Package 'basecamb'

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Type Package

Title Utilities for Streamlined Data Import, Imputation and Modelling

Version 1.0.4

Description Provides functions streamlining the data analysis workflow:
Outsourcing data import, renaming and type casting to a *.csv.
Manipulating imputed datasets and fitting models on them. Summarizing models.

Depends R (>= 4.0.0)

Imports assertive.types, assertthat, dplyr, mice, Hmisc, purrr

License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.1.1

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

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https://github.com/codeblue-team/basecamb

BugReports https://github.com/codeblue-team/basecamb/issues

NeedsCompilation no

Author J. Peter Marquardt [aut] (<https://orcid.org/0000-0002-5596-1357>),
Till D. Best [aut, cre] (<https://orcid.org/0000-0001-7323-827X>)

Maintainer Till D. Best <till-best@gmx.de>

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R topics documented:

`.scale_variable` *Scaling a variable*

Description

A helper function to scale a variable in a dataframe. Divides 'variable' by 'scaling_denominator'.

Usage

```
.scale_variable(data, variable, scaling_denominator)
```

Arguments

`data`	data.frame
`variable`	a char indicating the variable to be scaled
`scaling_denominator`	a numeric indicating the scaling. The variable is divided by the scaling_denominator.

Value

the input dataframe with the newly scaled 'variable'

`apply_data_dictionary` *Clean column names, types and levels*

Description

Use a data dictionary data.frame to apply the following tidying steps to your data.frame:

- Remove superfluous columns
- Rename columns
- Ensure/coerce correct data type for each column
- Assign factorial levels, including renaming and grouping

Usage

```
apply_data_dictionary(
  data,
  data_dictionary,
  na_action_default = "keep_NA",
  print_coerced_NA = TRUE
)
```

Arguments

`data` data.frame to be cleaned

`data_dictionary`

data.frame with the following columns:

- old_column_name : character with the old column name
- new_data_type : character denoting the tidy data type. Supported types are:
  - character
  - integer
  - float
  - factor
  - date
- new_column_name : tidy column name. Can be left blank to keep the old column name
- coding (factor and date columns only):
  - factor columns: character denoting old value (key) and new value (value) in a standardised fashion:
    - key-value pairs are separated from other key-value-pairs by a comma (",")
    - key and value of the same pair are separated by an equal sign ("=")
    - quotations around individual keys and values are recommended for clarity, but do not affect functionality.
    - all values will be coerced to type character, with the exception of "NA" being parsed as type NA
    - using "default" as a key will assign the specified value to all current values that do not match any of the specified keys, excluding NA
    - using "NA" as a key will assign the specified value to all current NA values
    - example coding: "'key1' = 'val1', 'key2' = 'val2', 'default' = 'Other', 'NA' = NA"
    - if no coding is specified for a column, the coding remains unchanged
  - date columns: character denoting coding (see format argument in `as.Date`)
- Optional other columns (do not affect behaviour)

`na_action_default`

character: Specify what to do with NA values. Defaults to 'keep_NA'. Options are:

- 'keep_NA' NA values remain NA values
- 'assign_default' NA values are assigned the value specified as 'default'. Requires a 'default' value to be specified Can be overwritten for individual columns by specifying a value for key 'NA'

`print_coerced_NA`
: logical indicating whether a message specifying the location of NAs that are introduced by apply_data_dictionary() to data should be printed.

Value

clean data.frame

Author(s)

J. Peter Marquardt

`apply_function_to_imputed_data` *Apply function to dataframes in a mice object*

Description

Wrapper function to apply a function on each dataframe in an imputed dataset created with `mice::mice()`.

Usage

```
apply_function_to_imputed_data(mice_data, fun, ...)
```

Arguments

`mice_data`	a mids object generated by `mice::mice()`.
`fun`	the function to apply to each dataframe. May only take one positional argument of type data.frame.
`...`	other arguments passed to fun()

Value

a mids object with transformed data.

Author(s)

J. Peter Marquardt

`assign_factorial_levels` *Assign custom values for key levels in factorial columns*

Description

Use a named vector of keys (current value) and values for factorial columns to assign meaningful levels and/or group levels

Usage

```
assign_factorial_levels(
  data,
  factor_keys_values,
  na_action_default = "keep_NA"
)
```

Arguments

`data` data.frame to modify

`factor_keys_values`
named list with:

- Keys: Names of factor columns
- values: Named vectors with
  - keys: current value (string representation)
  - values: new value to be assigned
  - if a 'default' key is passed, all existing values not conforming to the new scheme will be converted to the 'default' value
  - if a 'NA' key is passed, all NA values will be converted to the value specified here. Overwrites na_action_default for the specified column.

