Package: ggplate (via r-universe)

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Title Create Layout Plots of Biological Culture Plates and Microplates

Version 0.4.0

Description Enables users to create simple plots of biological culture plates as well as microplates. Both continuous and discrete values can be plotted onto the plate layout.

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`border_colours` *Colour scheme for well borders*

Description

A colour scheme for the borders of wells that contains 4 colours. The colours are meant to mark the status of a well (Fail, Check, OK and Not tested). They do not appear in the `protti_colours` and `viridis_colours` schemes, which ensures that borders are visible on every fill colour.

Usage

```
border_colours
```

Format

A vector containing 4 colours

data_continuous_12 *Continuous 12-well plate dataset*

Description

A dataset containing 12 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 12-well plate. The `Status` column marks wells with a low signal.

Usage

```
data_continuous_12
```

Format

A data frame with a `Value`, a `well` and a `Status` column.

Source

Randomly generated.

data_continuous_1536 *Continuous 1536-well plate dataset (A-AF)*

Description

A dataset containing 1536 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 1536-well plate. The row format uses the A-AF labeling. The `Status` column marks the wells at the edge of the plate, which are prone to evaporation.

Usage

```
data_continuous_1536
```

Format

A data frame with a `well`, a `Value` and a `Status` column.

Source

Randomly generated.

data_continuous_1536_Aa

Continuous 1536-well plate dataset (Aa-Hd)

Description

A dataset containing 1536 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 1536-well plate. The row format uses the Ab-Hd labeling. The `Status` column marks the four columns of the plate that were not used.

Usage

```
data_continuous_1536_Aa
```

Format

A data frame with a `well`, a `Value` and a `Status` column.

Source

Randomly generated.

data_continuous_24

Continuous 24-well plate dataset

Description

A dataset containing 24 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 24-well plate. The `Status` column marks wells with a low signal.

Usage

```
data_continuous_24
```

Format

A data frame with a `Value`, a `well` and a `Status` column.

Source

Randomly generated.

data_continuous_384 *Continuous 384-well plate dataset*

Description

A dataset containing 384 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 384-well plate. The `Status` column marks the wells at the edge of the plate, which are prone to evaporation.

Usage

```
data_continuous_384
```

Format

A data frame with a `Value`, a `well` and a `Status` column.

Source

Randomly generated.

data_continuous_48 *Continuous 48-well plate dataset*

Description

A dataset containing 48 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 48-well plate. The `Status` column marks wells with a low or a high signal.

Usage

```
data_continuous_48
```

Format

A data frame with a `Value`, a `well` and a `Status` column.

Source

Randomly generated.

data_continuous_48_incomplete *Continuous incomplete 48-well plate dataset*

Description

A dataset containing 23 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 48-well plate. Therefore, not every well in the plate contains a value. The position 1D and the second half of the plate are `NA`. The `Status` column marks the wells that were not tested. These wells are only shown if the `remove_na` argument of `plate_plot()` is set to `FALSE`.

Usage

```
data_continuous_48_incomplete
```

Format

A data frame with a `Value`, a `well` and a `Status` column.

Source

Randomly generated.

data_continuous_6 *Continuous 6-well plate dataset*

Description

A dataset containing 6 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 6-well plate. The `Status` column marks the well with a very low signal.

Usage

```
data_continuous_6
```

Format

A data frame with a `Value`, a `well` and a `Status` column.

Source

Randomly generated.

data_continuous_96 *Continuous 96-well plate dataset*

Description

A dataset containing 96 positive numeric values randomly generated using a normal distribution (`rnorm()`). Each value is assigned to a position in a 96-well plate. The `Status` column marks wells with a low signal.

Usage

```
data_continuous_96
```

Format

A data frame with a `Value`, a `well` and a `Status` column.

