

Package ‘tidyHeatmap’

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Type Package

Title A Tidy Implementation of Heatmap

Version 1.1.4

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Description This is a tidy implementation for heatmap. At the moment it is based on the (great) package 'ComplexHeatmap'. The goal of this package is to interface a tidy data frame with this powerful tool. Some of the advantages are: Row and/or columns colour annotations are easy to integrate just specifying one parameter (column names). Custom grouping of rows is easy to specify providing a grouped tbl. For example: `df %>% group_by(...)`. Labels size adjusted by row and column total number. Default use of Brewer and Viridis palettes.

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URL <https://www.r-project.org>,
<https://github.com/stemangiola/tidyHeatmap>

BugReports <https://github.com/stemangiola/tidyHeatmap>

Depends R (>= 3.6)

Imports methods,
stats,
utils,
dplyr (>= 0.8.5),
magrittr (>= 1.5),
tidyr (>= 1.0.3),
rlang (>= 0.4.5),
purrr (>= 0.3.3),
ComplexHeatmap (>= 2.2.0),
viridis (>= 0.5.1),
circlize (>= 0.4.8),
RColorBrewer (>= 1.1),
grid,
grDevices,
lifecycle (>= 0.2.0)

Suggests spelling,
testthat,
vdiff,

BiocManager,
 knitr,
 rmarkdown,
 qpdf,
 covr,
 roxygen2
VignetteBuilder knitr
RdMacros lifecycle
Biarch true
biocViews AssayDomain, Infrastructure
Encoding UTF-8
LazyData true
RoxygenNote 7.1.1
Language en-US

R topics documented:

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add_attr	<i>Add attribute to object</i>
----------	--------------------------------

Description

Add attribute to object

Usage

```
add_attr(var, attribute, name)
```

Arguments

var	A tibble
attribute	An object
name	A character name of the attribute

Value

A tibble with an additional attribute

add_bar	<i>Adds a bar annotation layer to a 'InputHeatmap', that on evaluation creates a 'ComplexHeatmap'</i>
---------	---

Description

add_bar() from a 'InputHeatmap' object, adds a bar annotation layer.

Usage

```
add_bar(.data, .column, palette = NULL)
```

Arguments

.data	A 'tbl_df' formatted as <ELEMENT> <FEATURE> <VALUE> <...>
.column	Vector of quotes
palette	A character vector of colors This is the list of palettes that will be used for horizontal and vertical discrete annotations. The discrete classification of annotations depends on the column type of your input tibble (e.g., character and factor).

Details

Maturing

It uses 'ComplexHeatmap' as visualisation tool.

Value

A ‘InputHeatmap’ object that gets evaluated to a ‘ComplexHeatmap’

Examples

```
library(dplyr)

hm =
  tidyHeatmap::N52 %>%
  tidyHeatmap::heatmap(
    .row = symbol_ct,
    .column = UBR,
    .value = `read count normalised log`
  )

hm %>% add_bar()
```

add_bar, InputHeatmap-method
add_bar

Description

add_bar

Usage

```
## S4 method for signature 'InputHeatmap'
add_bar(.data, .column, palette = NULL)
```

Arguments

.data	A ‘tbl_df’ formatted as <ELEMENT> <FEATURE> <VALUE> <...>
.column	Vector of quotes
palette	A character vector of colors This is the list of palettes that will be used for horizontal and vertical discrete annotations. The discrete classification of annotations depends on the column type of your input tibble (e.g., character and factor).

Value

A ‘add_bar’ object

add_class	<i>Add class to object</i>
-----------	----------------------------

Description

Add class to object

Usage

```
add_class(var, name)
```

Arguments

var	A tibble
name	A character name of the attribute

Value

A tibble with an additional attribute

add_line	<i>Adds a line annotation layer to a 'InputHeatmap', that on evaluation creates a 'ComplexHeatmap'</i>
----------	--

Description

add_line() from a 'InputHeatmap' object, adds a line annotation layer.

