Package 'coveffectsplot'

December 10, 2020

Title Produce Forest Plots to Visualize Covariate Effects

Version 0.0.9.1

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, ggplot2 (>= 3.3.2), markdown, shiny, shinyjs, stats, tidyr, table1, utils

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

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SystemRequirements pandoc with https support

LazyData true

VignetteBuilder knitr

RoxygenNote 7.1.1

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NeedsCompilation no

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R topics documented:

`forest_plot` *Forest plot*

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",
  interval_col = "blue",
  bsv_col = "red",
```

```
  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,
  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`
: with theme_benrich on what text to use for table title.

`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.

`interval_col` Point range color. One value.

`bsv_col` BSV pointinterval color. One value.

`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.

`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_strip = "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_strip = "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 Inihibitors 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_202895s020lbl.pdf

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`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()
}
```

Index