Package ‘scifigure’

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Title Visualize 'Reproducibility' and 'Replicability' in a Comparison of Scientific Studies

Version 0.2

Description Users may specify what fundamental qualities of a new study have or have not changed in an attempt to reproduce or replicate an original study. A comparison of the differences is visualized. Visualization approach follows 'Patil', 'Peng', and 'Leek' (2016) <doi:10.1101/066803>.

Depends R (>= 3.0)

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Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

Imports grid

Suggests knitr, rmarkdown, covr, testthat, png

VignetteBuilder knitr

NeedsCompilation no

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Contents

`icons` *scifigure icons*

Description

A dataset containing icon images used to render all figures in the scifigure package.

Usage

```
icons
```

Format

A list of length 44, with each item a 75x75x4 bitmap

`icons_diff` *repfigure icons_diff*

Description

A dataset containing icon images showing difference rather than entity used to render all difference figures in the scifigure package.

Usage

```
icons_diff
```

Format

A list of length 44, with each item a 75x75x4 bitmap

`init_experiments` *Initialize a skeleton data frame to create a figure with* `sci_figure`

Description

`init_experiments` generates a dataframe with the proper row and column headers for user manipulation before calling `sci_figure`

Usage

```
init_experiments(nexp = 3, exp_names = paste0("Exp", 1:nexp),
  stage_names = c("population", "question", "hypothesis",
  "experimental_design", "experimenter", "data", "analysis_plan",
  "analyst", "code", "estimate", "claim"))
```

Arguments

`nexp`	The number of scientific experiments to be represented in the data frame, i.e. number of columns.
`exp_names`	The names of each experiment, i.e. column names. Default: "Exp1, Exp2, ..."
`stage_names`	The names of each step in the process, i.e. row names. Defaults match Patil et. al.

See Also

`sci_figure`

Examples

```
# Generate the default data frame of three experiments
init_experiments()

init_experiments(nexp = 5,
exp_names = c("Run_16_01", "Run_16_04", "Run_16_07",
"Run_16_09", "Run_16_12"))
testthat::expect_error({
init_experiments(nexp = 2, exp_names = names)
})
```

`replicate_figure` *Create a figure depicting replicability*

Description

`replicate_figure` is a wrapper around the `sci_figure` function to illustrate replicability in a two-experiment setting. Options for `sci_figure` are accepted, but this may be run as is.

Usage

```
replicate_figure(...)
```

Arguments

`...`	Additional arguments passed to `sci_figure`.

See Also

`sci_figure` for additional arguments.

`reproduce_figure` *Create a figure depicting reproducibility*

Description

`reproduce_figure` is a wrapper around the `sci_figure` function to illustrate reproducibility in a two-experiment setting. Options for `sci_figure` are accepted, but this may be run as is.

Usage

```
reproduce_figure(...)
```

Arguments

`...`	Additional arguments passed to `sci_figure`.

See Also

`sci_figure` for additional arguments.

`sci_figure` *Create a figure depicting reproducibility/replicability of a set of scientific experiments*

Description

`sci_figure` creates a graphical representation of changes in a a set of subsequent studies or reproduction attempts as compared to an original study.

Usage

```
sci_figure(experiments, custom_icons = NULL,
  stage_names = c("Population", "Question", "Hypothesis", "Exp. Design",
  "Experimenter", "Data", "Analysis Plan", "Analyst", "Code", "Estimate",
  "Claim"), hide_stages = NULL, diff = FALSE, showlegend = TRUE,
  cols = c("#D20000", "#007888", "#CDCDCD", "black"),
  leg_text = c("Incorrect", "Different", "Unobserved", "Original"))
```

Arguments

`experiments`	A data frame, which can be initialized with `init_experiments()`, whose rownames are the predefined stages of a scientifc experiments, columnnames are the names of each experiment, and cell values represent the state of each stage in each experiment (states described below).
`custom_icons`	(optional) A list of bitmap matrices of custom icon images of length matching `experiments` input. Bitmap icons must be 75 x 75 pixels. See vignette for detailed instructions and specifications. Default NULL, indicating that default icons will be used.
`stage_names`	Character vector of names of stages. Default names match Patil et. al. If set to NULL, all names will be suppressed. Use `hide_stages` (below) to suppress specific stage names.
`hide_stages`	(optional) A character vector with the names of the stages in the scientific experiment, i.e. rownames of `experiments`, which the user wishes to suppress from the figure output. The default value of `hide_stages` is NULL, indicating that all stages will be displayed.
`diff`	(optional) A Boolean flag to indicate whether the rendering of the figure should emphasize the differences between the experiments ("difference mode"). The difference mode uses a set of four symbols that are semantically close to the scenarios that they are encoding. The default value is `FALSE`.
`showlegend`	Do you want the legend to be shown?
`cols`	colors to use for the specific scenarios when diff = T or custom_icons used.
`leg_text`	text for legend keys corresponding to the specific colors.

Note

For the parameter `experiments`, the four values any cell may take are: `observed`, `different`, `unobserved`, `incorrect`.

See Also

`init_experiments`

Examples

```
# Initialize the default experiments data frame
exps <- init_experiments()
sci_figure(exps)
sci_figure(exps, hide_stages = c("population", "analyst"))

# Do some manual manipulation to the experiments

exps["analyst", "Exp2"] <- "different"
exps["code", c("Exp2", "Exp3")] <- "unobserved"
sci_figure(exps, showlegend = FALSE)

# Create the same figure using the difference mode

sci_figure(exps, diff=TRUE)
too_many = init_experiments(nexp = 30)

testthat::expect_warning({
sci_figure(too_many)
}, "showing the first")

exp2 = exps
exp2[,1] = "bad"
testthat::expect_error({
sci_figure(exp2)
}, "Invalid cell")
```

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