Source

Randomly generated.

data_discrete_24 *Discrete 24-well plate dataset*

Description

A dataset containing 12 conditions for an siRNA treatment in a 24-well plate. The siRNA treatment consists of a control (siControl) and 11 siRNAs targeting mRNAs of proteins in the mTORC1 pathway. Each treatment is assigned to a position in a 24-well plate. The `Status` column marks the knockdowns that did not work as expected.

Usage

```
data_discrete_24
```

Format

A data frame with a `Condition`, a `well` and a `Status` column.

Source

Theoretically possible siRNA treatment for cells.

data_discrete_6 *Discrete 6-well plate dataset*

Description

A dataset containing 3 conditions for a drug treatment in a 6-well plate. The treatment consists of a DMSO negative control, Rapamycin and Taxol. Each treatment is assigned to a position in a 6-well plate. The `Control` column marks the wells that contain the vehicle control.

Usage

```
data_discrete_6
```

Format

A data frame with a `Condition`, a `well` and a `Control` column.

Source

Theoretically possible treatment for cells.

data_discrete_96 *Discrete 96-well plate dataset*

Description

A dataset containing 22 conditions for a hypothetical drug treatment in a 96-well plate. The first column contains the positive control while the last column contains the negative control. Each treatment is assigned to four wells in a 96-well plate. The `Replicate` column contains the number of the replicate of each compound. The two controls have eight replicates, every other compound has four.

Usage

```
data_discrete_96
```

Format

A data frame with a `Compound`, a `well`, a `Compound_multiline` and a `Replicate` column.

Source

Drugs were chosen from a standard FDA approved drug library.

plate_plot *Plate Layout Plot*

Description

Plots a culture plate or microplate in the desired format. Both continuous as well as discrete values can be displayed with colours and labels.

Usage

```
plate_plot(
  data,
  position,
  value,
  label,
  plate_size = 96,
  plate_type = "square",
  colour,
  remove_na = TRUE,
  na_fill = "grey50",
  limits,
  title,
  title_size,
  show_legend = TRUE,
  legend_n_row,
  label_size,
  silent = TRUE,
  scale,
  border,
  border_colour
)
```

Arguments

data	a data frame that contains at least a column with plate position information and a column with values or labels.
position	a character column in the data data frame that contains plate positions. These should be in the format: row = letter, column = number. So for example A1, D12 etc.
value	a character, factor or numeric column in the data data frame that contains values that should be plotted as colours on the plate layout. Can be the same column as label. If the column is a factor, the order of its levels determines the order of the legend and every level is assigned a colour, even if it is not present in the data.
label	a character or numeric column in the data data frame that contains values that should be plotted as labels on the plate layout. Can be the same column as value.

`plate_size` a numeric value that specifies the plate size (number of wells) used for the plot. Possible values are: 6, 12, 24, 48, 96, 384 and 1536.

`plate_type` a character value that specifies the well type. Possible values are "round" and "square". The default is "square".

`colour` optional, a character vector that contains colours used for the plot. If the `value` argument is discrete the colours are used as provided. If it is continuous a gradient is created using the colours.

`remove_na` a logical value specifying whether rows with missing values (`NA`) in the `value` column are removed from the input data. This will not remove any `NA` values created due to values outside of the `limits`. Default is `TRUE`.

`na_fill` optional, a character value specifying the fill colour used for wells with missing values (`NA`) and, for continuous data, for values outside the range defined by `limits`. The default is `"grey50"`.

`limits` optional, a numeric vector of length two providing new limits for a colour gradient. Use NA to refer to the existing minimum or maximum. If this argument is not supplied the existing minimum and maximum of the values provided to the `value` argument are used for the start and end point of the colour gradient.

`title` optional, a character value that contains the plot title.

`title_size` optional, a numeric value that determines the text size of the title. The size is also affected by the `scale` argument.

`show_legend` a logical value that specifies if the plot legend is shown. Default is `TRUE`.