`na_action_default`
character: Specify what to do with NA values. Defaults to 'keep_NA'. Options are:

- 'keep_NA' NA values remain NA values
- 'assign_default' NA values are assigned the value specified as 'default'. Requires a 'default' value to be specified Can be overwritten for individual columns by specifying a value for key 'NA'

Value

data frame with new levels

Author(s)

J. Peter Marquardt

Examples

```
data <- data.frame(col1 = as.factor(rep(c('1', '2', '4'), 5)))
keys_1 <- list('col1' = c('1' = 'One', '2' = 'Two', '4' = 'Four'))
data_1 <- assign_factorial_levels(data, keys_1)
keys_2 <- list('col1' = c('1' = 'One', 'default' = 'Not_One'))
data_2 <- assign_factorial_levels(data, keys_2)
```

`assign_types_names` *Assign tidy types and names to a data.frame*

Description

Verbosely assign tidy name and data type for each column of a data.frame and get rid of superfluous columns. Uses a .csv file for assignments to encourage a data dictionary based workflow. CAVE! Requires 'Date' type columns to already be read in as Date.

Usage

```
assign_types_names(data, meta_data)
```

Arguments

`data`	data.frame to be tidied. Dates must already be of type date.
`meta_data`	data.frame specifying old column names, new column names and datatypes of data. Has the following columns: • old_column_name : character with the old column name. • new_data_type : character denoting the tidy data type. Supported types are: – character (will be coerced using `as.character()`). – integer (will be coerced using `as.integer()`). – float (will be coerced using `as.double()`). – factor (will be coerced using `as.factor()`). Will result in a warning if the new factor variable will have more than 10 levels. – date (can only confirm correct datatype assignment or coerce characters with format '%Y-%m-%d'). • new_column_name : tidy column name. Can be left blank to keep the old column name. • Optional other columns (do not affect behavior).

Value

clean data.frame

Author(s)

J. Peter Marquardt

build_model_formula *Build formula for statistical models*

Description

Build formula used in statistical models from vectors of strings.

Usage

```
build_model_formula(outcome, predictors, censor_event = NULL)
```

Arguments

outcome	character denoting the column with the outcome.
predictors	vector of characters denoting the columns with the predictors.
censor_event	character denoting the column with the censoring event, for use in Survival-type models.

Value

formula for use in statistical models

Author(s)

J. Peter Marquardt

Examples

```
build_model_formula("outcome", c("pred_1", "pred_2"))
build_model_formula("outcome", c("pred_1", "pred_2"), censor_event = "cens_event")
```

deconstruct_formula *Deconstruct formula*

Description

Deconstruct a formula object into strings of its components. Predictors are split by '+', so interaction terms will be returned as a single string.

Usage

```
deconstruct_formula(formula)
```

Arguments

formula	formula object for use in statistical models.

Value

a named list with fields:

- outcome (character)
- predictors (vector of characters)
- censor_event (character) (optional) censor event, only for formulas including a Surv() object

Author(s)

J. Peter Marquardt

Examples

```
deconstruct_formula(stats::as.formula("outcome ~ predictor1 + predictor2 + predictor3"))
deconstruct_formula(stats::as.formula("Surv(outcome, censor_event) ~ predictor"))
```

---

filter_nth_entry *Filter dataframe for nth entry*

Description

Filter a dataframe for the nth entry of each subject in it. A typical use cases would be to filter a dataset for the first or last measurement of a subject.#'

Usage

```
filter_nth_entry(data, ID_column, entry_column, n = 1, reverse_order = FALSE)
```

Arguments

data	the data.frame to filter
ID_column	character column identifying subjects
entry_column	character column identifying order of entries. That column can by of types Date, numeric, or any other type suitable for order()
n	integer number of entry to keep after ordering
reverse_order	logical when TRUE sorts entries last to first before filtering

Value

data.frame with <= 1 entry per subject

Author(s)

J. Peter Marquardt

Examples

```
data <- data.frame(list(ID = rep(1:5, 3), encounter = rep(1:3, each=5), value = rep(4:6, each=5)))
filter_nth_entry(data, 'ID', 'encounter')
filter_nth_entry(data, 'ID', 'encounter', n = 2)
filter_nth_entry(data, 'ID', 'encounter', reverse_order = TRUE)
```

---

fit_mult_impute_obs_outcome

Fit a model on multiply imputed data using only observatoin with non-missing outcome(s)

Description

This function fits a regression model using `Hmisc::fit.mult.impute()` on a multiply imputed dataset generated with `mice::mice()`. Cases with a missing outcome in the original dataset are removed from the mids object before model fitting.

