

Package ‘hdImpute’

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Type Package
Title A Batch Process for High Dimensional Imputation
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Description A correlation-based batch process for fast, accurate imputation for high dimensional missing data problems via chained random forests. See Waggoner (2023) <[doi:10.1007/s00180-023-01325-9](https://doi.org/10.1007/s00180-023-01325-9)> for more on 'hdImpute', Stekhoven and Bühlmann (2012) <[doi:10.1093/bioinformatics/btr597](https://doi.org/10.1093/bioinformatics/btr597)> for more on 'missForest', and Mayer (2022) <<https://github.com/mayer79/missRanger>> for more on 'missRanger'.
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check_feature_na	<i>Find features with (specified amount of) missingness</i>
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Description

Find features with (specified amount of) missingness

Usage

check_feature_na(data, threshold)

Arguments

- data A data frame or tibble.
- threshold Missingness threshold in a given column/feature as a proportion bounded between 0 and 1. Default set to sensitive level at 1e-04.

Value

A vector of column/feature names that contain missingness greater than threshold.

Examples

```
## Not run:  
check_feature_na(data = any_data_frame, threshold = 1e-04)  
  
## End(Not run)
```

check_row_na	<i>Find number of and which rows contain any missingness</i>
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Description

Find number of and which rows contain any missingness

Usage

check_row_na(data, which)

Arguments

data	A data frame or tibble.
which	Logical. Should a list be returned with the row numbers corresponding to each row with missingness? Default set to FALSE.

Value

Either an integer value corresponding to the number of rows in data with any missingness (if which = FALSE), or a tibble containing: 1) number of rows in data with any missingness, and 2) a list of which rows/row numbers contain missingness (if which = TRUE).

Examples

```
## Not run:
check_row_na(data = any_data_frame, which = FALSE)

## End(Not run)
```

feature_cor	<i>High dimensional imputation via batch processed chained random forests Build correlation matrix</i>
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Description

High dimensional imputation via batch processed chained random forests Build correlation matrix

Usage

```
feature_cor(data, return_cor)
```

Arguments

data	A data frame or tibble.
return_cor	Logical. Should the correlation matrix be printed? Default set to FALSE.

Value

A cross-feature correlation matrix

References

Waggoner, P. D. (2023). A batch process for high dimensional imputation. Computational Statistics, 1-22. doi: <10.1007/s00180-023-01325-9>

van Buuren S, Groothuis-Oudshoorn K (2011). "mice: Multivariate Imputation by Chained Equations in R." Journal of Statistical Software, 45(3), 1-67. doi: <10.18637/jss.v045.i03>

Examples

```
## Not run:
feature_cor(data = data, return_cor = FALSE)

## End(Not run)
```

flatten_mat	<i>Flatten and arrange cor matrix to be df</i>
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Description

Flatten and arrange cor matrix to be df

Usage

```
flatten_mat(cor_mat, return_mat)
```

Arguments

cor_mat	A correlation matrix output from running feature_cor()
return_mat	Logical. Should the flattened matrix be printed? Default set to FALSE.

Value

A vector of correlation-based ranked features

Examples

```
## Not run:
flatten_mat(cor_mat = cor_mat, return_mat = FALSE)

## End(Not run)
```

hdImpute	<i>Complete hdImpute process: correlation matrix, flatten, rank, create batches, impute, join</i>
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Description

Complete hdImpute process: correlation matrix, flatten, rank, create batches, impute, join

Usage

```
hdImpute(data, batch, pmm_k, n_trees, seed, save)
```

Arguments

data	Original data frame or tibble (with missing values)
batch	Numeric. Batch size.
pmm_k	Integer. Number of neighbors considered in imputation. Default set at 5.
n_trees	Integer. Number of trees used in imputation. Default set at 15.
seed	Integer. Seed to be set for reproducibility.
save	Should the list of individual imputed batches be saved as .rds file to working directory? Default set to FALSE.

Details

Step 1. group data by dividing the row_number() by batch size (batch, number of batches set by user) using integer division. Step 2. pass through group_split() to return a list. Step 3. impute each batch individually and time. Step 4. generate completed (unlisted/joined) imputed data frame

Value

A completed, imputed data set

References

Waggoner, P. D. (2023). A batch process for high dimensional imputation. Computational Statistics, 1-22. doi: <10.1007/s00180-023-01325-9>

Stekhoven, D. J., & Bühlmann, P. (2012). MissForest—non-parametric missing value imputation for mixed-type data. Bioinformatics, 28(1), 112-118. doi: <10.1093/bioinformatics/btr597>

Examples

```
## Not run:
impute_batches(data = data,
batch = 2, pmm_k = 5, n_trees = 15,
seed = 123, save = FALSE)

## End(Not run)
```

impute_batches	<i>Impute batches and return completed data frame</i>
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Description

Impute batches and return completed data frame

Usage

```
impute_batches(data, features, batch, pmm_k, n_trees, seed, save)
```

Arguments

data	Original data frame or tibble (with missing values)
features	Correlation-based vector of ranked features output from running <code>flatten_mat()</code>
batch	Numeric. Batch size.
pmm_k	Integer. Number of neighbors considered in imputation. Default at 5.
n_trees	Integer. Number of trees used in imputation. Default at 15.
seed	Integer. Seed to be set for reproducibility.
save	Should the list of individual imputed batches be saved as .rds file to working directory? Default set to FALSE.

Details

Step 1. group data by dividing the `row_number()` by batch size (batch, number of batches set by user) using integer division. Step 2. pass through `group_split()` to return a list. Step 3. impute each batch individually and time. Step 4. generate completed (unlisted/joined) imputed data frame

Value

A completed, imputed data set

References

Waggoner, P. D. (2023). A batch process for high dimensional imputation. Computational Statistics, 1-22. doi: <10.1007/s00180-023-01325-9>

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Examples

```
## Not run:
impute_batches(data = data, features = flat_mat,
batch = 2, pmm_k = 5, n_trees = 15, seed = 123,
save = FALSE)

## End(Not run)
```

mad

Compute variable-wise mean absolute differences (MAD) between original and imputed dataframes.

Description

Compute variable-wise mean absolute differences (MAD) between original and imputed dataframes.

Usage

```
mad(original, imputed, round)
```

Arguments

<code>original</code>	A data frame or tibble with original values.
<code>imputed</code>	A data frame or tibble that has been imputed/completed.
<code>round</code>	Integer. Number of places to round MAD scores. Default set to 3.

Value

‘mad_scores’ as ‘p’ x 2 tibble. One row for each variable in `original`, from 1 to ‘p’. Two columns: first is variable names (‘var’) and second is associated MAD score (‘mad’) as percentages for each variable.

Examples

```
## Not run:  
mad(original = original_data, imputed = imputed_data, round = 3)  
  
## End(Not run)
```

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