Usage

```
add_line(.data, .column, palette = NULL)
```

Arguments

.data	A 'tbl_df' formatted as <ELEMENT> <FEATURE> <VALUE> <...>
.column	Vector of quotes
palette	A character vector of colors This is the list of palettes that will be used for horizontal and vertical discrete annotations. The discrete classification of annotations depends on the column type of your input tibble (e.g., character and factor).

Details**Maturing**

It uses 'ComplexHeatmap' as visualisation tool.

Value

A 'InputHeatmap' object that gets evaluated to a 'ComplexHeatmap'

Examples

```
library(dplyr)

hm =
  tidyHeatmap::N52 %>%
  tidyHeatmap::heatmap(
    .row = symbol_ct,
    .column = UBR,
    .value = `read count normalised log`
  )

hm %>% add_line()
```

```
add_line, InputHeatmap-method
      add_line
```

Description

add_line

Usage

```
## S4 method for signature 'InputHeatmap'
add_line(.data, .column, palette = NULL)
```

Arguments

.data	A 'tbl_df' formatted as <ELEMENT> <FEATURE> <VALUE> <...>
.column	Vector of quotes
palette	A character vector of colors This is the list of palettes that will be used for horizontal and vertical discrete annotations. The discrete classification of annotations depends on the column type of your input tibble (e.g., character and factor).

Value

A 'add_line' object

add_point	<i>Adds a point annotation layer to a 'InputHeatmap', that on evaluation creates a 'ComplexHeatmap'</i>
-----------	---

Description

add_point() from a 'InputHeatmap' object, adds a point annotation layer.

Usage

```
add_point(.data, .column, palette = NULL)
```

```
## S4 method for signature 'InputHeatmap'
add_point(.data, .column, palette = NULL)
```

Arguments

.data	A 'tbl_df' formatted as <ELEMENT> <FEATURE> <VALUE> <...>
.column	Vector of quotes
palette	A character vector of colors This is the list of palettes that will be used for horizontal and vertical discrete annotations. The discrete classification of annotations depends on the column type of your input tibble (e.g., character and factor).

Details

Maturing

It uses 'ComplexHeatmap' as visualisation tool.

Value

A 'InputHeatmap' object that gets evaluated to a 'ComplexHeatmap'
 A 'add_point' object

Examples

```
library(dplyr)

hm =
  tidyHeatmap::N52 %>%
  tidyHeatmap::heatmap(
    .row = symbol_ct,
    .column = UBR,
    .value = `read count normalised log`
  )

hm %>% add_point()
```

add_tile	<i>Adds a tile annotation layer to a 'InputHeatmap', that on evaluation creates a 'ComplexHeatmap'</i>
----------	--

Description

add_tile() from a 'InputHeatmap' object, adds a tile annotation layer.

Usage

```
add_tile(.data, .column, palette = NULL)
```

```
## S4 method for signature 'InputHeatmap'
add_tile(.data, .column, palette = NULL)
```

Arguments

.data	A 'tbl_df' formatted as <ELEMENT> <FEATURE> <VALUE> <...>
.column	Vector of quotes
palette	A character vector of colors This is the list of palettes that will be used for horizontal and vertical discrete annotations. The discrete classification of annotations depends on the column type of your input tibble (e.g., character and factor).

Details

Maturing

It uses 'ComplexHeatmap' as visualisation tool.

Value

A 'InputHeatmap' object that gets evaluated to a 'ComplexHeatmap'
 A 'add_tile' object

Examples

```
library(dplyr)

hm =
  tidyHeatmap::N52 %>%
  tidyHeatmap::heatmap(
    .row = symbol_ct,
    .column = UBR,
    .value = `read count normalised log`
  )

hm %>% add_tile(CAPRA_TOTAL)
```

annot_to_list	<i>annot_to_list</i>
---------------	----------------------

Description

annot_to_list

Usage

```
annot_to_list(.data)
```

Arguments

.data	A data frame
-------	--------------

Value

A list

as_matrix	<i>Get matrix from tibble</i>
-----------	-------------------------------

