Package: scifigure (via r-universe)

August 30, 2024

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>.

URL https://github.com/prpatil/scifigure

BugReports https://github.com/prpatil/scifigure/issues

Depends R (>= 3.0)

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Imports grid, grDevices

Suggests knitr, rmarkdown, covr, testthat, png

VignetteBuilder knitr

Repository https://prpatil.r-universe.dev

RemoteUrl https://github.com/prpatil/scifigure

RemoteRef HEAD

RemoteSha de785ca6143287ce0dd204699f6a1b7ecbabba51

Contents

change_icon_color   *Change Icon Color*

Description

Change Icon Color

Usage

```
change_icon_color(icon, color)
```

Arguments

icon	icon, which is a 4D array
color	color to change, in text form, passed to [col2rgb](#)

Value

A 4D array of the icon

Examples

```
icon = scifigure::icons[[2]]
color = "blue"
original_color = "red"
icon2 = change_icon_color(icon, color)
```

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

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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

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

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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)
})
```

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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.

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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.

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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(incorect = "#D20000", different = "#007888", unobserved = "#CDCDCD",
    original = "black"),
  leg_text = c("Incorrect", "Different", "Unobserved", "Original"),
  fontsize = 16,
  fig.height = 0.08,
  fig.width = 0.05
)
```

Arguments

experiments	A data frame, which can be initialized with init_experiments(), whose rownames are the predefined stages of a scientifc experiments, column names 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.
fontsize	Size of the font. A calculation will change it but you can adjust this accordingly
fig.height	Height of the figures
fig.width	Width of the figures

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)
experiments = exps
experiments["analyst", "Exp2"] <- "different"
cols = c("#D20000", "yellow", "#CDCDCD", "black")
sci_figure(experiments, cols = cols)
sci_figure(experiments, cols = cols, diff = TRUE)
sci_figure(experiments, cols = cols, diff = TRUE,
hide_stages = "population")
sci_figure(experiments,
cols = c("yellow", "#CDCDCD", "black"),
leg_text = c("Different", "Unobserved", "Original"),
diff = TRUE)
hide_stages = NULL
diff = FALSE

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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