Usage

```
fit_mult_impute_obs_outcome(mids, formula, fitter, ...)
```

Arguments

`mids`	a mids object, i.e. the imputed dataset.
`formula`	a formula that describes the model to be fit. The outcome (y variable) in the formula will be used to remove missing cases.
`fitter`	a modeling function (not in quotes) that is compatible with `Hmisc::fit.mult.impute()`.
`...`	additional arguments to `Hmisc::fit.mult.impute()`.

Value

mod a fit.mult.impute object.

Author(s)

Till D. Best

Examples

```
# create an imputed dataset
imputed_data <- mice::mice(airquality)

fit_mult_impute_obs_outcome(mids = imputed_data, formula = Ozone ~ Solar.R + Wind, fitter = glm)
```

`or_model_summary` *Summarise a logistic regression model on the odds ratio scale*

Description

This function summarises regression models that return data on the log-odds scale and returns a dataframe with estimates, and confidence intervals as odds ratios. P value are also provided. Additionally, intercepts can be removed from the summary. This comes in handy when ordinal logistic regression models are fit. Ordinal regression models (such as proportional odds models) usually result in many intercepts that are not really of interest. This function is also compatible with models obtained from multiply imputed datasets, for example models fitted with `Hmisc::fit.mult.impute()`.

Usage

```
or_model_summary(
  model,
  conf_int = 1.96,
  print_intercept = FALSE,
  round_est = 3,
  round_p = 4
)
```

Arguments

`model`	a model object with estimates on the log-odds scale.
`conf_int`	a numeric used to calculate the confidence intervals. The default of 1.96 gives the 95% confidence interval.
`print_intercept`	a logical flag indicating whether intercepts shall be removed. All variables that start with "y>=" will be removed. If there is a variable matching this pattern, it will also be removed!
`round_est`	the number of decimals returned for estimates (odds ratios) and confidence intervals.
`round_p`	the number of decimals provided for p-values.

Details

CAVE! The function does not check whether your estimates are on the log-odds scale. It will do the transformation no matter what!

Value

a dataframe with the adjusted odds ratio, confidence intervals and p-values.

Author(s)

Till D. Best

Examples

```
# fit a logistic model
mod <- glm(formula = am ~ mpg + cyl, data = mtcars, family = binomial())

or_model_summary(model = mod)
```

---

parse_date_columns *Parse values in date columns as Dates*

Description

Parse date columns in a data.frame as Date. Use a named list to specify each date column (key) and the format (value) it is coded in.

Usage

```
parse_date_columns(data, date_formats)
```

Arguments

data	data.frame to modify
date_formats	named list with: • Keys: Names of date columns • values: character specifying the format

Value

data.frame with date columns in Date type

Author(s)

J. Peter Marquardt

Examples

```
data <- data.frame(date = rep('01/23/4567', 5))
data <- parse_date_columns(data, list(date = '%m/%d/%Y'))
```

`remove_missing_from_mids` *Remove missing cases from a mids object*

Description

Remove_missing_from_mids is used to filter a mids object for missing cases in the original dataset in the variable var. This is useful for situations where you want to use as many observations as possible for imputation but only fit your model on a subset of these. Or, if you want to create one large imputed datset from which multiple analyses with multiple outcomes are derived.

Usage

```
remove_missing_from_mids(mids, var)
```

Arguments

`mids`	mids objects that is filtered.
`var`	a string or vector of strings specifying the variable(s). All cases (i.e. rows) for which there are missing values are removed.

Value

a mids object filtered for observed cases of var.

Author(s)

Till D. Best

`scale_continuous_predictors` *Scale continuous predictors*

Description

This function linearly scales variables in data objects according to a data dictionary. The data dictionary has at least two columns, "variable" and "scaling_denominator". "Variable" is divided by "scaling_denominator".

Usage

```
scale_continuous_predictors(data, scaling_dictionary)
```

Arguments

`data`	a data object with variables.
`scaling_dictionary`	a data.frame with two columns that are called "variable" and "scaling_denominator".

Value

The data with the newly scaled 'variables'.

Author(s)

Till D. Best

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