

Package ‘coveffectsplot’

January 12, 2022

Title Produce Forest Plots to Visualize Covariate Effects

Version 1.0.0

Description Produce forest plots to visualize covariate effects using either the command line or an interactive 'Shiny' application.

URL <https://github.com/smouksassi/coveffectsplot>

BugReports <https://github.com/smouksassi/coveffectsplot/issues>

Depends R (>= 3.6.0), data.table (>= 1.9.8)

Imports colourpicker, dplyr, egg, grid, ggplot2 (>= 3.3.2), markdown, shiny, shinyjs, shinymeta, stats, tidyr, table1, utils

Suggests clipr, formatR, MASS, knitr, rmarkdown, mrgsolve, ggridges, ggrepel, ggstance, patchwork, plotly, scales, shinyAce, Rcpp, gamlss.dist

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SystemRequirements pandoc with https support

LazyData true

VignetteBuilder knitr

RoxygenNote 7.1.2

Encoding UTF-8

NeedsCompilation no

Author Samer Mouksassi [aut, cre] (<<https://orcid.org/0000-0002-7152-6654>>),
Dean Attali [ctb]

Maintainer Samer Mouksassi <samerrouksassi@gmail.com>

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draw_key	<i>Horizontal key drawing functions from ggstance in case it is deprecated</i>
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Description

Horizontal key drawing functions from ggstance in case it is deprecated

Usage

```
draw_key_hpath(data, params, size)
draw_key_pointrangeh(data, params, size)
```

Arguments

data	A single row data frame containing the scaled aesthetics to display in this key
params	A list of additional parameters supplied to the geom.
size	Width and height of key in mm.

Value

A grid grob.

forest_plot	<i>Forest plot</i>
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Description

Produce forest plots to visualize covariate effects

Usage

```
forest_plot(
  data,
  facet_formula = "covname~paramname",
  xlabel = "",
  ylabel = "",
  x_facet_text_size = 13,
  y_facet_text_size = 13,
```

```
x_facet_text_angle = 0,
y_facet_text_angle = 0,
x_facet_text_vjust = 0.5,
y_facet_text_vjust = 0.5,
x_facet_text_hjust = 0.5,
y_facet_text_hjust = 0.5,
xy_facet_text_bold = TRUE,
x_label_text_size = 16,
y_label_text_size = 16,
break_ylabel = FALSE,
y_label_text_width = 25,
table_text_size = 7,
base_size = 22,
theme_benrich = FALSE,
table_title = "",
table_title_size = 15,
ref_legend_text = "",
area_legend_text = "",
interval_legend_text = "",
legend_order = c("pointinterval", "ref", "area", "shape"),
combine_area_ref_legend = TRUE,
legend_position = "top",
show_ref_area = TRUE,
ref_area = c(0.8, 1.25),
show_ref_value = TRUE,
ref_value = 1,
ref_area_col = "#BEBEBE50",
ref_value_col = "black",
ref_value_size = 1,
ref_value_linetype = "dashed",
interval_col = "blue",
interval_size = 1,
interval_fatten = 4,
bsv_col = "red",
bsv_text_id = c("BSV", "bsv", "IIV", "Bsv"),
interval_bsv_text = "",
strip_col = "#E5E5E5",
paramname_shape = FALSE,
legend_shape_reverse = FALSE,
facet_switch = c("both", "y", "x", "none"),
facet_scales = c("fixed", "free_y", "free_x", "free"),
facet_space = c("fixed", "free_x", "free_y", "free"),
facet_labeller = "label_value",
label_wrap_width = 55,
facet_labeller_multiline = FALSE,
strip_placement = c("inside", "outside"),
strip_outline = TRUE,
facet_spacing = 5.5,
```

```

major_x_ticks = NULL,
minor_x_ticks = NULL,
x_range = NULL,
logxscale = FALSE,
show_yaxis_gridlines = TRUE,
show_xaxis_gridlines = TRUE,
show_table_facet_strip = "none",
table_facet_switch = c("both", "y", "x", "none"),
show_table_yaxis_tick_label = FALSE,
reserve_table_xaxis_label_space = TRUE,
table_panel_border = TRUE,
table_position = c("right", "below", "none"),
plot_table_ratio = 4,
vertical_dodge_height = 0.8,
legend_space_x_mult = 1,
legend_ncol_interval = 1,
legend_ncol_shape = 1,
plot_margin = c(5.5, 5.5, 5.5, 5.5),
table_margin = c(5.5, 5.5, 5.5, 5.5),
legend_margin = c(0, 0.1, -0.1, 0),
parse_xlabel = FALSE,
parse_ylabel = FALSE,
plot_title = "\n",
return_list = FALSE
)