`legend_n_row` optional, a numeric value that specifies the maximum total number of rows used by the legends. If a legend for the `border` argument is shown, both legends share these rows. The number of legend columns is increased until both legends fit into the rows. If no value is provided, 20 rows are used, which is the number of rows `ggplot2` fits into one legend column.

`label_size` optional, a numeric value that determines the text size of the well labels. The size is also affected by the `scale` argument.

`silent` a logical value that specifies if the function should report the size of the plotting area and the adjusted scale parameter. Default is `TRUE` meaning it will not return any message. The plot was optimized for a device size of: width = 5.572917 in and height = 3.177083 in, which was determined using the function `par("fin")`. This means if the device has these dimensions the scaling factor is 1.

`scale` a numeric value that scales point sizes and labels of the plot. If not provided, the plot uses the device size to find the optimal scaling factor for the output, however, this might be slightly off (e.g. due to number of labels) and can be manually adjusted with this argument.

`border` optional, a character, factor or numeric column in the `data` data frame that contains categories that should be plotted as colours of the well borders. This makes it possible to highlight individual wells. The categories are shown in a second legend below the legend of the `value` argument. Wells with a missing value (`NA`) keep the default black border and do not appear in the legend. If the column is a factor, the order of its levels determines the order of the legend.

`border_colour` optional, a character vector that contains colours used for the borders of the wells. The colours are used as provided. If this argument is not supplied the `border_colours` scheme is used, which contains four colours that are visible on every fill colour of the plot.

Value

A plate layout plot.

Examples

```
library(dplyr)
library(tidyr)
library(stringr)

# Load example data
data("data_continuous_96")
data("data_continuous_384")
data("data_discrete_6")
data("data_discrete_24")

# Create a 96-well plot with round wells
plate_plot(
  data = data_continuous_96,
  position = well,
  value = Value,
  label = Value,
  plate_size = 96,
  plate_type = "round"
)

# Create a 384-well plot with square wells
# Define a custom lower limit
# Define a custom colour scheme
# Define a custom title with a custom size
plate_plot(
  data = data_continuous_384,
  position = well,
  value = Value,
  label = Value,
  plate_size = 384,
  colour = c("#000004FF", "#51127CFF", "#B63679FF", "#FB8861FF", "#FCFDBFFF"),
  limits = c(0, NA),
  title = "Custom Title",
  title_size = 20
)

# Create a 24-well plot
# Show a 6 row legend
# Scale the plot to 1.2
plate_plot(
  data = data_discrete_24,
```

```
  position = well,
  value = Condition,
  plate_size = 24,
  plate_type = "round",
  scale = 1.2,
  legend_n_row = 6
)

# Create a 6-well plot
# Define a custom colour scheme
# Adjust label_size to fit text
# Let the plot return width, height and scale
plate_plot(
  data = data_discrete_6,
  position = well,
  value = Condition,
  label = Condition,
  plate_size = 6,
  plate_type = "round",
  colour = c("#3a1c71", "#d76d77", "#ffaf7b"),
  label_size = 4,
  show_legend = FALSE,
  silent = FALSE
)

# Create a 24-well plot
# Highlight the borders of wells that did not pass the quality control
plate_plot(
  data = data_discrete_24,
  position = well,
  value = Condition,
  border = Status,
  plate_size = 24,
  plate_type = "round"
)

# Create a 1536-well plot with square wells
# Aa-Hd row labels
plate_plot(
  data = data_continuous_1536_Aa,
  position = well,
  value = Value,
  plate_size = 1536,
)
```

`protti_colours` *Colour scheme for protti*

Description

A colour scheme from the `protti` package that contains 100 colours.

Usage

```
protti_colours
```

Format

A vector containing 100 colours

Source

protti R package.

`viridis_colours` *Viridis colour scheme*

Description

A colour scheme by the viridis colour scheme from the `viridis` R package.

Usage

```
viridis_colours
```

Format

A vector containing 256 colours

Source

viridis R package

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