Description

Get matrix from tibble

Usage

```
as_matrix(tbl, rownames = NULL, do_check = TRUE)
```

Arguments

tbl	A tibble
rownames	A character string of the rownames
do_check	A boolean

Value

A matrix

check_if_counts_is_na *Check whether there are NA counts*

Description

Check whether there are NA counts

Usage

```
check_if_counts_is_na(.data, .abundance)
```

Arguments

.data	A tibble of read counts
.abundance	A character name of the read count column

Value

A tbl

check_if_duplicated_genes
Check whether there are duplicated genes/transcripts

Description

Check whether there are duplicated genes/transcripts

Usage

```
check_if_duplicated_genes(.data, .sample, .transcript, .abundance)
```

Arguments

.data	A tibble of read counts
.sample	A character name of the sample column
.transcript	A character name of the transcript/gene column
.abundance	A character name of the read count column

Value

A tbl

check_if_wrong_input	<i>Check whether there are NA counts</i>
----------------------	--

Description

Check whether there are NA counts

Usage

```
check_if_wrong_input(.data, list_input, expected_type)
```

Arguments

.data	A tibble of read counts
list_input	A list
expected_type	A character string

Value

A tbl

drop_class	<i>Remove class to abject</i>
------------	-------------------------------

Description

Remove class to abject

Usage

```
drop_class(var, name)
```

Arguments

var	A tibble
name	A character name of the class

Value

A tibble with an additional attribute

`error_if_log_transformed`*Check whether a numeric vector has been log transformed*

Description

Check whether a numeric vector has been log transformed

Usage

```
error_if_log_transformed(x, .abundance)
```

Arguments

<code>x</code>	A numeric vector
<code>.abundance</code>	A character name of the transcript/gene abundance column

Value

NA

`get_abundance_norm_if_exists`*Get column names either from user or from attributes*

Description

Get column names either from user or from attributes

Usage

```
get_abundance_norm_if_exists(.data, .abundance)
```

Arguments

<code>.data</code>	A tibble
<code>.abundance</code>	A character name of the abundance column

Value

A list of column enquo or error

get_elements	<i>Get column names either from user or from attributes</i>
--------------	---

Description

Get column names either from user or from attributes

Usage

```
get_elements(.data, .element, of_samples = TRUE)
```

Arguments

.data	A tibble
.element	A character name of the sample column
of_samples	A boolean

Value

A list of column enquo or error

get_elements_features	<i>Get column names either from user or from attributes</i>
-----------------------	---

Description

Get column names either from user or from attributes

Usage

```
get_elements_features(.data, .element, .feature, of_samples = TRUE)
```

Arguments

.data	A tibble
.element	A character name of the sample column
.feature	A character name of the transcript/gene column
of_samples	A boolean

Value

A list of column enquo or error

`get_elements_features_abundance`*Get column names either from user or from attributes*

Description

Get column names either from user or from attributes

Usage

```
get_elements_features_abundance(  
  .data,  
  .element,  
  .feature,  
  .abundance,  
  of_samples = TRUE  
)
```

Arguments

<code>.data</code>	A tibble
<code>.element</code>	A character name of the sample column
<code>.feature</code>	A character name of the transcript/gene column
<code>.abundance</code>	A character name of the read count column
<code>of_samples</code>	A boolean

Value

A list of column enquo or error

`get_sample_counts`*Get column names either from user or from attributes*

Description

Get column names either from user or from attributes

Usage

```
get_sample_counts(.data, .sample, .abundance)
```

Arguments

<code>.data</code>	A tibble
<code>.sample</code>	A character name of the sample column
<code>.abundance</code>	A character name of the read count column

Value

A list of column enquo or error

get_sample_transcript *Get column names either from user or from attributes*

Description

Get column names either from user or from attributes

Usage

```
get_sample_transcript(.data, .sample, .transcript)
```

Arguments

.data	A tibble
.sample	A character name of the sample column
.transcript	A character name of the transcript/gene column

Value

A list of column enquo or error

get_sample_transcript_counts
Get column names either from user or from attributes

Description

Get column names either from user or from attributes

Usage

```
get_sample_transcript_counts(.data, .sample, .transcript, .abundance)
```