```

Arguments

data	Data to use.
facet_formula	Facet formula.
xlabel	X axis title.
ylabel	Y axis title.
x_facet_text_size	Facet text size X.
y_facet_text_size	Facet text size Y.
x_facet_text_angle	Facet text angle X.
y_facet_text_angle	Facet text angle Y.
x_facet_text_vjust	Facet text vertical justification.
y_facet_text_vjust	Facet text vertical justification.
x_facet_text_hjust	Facet text horizontal justification.

y_facet_text_hjust	Facet text horizontal justification.
xy_facet_text_bold	Bold Facet text. Logical TRUE FALSE.
x_label_text_size	X axis labels size.
y_label_text_size	Y axis labels size.
break_ylabel	Split Y axis labels into multiple lines. Logical FALSE TRUE.
y_label_text_width	Number of characters to break Y axis labels.
table_text_size	Table text size.
base_size	theme_bw base_size for the plot and table.
theme_benrich	apply Benjamin Rich's theming.
table_title	What text to use for table title (theme_benrich has a default).
table_title_size	table title size.
ref_legend_text	Reference legend text.
area_legend_text	Area legend text.
interval_legend_text	Pointinterval Legend text.
legend_order	Legend order. A four-element vector with the following items ordered in your desired order: "pointinterval", "ref", "area", "shape". if an item is absent the legend will be omitted.
combine_area_ref_legend	Combine reference and area legends if they share the same text?
legend_position	where to put the legend: "top", "bottom", "right", "none"
show_ref_area	Show reference window?
ref_area	Reference area. Two-element numeric vector multiplying the ref_value.
show_ref_value	Show reference line?
ref_value	X intercept of reference line.
ref_area_col	Reference area background color.
ref_value_col	Reference line color.
ref_value_size	Reference line size.
ref_value_linetype	Reference line linetype.
interval_col	Point range color. One value.
interval_size	Point range size. Default to 1

interval_fatten Point range fatten. Default to 4
 bsv_col BSV pointinterval color. One value.
 bsv_text_id Text string(s) to identify BSV. Default to c("BSV","bsv","IIV","Bsv")
 interval_bsv_text BSV legend text.
 strip_col Strip background color.
 paramname_shape Map symbol to parameter(s)?
 legend_shape_reverse TRUE or FALSE.
 facet_switch Facet switch to near axis. Possible values: "both", "y", "x", "none".
 facet_scales Facet scales. Possible values: "free_y", "fixed", "free_x", "free".
 facet_space Facet spaces. Possible values: "fixed", "free_x", "free_y", "free".
 facet_labeller Facet Labeller. Default "label_value" any other valid 'facet_grid' labeller can be specified.
 label_wrap_width How many characters before breaking the line. Numeric value. any other valid 'facet_grid' labeller can be specified.
 facet_labeller_multiline break facet strips into multiple lines. Logical TRUE FALSE.
 strip_placement Strip placement. Possible values: "inside", "outside".
 strip_outline Draw rectangle around the Strip. Logical TRUE FALSE.
 facet_spacing Control the space between facets in points.
 major_x_ticks X axis major ticks. Numeric vector.
 minor_x_ticks X axis minor ticks. Numeric vector.
 x_range Range of X values. Two-element numeric vector.
 logxscale X axis log scale. Logical TRUE FALSE.
 show_yaxis_gridlines Draw the y axis gridlines. Logical TRUE FALSE.
 show_xaxis_gridlines Draw the x axis gridlines. Logical TRUE FALSE.
 show_table_facet_strip Possible values: "none", "both", "y", "x".
 table_facet_switch Table facet switch to near axis. Possible values: "both", "y", "x", "none".
 show_table_yaxis_tick_label Show table y axis ticks and labels?
 reserve_table_xaxis_label_space keep space for the x axis label to keep alignment.

