).

Examples

```
dat <- mice::nhanes
ggmice(dat, ggplot2::aes(x = age, y = bmi)) + ggplot2::geom_point()
imp <- mice::mice(dat, print = FALSE)
ggmice(imp, ggplot2::aes(x = age, y = bmi)) + ggplot2::geom_point()
```

plot_corr*Plot correlations between (incomplete) variables***Description**

Plot correlations between (incomplete) variables

Usage

```
plot_corr(
  data,
  vrb = "all",
  label = FALSE,
  square = TRUE,
  diagonal = FALSE,
  rotate = FALSE,
  caption = TRUE
)
```

Arguments

<code>data</code>	A dataset of class <code>data.frame</code> , <code>tibble</code> , or <code>matrix</code> .
<code>vrb</code>	String, vector, or unquoted expression with variable name(s), default is "all".
<code>label</code>	Logical indicating whether correlation values should be displayed.
<code>square</code>	Logical indicating whether the plot tiles should be squares.

diagonal	Logical indicating whether the correlation of each variable with itself should be displayed.
rotate	Logical indicating whether the variable name labels should be rotated 90 degrees.
caption	Logical indicating whether the figure caption should be displayed.

Value

An object of class [ggplot2::ggplot](#).

Examples

```
# plot correlations for all columns
plot_corr(mice::nhanes)

# plot correlations for specific columns by supplying a character vector
plot_corr(mice::nhanes, c("chl", "hyp"))

# plot correlations for specific columns by supplying unquoted variable names
plot_corr(mice::nhanes, c(chl, hyp))

# plot correlations for specific columns by passing an object with variable names
# from the environment, unquoted with `!!` 
my_variables <- c("chl", "hyp")
plot_corr(mice::nhanes, !!my_variables)
# object with variable names must be unquoted with `!!`
try(plot_corr(mice::nhanes, my_variables))
```

plot_flux

Plot the influx and outflux of a multivariate missing data pattern

Description

Plot the influx and outflux of a multivariate missing data pattern

Usage

```
plot_flux(data, vrb = "all", label = TRUE, caption = TRUE)
```

Arguments

data	An incomplete dataset of class <code>data.frame</code> or <code>matrix</code> .
vrb	String, vector, or unquoted expression with variable name(s), default is "all".
label	Logical indicating whether variable names should be displayed within the plot (the default) or with colors in the legend.
caption	Logical indicating whether the figure caption should be displayed.

Value

An object of class [ggplot2::ggplot](#).

Examples

```
# plot flux for all columns
plot_flux(mice::nhanes)

# plot flux for specific columns by supplying a character vector
plot_flux(mice::nhanes, c("chl", "hyp"))

# plot flux for specific columns by supplying unquoted variable names
plot_flux(mice::nhanes, c(chl, hyp))

# plot flux for specific columns by passing an object with variable names
# from the environment, unquoted with `!!` 
my_variables <- c("chl", "hyp")
plot_flux(mice::nhanes, !!my_variables)
# object with variable names must be unquoted with `!!` 
try(plot_flux(mice::nhanes, my_variables))
```

plot_miss

Plot missingness in a dataset

Description

[Experimental]

Usage

```
plot_miss(
  data,
  vrb = "all",
  ordered = FALSE,
  rotate = FALSE,
  grid = FALSE,
  square = FALSE
)
```

Arguments

data	An incomplete dataset of class <code>data.frame</code> or <code>matrix</code> .
vrb	String, vector, or unquoted expression with variable name(s), default is "all".
ordered	Logical indicating whether rows should be ordered according to their pattern.
rotate	Logical indicating whether the variable name labels should be rotated 90 degrees.
grid	Logical indicating whether borders should be present between tiles.
square	Logical indicating whether the plot tiles should be squares, defaults to squares.

Value

An object of class [ggplot2::ggplot](#).

Examples

```
# plot correlations for all columns
plot_miss(mice::nhanes)

# plot correlations for specific columns by supplying a character vector
plot_miss(mice::nhanes, c("chl", "hyp"))

# plot correlations for specific columns by supplying unquoted variable names
plot_miss(mice::nhanes, c(chl, hyp))

# plot correlations for specific columns by passing an object with variable names
# from the environment, unquoted with `!!!`
my_variables <- c("chl", "hyp")
plot_miss(mice::nhanes, !!!my_variables)
# object with variable names must be unquoted with `!!!`
try(plot_miss(mice::nhanes, my_variables))

# plot larger dataset
plot_miss(mice::boys)
plot_miss(mice::boys, ordered = TRUE)
```

plot_pattern

Plot the missing data pattern of an incomplete dataset

Description

Plot the missing data pattern of an incomplete dataset

Usage

```
plot_pattern(
  data,
  vrb = "all",
  square = TRUE,
  rotate = FALSE,
  cluster = NULL,
  npat = NULL,
  caption = TRUE
)
```

Arguments

<code>data</code>	An incomplete dataset of class <code>data.frame</code> or <code>matrix</code> .
<code>vrb</code>	String, vector, or unquoted expression with variable name(s), default is "all".
<code>square</code>	Logical indicating whether the plot tiles should be squares, defaults to squares to mimick <code>mice::md.pattern()</code> .
<code>rotate</code>	Logical indicating whether the variable name labels should be rotated 90 degrees.
<code>cluster</code>	Optional character string specifying which variable should be used for clustering (e.g., for multilevel data).
<code>npat</code>	Optional numeric input specifying the number of missing data patterns to be visualized, defaults to all patterns.
<code>caption</code>	Logical indicating whether the figure caption should be displayed.