Arguments

.data	A tibble
.sample	A character name of the sample column
.transcript	A character name of the transcript/gene column
.abundance	A character name of the read count column

Value

A list of column enquo or error

```
get_x_y_annotation_columns
      get_x_y_annotation_columns
```

Description

get_x_y_annotation_columns

Usage

```
get_x_y_annotation_columns(.data, .column, .row, .abundance)
```

Arguments

.data	A 'tbl' formatted as <SAMPLE> <TRANSCRIPT> <COUNT> <...>
.column	The name of the column horizontally presented in the heatmap
.row	The name of the column vertically presented in the heatmap
.abundance	The name of the transcript/gene abundance column

Value

A list

heatmap	<i>Creates a 'InputHeatmap' object from 'tbl_df' on evaluation creates a 'ComplexHeatmap'</i>
---------	---

Description

heatmap() takes a tbl object and easily produces a ComplexHeatmap plot, with integration with tibble and dplyr frameworks.

Usage

```
heatmap(
  .data,
  .row,
  .column,
  .value,
  transform = NULL,
  .scale = "row",
  palette_value = c("#440154FF", "#21908CFF", "#fefada"),
  palette_grouping = list(),
  annotation = NULL,
  type = rep("tile", length(quo_names(annotation))),
  palette_discrete = list(),
  palette_continuous = list(),
  .abundance = NULL,
  .horizontal = NULL,
```

```

        .vertical = NULL,
        log_transform = NULL,
        palette_abundance = NULL,
        ...
    )

heatmap_(
    .data,
    .row,
    .column,
    .value,
    transform = NULL,
    .scale = "row",
    palette_value = c("#440154FF", "#21908CFF", "#fefada"),
    palette_grouping = list(),
    annotation = NULL,
    type = rep("tile", length(quo_names(annotation))),
    palette_discrete = list(),
    palette_continuous = list(),
    .abundance = NULL,
    .horizontal = NULL,
    .vertical = NULL,
    log_transform = NULL,
    palette_abundance = NULL,
    ...
)

## S4 method for signature 'tbl'
heatmap(
    .data,
    .row,
    .column,
    .value,
    transform = NULL,
    .scale = "row",
    palette_value = c("#440154FF", "#21908CFF", "#fefada"),
    palette_grouping = list(),
    annotation = NULL,
    type = rep("tile", length(quo_names(annotation))),
    palette_discrete = list(),
    palette_continuous = list(),
    .abundance = NULL,
    .horizontal = NULL,
    .vertical = NULL,
    log_transform = NULL,
    palette_abundance = NULL,
    ...
)

## S4 method for signature 'tbl_df'
heatmap(
    .data,

```

```

    .row,
    .column,
    .value,
    transform = NULL,
    .scale = "row",
    palette_value = c("#440154FF", "#21908CFF", "#fefada"),
    palette_grouping = list(),
    annotation = NULL,
    type = rep("tile", length(quo_names(annotation))),
    palette_discrete = list(),
    palette_continuous = list(),
    .abundance = NULL,
    .horizontal = NULL,
    .vertical = NULL,
    log_transform = NULL,
    palette_abundance = NULL,
    ...
  )

## S4 method for signature 'tidybulk'
heatmap(
  .data,
  .row,
  .column,
  .value,
  transform = NULL,
  .scale = "row",
  palette_value = c("#440154FF", "#21908CFF", "#fefada"),
  palette_grouping = list(),
  annotation = NULL,
  type = rep("tile", length(quo_names(annotation))),
  palette_discrete = list(),
  palette_continuous = list(),
  .abundance = NULL,
  .horizontal = NULL,
  .vertical = NULL,
  log_transform = NULL,
  palette_abundance = NULL,
  ...
)