table_panel_border	Draw the panel border for the table. Logical TRUE FALSE.
table_position	Table position. Possible values: "right", "below", "none".
plot_table_ratio	Plot-to-table ratio. Suggested value between 1-5.
vertical_dodge_height	Amount of vertical dodging to apply on segments and table text.
legend_space_x_mult	Multiplier to adjust the spacing between legend items.
legend_ncol_interval	Control the number of columns for the pointinterval legend.
legend_ncol_shape	Control the number of columns for the shape legend.
plot_margin	Control the white space around the main plot. Vector of four numeric values for the top, right, bottom and left sides.
table_margin	Control the white space around the table. Vector of four numeric values for the top, right, bottom and left sides.
legend_margin	Control the white space around the plot legend. Vector of four numeric values for the top, right, bottom and left sides.
parse_xlabel	treat xlabel as an expression. Logical FALSE TRUE.
parse_ylabel	treat ylabel as an expression. Logical FALSE TRUE.
plot_title	main plot title default to a line break.
return_list	What to return if True a list of the main and table plots is returned instead of the gtable/plot.

Examples

```

library(dplyr)
library(ggplot2)

# Example 1

plotdata <- get_sample_data("forest-plot-table.csv")
plotdata <- plotdata %>%
  mutate(midlabel = format(round(mid,2), nsmall = 2),
         lowerlabel = format(round(lower,2), nsmall = 2),
         upperlabel = format(round(upper,2), nsmall = 2),
         LABEL = paste0(midlabel, " [", lowerlabel, "-", upperlabel, "]"))
param <- "BZD AUC"
plotdata <- filter(plotdata,paramname==param)
plotdata$covname <- reorder(plotdata$covname,plotdata$upper,FUN =max)
plotdata$label <- reorder(plotdata$label,plotdata$scen)
covs <- c("WEIGHT","AGE")
plotdata <- filter(plotdata,covname%in%covs)
forest_plot(plotdata,
            ref_legend_text = "Reference (vertical line)",
            area_legend_text = "Reference (vertical line)",

```

```

xlabel = paste("Fold Change in", param, "Relative to Reference"),
logxscale = TRUE, major_x_ticks =c(0.1,1,1.5),
show_ref_area = FALSE,
facet_formula = "covname~.",
facet_scales = "free_y",
facet_space = "free_y",
show_table_facet_strip = "none",
table_position = "right",
plot_table_ratio = 4)

# Example 2

plotdata <- get_sample_data("forest-plot-table.csv")
plotdata <- plotdata %>%
  mutate(midlabel = format(round(mid,2), nsmall = 2),
         lowerlabel = format(round(lower,2), nsmall = 2),
         upperlabel = format(round(upper,2), nsmall = 2),
         LABEL = paste0(midlabel, " [", lowerlabel, "-", upperlabel, "]"))
param <- c("BZD AUC", "BZD Cmax")
plotdata <- filter(plotdata,paramname%in%param)
plotdata <- filter(plotdata,covname%in%"WEIGHT")
plotdata$covname <- reorder(plotdata$covname,plotdata$upper,FUN =max)
plotdata$label <- reorder(plotdata$label,plotdata$scen)
forest_plot(plotdata,
            ref_legend_text = "Reference (vertical line)",
            area_legend_text = "Reference (vertical line)",
            xlabel = paste("Fold Change of Parameter", "Relative to Reference"),
            show_ref_area = FALSE,
            facet_formula = "covname~paramname",
            facet_scales = "free_y",
            facet_space = "free_y",
            x_facet_text_size = 10,
            y_facet_text_size = 10,
            y_label_text_size = 10,
            y_label_text_width = 15,
            x_label_text_size = 10,
            facet_switch = "both",
            show_table_facet_strip = "both",
            show_table_yaxis_tick_label = TRUE,
            table_position = "below",
            plot_table_ratio = 1)

## Not run:
# Example 3

plotdata <- get_sample_data("forestplotdatacpidata.csv")
forest_plot(plotdata,
            ref_area = c(0.8, 1.2),
            x_facet_text_size = 12,
            y_facet_text_size = 12,
            y_label_text_size = 10,
            x_label_text_size = 10,
            table_text_size = 6,
            plot_table_ratio = 1.5,