Value

An object of class `ggplot2::ggplot`.

Examples

```
# plot missing data pattern for all columns
plot_pattern(mice::nhanes)

# plot missing data pattern for specific columns by supplying a character vector
plot_pattern(mice::nhanes, c("chl", "hyp"))

# plot missing data pattern for specific columns by supplying unquoted variable names
plot_pattern(mice::nhanes, c(chl, hyp))

# plot missing data pattern for specific columns by passing an object with variable names
# from the environment, unquoted with `!!`
my_variables <- c("chl", "hyp")
plot_pattern(mice::nhanes, !!my_variables)
# object with variable names must be unquoted with `!!`
try(plot_pattern(mice::nhanes, my_variables))
```

Description

Plot the predictor matrix of an imputation model

Usage

```
plot_pred(  
  data,  
  vrb = "all",  
  method = NULL,  
  label = TRUE,  
  square = TRUE,  
  rotate = FALSE  
)
```

Arguments

data	A predictor matrix for mice, typically generated with <code>mice::make.predictorMatrix</code> or <code>mice::quickpred</code> , or an object of class <code>mice::mids</code> .
vrb	String, vector, or unquoted expression with variable name(s), default is "all".
method	Character string or vector with imputation methods.
label	Logical indicating whether predictor matrix values should be displayed.
square	Logical indicating whether the plot tiles should be squares.
rotate	Logical indicating whether the variable name labels should be rotated 90 degrees.

Details

The predictor matrix in `mice::mice` determines the role an imputation model predictor takes in the imputation model. The rows correspond to incomplete target variables, and the columns to imputation model predictors.

A value of 1 indicates that the column variable is a predictor to impute the target (row) variable. The value 0 means that it is not used as predictor.

Imputation methods for multilevel data use other codes than 0 and 1:

- Methods `2l.bin`, `2l.lmer`, `2l.norm`, `2l.pan`, `2lonly.mean`, `2lonly.norm` and `2lonly.pmm` use code -2 to indicate the class variable;
- Methods `2l.bin`, `2l.lmer`, `2l.norm` and `2l.pan` use code 2 to indicate the random effects;
- Method `2l.pan` uses codes 3 and 4 to add class means to codes 1 and 2 respectively.

Value

An object of class `ggplot2::ggplot`.

References

van Buuren, S. (2018). Flexible imputation of missing data. Chapman and Hall/CRC. [stefvanbuuren.name/fimd](#)

Examples

```
# generate a predictor matrix
pred <- mice::quickpred(mice::nhanes)

# plot predictor matrix for all columns
plot_pred(pred)

# plot predictor matrix for specific columns by supplying a character vector
plot_pred(pred, c("chl", "hyp"))

# plot predictor matrix for specific columns by supplying unquoted variable names
plot_pred(pred, c(chl, hyp))

# plot predictor matrix for specific columns by passing an object with variable names
# from the environment, unquoted with `!!`
my_variables <- c("chl", "hyp")
plot_pred(pred, !!my_variables)
# object with variable names must be unquoted with `!!`
try(plot_pred(pred, my_variables))

# plot predictor matrix of mids object
imp <- mice::mice(mice::nhanes, print = FALSE)
plot_pred(imp)
```

plot_trace

Plot the trace lines of the imputation algorithm

Description

Plot the trace lines of the imputation algorithm

Usage

```
plot_trace(data, vrb = "all", trend = FALSE, legend = TRUE)
```

Arguments

data	An object of class <code>mice::mids</code> .
vrb	String, vector, or unquoted expression with variable name(s), default is "all".
trend	Logical indicating whether a smoothed trend should be added, default is FALSE.
legend	Logical indicating whether the plot legend should be visible, default is TRUE.

Details

The `vrb` argument is "quoted" via `rlang::enexpr()` and evaluated according to **tidy evaluation principles**. In practice, this technical nuance only affects users when passing an object from the environment (e.g., a vector of variable names) to the `vrb` argument. In such cases, the object must be "unquoted" via the `!!` prefix operator.

Value

An object of class [ggplot2::ggplot](#).

Examples

```
# create [mice:::mids] object with [mice:::mice()]
imp <- mice:::mice(mice:::nhanes, print = FALSE)

# plot trace lines for all imputed columns
plot_trace(imp)

# plot trace lines for specific columns by supplying a string or character vector
plot_trace(imp, "chl")
plot_trace(imp, c("chl", "hyp"))
# plot trace lines for specific columns by supplying unquoted variable names
plot_trace(imp, chl)
plot_trace(imp, c(chl, hyp))

# plot trace lines for specific columns by passing an object with variable names
# from the environment, unquoted with `!!`
my_variables <- c("chl", "hyp")
plot_trace(imp, !!my_variables)
# object with variable names must be unquoted with `!!`
try(plot_trace(imp, my_variables))
```

stripplot

Stripplot of observed and imputed data

Description

Stripplot of observed and imputed data

Usage

```
stripplot(...)
```

Arguments

... Any arguments passed to the function.

Value

The output of [mice:::stripplot](#) and a message about the ggmice equivalent.

Examples

```
imp <- mice:::mice(mice:::nhanes, maxit = 1, printFlag = FALSE)
stripplot(imp)
```

`xyplot`*Scatterplot of observed and imputed data*

Description

Scatterplot of observed and imputed data

Usage

```
xyplot(...)
```

Arguments

... Any arguments passed to the function.

Value

The output of [mice::xyplot](#) and a message about the ggmice equivalent.

Examples

```
imp <- mice::mice(mice::nhanes, maxit = 1, printFlag = FALSE)
xyplot(imp, bmi ~ age)
```

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