```

Arguments

<code>.data</code>	A 'tbl_df' formatted as <ELEMENT> <FEATURE> <VALUE> <...>
<code>.row</code>	The name of the column vertically presented in the heatmap
<code>.column</code>	The name of the column horizontally presented in the heatmap
<code>.value</code>	The name of the column for the value of the element/feature pair
<code>transform</code>	A function, used to transform <code>.value</code> row-wise (e.g., <code>transform = log1p</code>)
<code>.scale</code>	A character string. Possible values are <code>c("none", "row", "column", "both")</code>
<code>palette_value</code>	A character vector This is the palette that will be used as gradient for <code>.value</code> . For higher flexibility you can use <code>circize::colorRamp2(c(-2, -1, 0, 1, 2), viridis::magma(5))</code>

palette_grouping	A list of character vectors. This is the list of palettes that will be used for grouping
annotation	DEPRECATED. please use the annotation functions add_* function \(* one of tile, point, bar, line \).
type	DEPRECATED. please use the annotation functions add_* function \(* one of tile, point, bar, line \).
palette_discrete	DEPRECATED. please use the annotation functions add_* function \(* one of tile, point, bar, line \).
palette_continuous	DEPRECATED. please use the annotation functions add_* function \(* one of tile, point, bar, line \).
.abundance	DEPRECATED. Please use .value instead
.horizontal	DEPRECATED. Please use .column instead
.vertical	DEPRECATED. Please use .row instead
log_transform	DEPRECATED. Please use transform instead
palette_abundance	DEPRECATED. Please use palette_value instead
...	Further arguments to be passed to ComplexHeatmap::Heatmap

Details

Maturing

This function takes a `tbl` as an input and creates a ‘ComplexHeatmap’ plot. The information is stored in a ‘InputHeatmap’ object that is updated along the pipe statement, for example adding annotation layers.

Value

A ‘InputHeatmap’ objects that gets evaluated to a ‘ComplexHeatmap’ object

A ‘InputHeatmap’ object

A ‘InputHeatmap’ object

A ‘InputHeatmap’ object

A ‘InputHeatmap’ object

Examples

```
library(dplyr)

tidyHeatmap::N52 %>%
  group_by( `Cell type` ) %>%
  tidyHeatmap::heatmap(
    .row = symbol_ct,
    .column = UBR,
    .value = `read count normalised log`,
  )
```

ifelse2_pipe	<i>This is a generalisation of ifelse that accepts an object and return an objects</i>
--------------	--

Description

This is a generalisation of ifelse that accepts an object and return an objects

Usage

```
ifelse2_pipe(.x, .p1, .p2, .f1, .f2, .f3 = NULL)
```

Arguments

.x	A tibble
.p1	A boolean
.p2	ELSE IF condition
.f1	A function
.f2	A function
.f3	A function

Value

A tibble

ifelse_pipe	<i>This is a generalisation of ifelse that accepts an object and return an objects</i>
-------------	--

Description

This is a generalisation of ifelse that accepts an object and return an objects

Usage

```
ifelse_pipe(.x, .p, .f1, .f2 = NULL)
```

Arguments

.x	A tibble
.p	A boolean
.f1	A function
.f2	A function

Value

A tibble

input_heatmap	<i>input_heatmap</i>
---------------	----------------------

Description

input_heatmap() takes a tbl object and easily produces a ComplexHeatmap plot, with integration with tibble and dplyr frameworks.

Usage

```
input_heatmap(
  .data,
  .horizontal,
  .vertical,
  .abundance,
  transform = NULL,
  .scale = "row",
  palette_abundance = c("#440154FF", "#21908CFF", "#fefada"),
  palette_grouping = list(),
  ...
)
```

Arguments

.data	A 'tbl' formatted as <SAMPLE> <TRANSCRIPT> <COUNT> <...>
.horizontal	The name of the column horizontally presented in the heatmap
.vertical	The name of the column vertically presented in the heatmap
.abundance	The name of the transcript/gene abundance column
transform	A function, used to transform .value, for example log1p
.scale	A character string. Possible values are c("\none\","row\","column\","both\")
palette_abundance	A character vector, or a function for higher customisation (colorRamp2). This is the palette that will be used as gradient for abundance. If palette_abundance is a vector of hexadecimal colours, it should have 3 values. If you want more customisation, you can pass to palette_abundance a function, that is derived as for example 'colorRamp2(c(-2, 0, 2), palette_abundance)'
palette_grouping	A list of character vectors. This is the list of palettes that will be used for grouping
...	Further arguments to be passed to ComplexHeatmap::Heatmap

Details

To be added.