```



```

    ref_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
    area_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
    xlabel = "Fold Change Relative to RHZE",
    facet_formula = "covname~paramname",
    table_position = "below",
    show_table_facet_stripe = "both",
    show_table_yaxis_tick_label = TRUE)

# Example 4
plotdata <- get_sample_data("dataforest.csv")
plotdata <- plotdata %>%
  mutate(midlabel = format(round(mid,2), nsmall = 2),
         lowerlabel = format(round(lower,2), nsmall = 2),
         upperlabel = format(round(upper,2), nsmall = 2),
         LABEL = paste0(midlabel, " [", lowerlabel, "-", upperlabel, "]"))
plotdata <- plotdata %>%
  filter(covname%in%c("Weight"))
plotdata$label <- as.factor(as.character(plotdata$label))
plotdata$label <- factor(plotdata$label, c("36.2 kg", "66 kg", "110 kg"))
forest_plot(plotdata,
            ref_area = c(0.8, 1.2),
            x_facet_text_size = 13,
            y_facet_text_size = 13,
            ref_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
            area_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
            xlabel = "Fold Change Relative to Parameter",
            facet_formula = "covname~paramname",
            facet_switch = "both",
            facet_scales = "free",
            facet_space = "fixed",
            table_position = "below",
            plot_table_ratio = 1,
            show_table_facet_stripe = "both",
            show_table_yaxis_tick_label = TRUE)

# Example 5
forest_plot(plotdata,
            ref_area = c(0.8, 1.2),
            x_facet_text_size = 13,
            y_facet_text_size = 13,
            ref_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
            area_legend_text = "Reference (vertical line)\n+/- 20% limits (colored area)",
            xlabel = "Fold Change Relative to Parameter",
            facet_formula = "covname~.",
            facet_switch = "both",
            facet_scales = "free",
            facet_space = "fixed",
            paramname_shape = TRUE,
            table_position = "none",
            ref_area_col = rgb( col2rgb("gray50")[1], col2rgb("gray50")[2], col2rgb("gray50")[3],
                             max = 255, alpha = 0.1*255 ) ,
            interval_col = "steelblue",

```

```

strip_col = "lightblue",
plot_table_ratio = 1)

## End(Not run)

```

```

get_sample_data      Get sample dataset

```

Description

Get a sample dataset that is included with the package to plot a forest plot.

Usage

```
get_sample_data(dataset = "dfall.csv")
```

Arguments

`dataset` A sample dataset file.

```

prezista      Prezista Drug Label Data

```

Description

A dataset containing an excerpt from the official Prezista FDA Drug Label to help in the app exploration.

Usage

```
prezista
```

Format

A dataset with 33 rows and 6 variables

covname Covariate Name, a character variable with two values Protease Inhibitors and Other Antiretrovirals

label Covariate value label, a character variable with several possible values

paramname Parameter on which the effects are shown, a character variable with three possible values Cmax, AUC and Cmin

mid Middle value for the effects, the median from the uncertainty distribution

lower Lower value for the effects usually the 5% from the uncertainty distribution

upper Upper value for the effects usually the 95% from the uncertainty distribution

Source

Table 16 from https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/021976s045_202895s0201b1.pdf

`run_interactiveforestplot`

Run the interactiveforestplot application

Description

Run the interactiveforestplot application.

Usage

```
run_interactiveforestplot(data = NULL)
```

Arguments

`data` optional data to load when the app is launched

Examples

```
if (interactive()) {  
  run_interactiveforestplot()  
}
```

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