Value

A 'ComplexHeatmap' object

N52	<i>Example data set N52</i>
-----	-----------------------------

Description

Example data set N52

Usage

N52

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 520 rows and 15 columns.

<code>parse_formula</code>	<i>.formula parser</i>
----------------------------	------------------------

Description

.formula parser

Usage

`parse_formula(fm)`

Arguments

`fm` a formula

Value

A character vector

<code>pasilla</code>	<i>Example data set Pasilla</i>
----------------------	---------------------------------

Description

Example data set Pasilla

Usage

`pasilla`

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 504 rows and 8 columns.

prepend	<i>From rlang deprecated</i>
---------	------------------------------

Description

From rlang deprecated

Usage

```
prepend(x, values, before = 1)
```

Arguments

x	An array
values	An array
before	A boolean

Value

An array

quo_names	<i>Convert array of quosure (e.g. c(col_a, col_b)) into character vector</i>
-----------	--

Description

Convert array of quosure (e.g. c(col_a, col_b)) into character vector

Usage

```
quo_names(v)
```

Arguments

v	A array of quosures (e.g. c(col_a, col_b))
---	--

Value

A character vector

save_pdf

*Save plot on PDF file***Description**

save_pdf() takes as input a Heatmap from ComplexHeatmap and save it to PDF file

Usage

```
save_pdf(
  .heatmap,
  filename,
  width = NULL,
  height = NULL,
  units = c("in", "cm", "mm")
)
```

Arguments

.heatmap	A 'Heatmap'
filename	A character string. The name of the output file/path
width	A 'double'. Plot width
height	A 'double'. Plot height
units	A character string. units ("in", "cm", or "mm")

Details**Maturing**

It simply save an 'Heatmap' to a PDF file use pdf() function in the back end

Value

NA

Examples

```
library(dplyr)
tidyHeatmap::heatmap(
  dplyr::group_by(tidyHeatmap::pasilla, location, type),
  .column = sample,
  .row = symbol,
  .value = `count normalised adjusted`,
) %>%
  save_pdf(tempfile())
```

save_pdf, Heatmap-method
save_pdf

Description

save_pdf

Usage

```
## S4 method for signature 'Heatmap'
save_pdf(
  .heatmap,
  filename,
  width = NULL,
  height = NULL,
  units = c("in", "cm", "mm")
)
```

Arguments

.heatmap	A 'Heatmap'
filename	A character string. The name of the output file/path
width	A 'double'. Plot width
height	A 'double'. Plot height
units	A character string. units ("in", "cm", or "mm")

save_pdf, InputHeatmap-method
save_pdf

Description

save_pdf

Usage

```
## S4 method for signature 'InputHeatmap'
save_pdf(
  .heatmap,
  filename,
  width = NULL,
  height = NULL,
  units = c("in", "cm", "mm")
)
```

Arguments

.heatmap	A 'Heatmap'
filename	A character string. The name of the output file/path
width	A 'double'. Plot width
height	A 'double'. Plot height
units	A character string. units ("in", "cm", or "mm")

scale_design	<i>Scale design matrix</i>
--------------	----------------------------

Description

Scale design matrix

Usage

```
scale_design(df, .formula)
```

Arguments

df	A tibble
.formula	a formula

Value

A tibble

scale_robust	<i>Scale counts in a robust way against sd == 0</i>
--------------	---

Description

Scale counts in a robust way against sd == 0

Usage

```
scale_robust(y)
```

Arguments

y	A numerical array
---	-------------------

Value

A scaled and centred numerical array

`select_closest_pairs` *Sub function of remove_redundancy_elements_though_reduced_dimensions*

Description

Sub function of `remove_redundancy_elements_though_reduced_dimensions`

Usage

```
select_closest_pairs(df)
```

Arguments

`df` A tibble

Value

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