Package ‘personograph’

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Title  Pictographic Representation of Treatment Effects
Version  0.1.3
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Description  Visualizes treatment effects using person icons, similar to Cates (NNT) charts.
License  LGPL (>= 2.0, < 3) | Mozilla Public License
LazyData  true
URL  https://github.com/joelkuiper/personograph
Depends  R (>= 3.1.0), grImport
Imports  stats, grDevices, grid
Suggests  meta
NeedsCompilation  no
Repository  CRAN
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Personograph-package

Generate personograph plots from data

Description

A personograph (Kuiper-Marshall plot) is a pictographic representation of (relative) harm and benefit from an intervention. It is similar to Visual Rx (Cates Plots). Each icon on the grid is colored to indicate whether that percentage of people is harmed by the intervention, would benefit from the intervention, has good outcome regardless of intervention, or bad outcome regardless of intervention. This terminology is similar to that of Uplift Modelling.

Details

The plot function personograph is implemented in such a way that it’s easy to just pass a named list of percentages, colors, and an icon. Making it potentially useful for other use cases as well.

The example code will generate the following graph if higher_is_better=F:
Example

89/100 good outcome  5/100 intervention benefit  6/100 bad outcome

Example from rMeta

Funding & Acknowledgments: This software was commissioned and sponsored by Doctor Evidence. The Doctor Evidence mission is to improve clinical outcomes by finding and delivering medical evidence to healthcare professionals, medical associations, policy makers and manufacturers through revolutionary solutions that enable anyone to make informed decisions and policies using medical data that is more accessible, relevant and readable.

Source & Issues: Source code and issue tracker can be found on Github.

See Also

github
Examples

# Example data
data <- read.table(textConnection("name ev.trt n.trt ev.ctrl n.ctrl
1 Auckland 36 532 60 538
2 Block 1 69 5 61
3 Doran 4 81 11 63
4 Gamsu 14 131 20 137
5 Morrison 3 67 7 59
6 Papageorgiou 1 71 7 75
7 Tauesch 8 56 10 71\n"), header=TRUE)

sm <- "RR" # The outcome measure (either Relative Risk or Odds Ratio)
if (requireNamespace("meta", quietly = TRUE)) { # use meta if available
  # Calculate the pooled OR or RR point estimate
  m <- with(data, meta::metabin(ev.trt, n.trt, ev.ctrl, n.ctrl, sm=sm))
  point <- exp(m$TE.random) # meta returns random effects estimate on the log scale
} else {
  # Calculated Random Effects RR, using the meta package
  point <- 0.5710092
}

# Approximate the Control Event Rates using a weighted median
cer <- w.approx.cer(data[,"ev.ctrl"], data[,"n.ctrl"])

# Calculate the Intervention Event Rates (IER) from the CER and point estimate
ier <- calc.ier(cer, point, sm)

# Calculate the "uplift" statistics
# Note that this depends on the direction of the outcome effect (higher_is_better)
u <- uplift(ier, cer, higher_is_better=FALSE)
plot(u, fig.title="Example", fig.cap="Example")

---

calc.ier  Calculate the IER (Intervention Event Rates)

Description

Calculate the IER (Intervention Event Rates)

Usage

calc.ier(cer, point, sm)
**personograph**

**Arguments**

- cer: Absolute risk with control (calculated; from 0 to 1)
- point: Relative risk with intervention (direct from meta-analysis)
- sm: The outcome measure, RR or OR as string

**Value**

Absolute risk of intervention as Intervention Event Rates (IER)

**See Also**

`w.approx.cer`

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**Description**

Plots a personograph from a named list with percentages (must sum to 1). A personograph is a graphical representation of relative benefit or harm, using a grid of icons with different colors. Its intended use is similar to that of Cates Plots (Visual Rx, Number Needed to Treat visualization). Although these could be seen as Kuiper-Marshall plots.

**Usage**

```r
personograph(data, fig.title = NULL, fig.cap = NULL, draw.legend = T, 
icon = NULL, icon.dim = NULL, icon.style = 1, n.icons = 100, 
plot.width = 0.75, dimensions = ceiling(sqrt(c(n.icons, n.icons))), 
fudge = 0.0075, legend.show.zeros = TRUE, force.fill = "ignore", 
round.fn = round.standard, colors = as.colors(data))
```

**Arguments**

- data: A list of names to percentages (from 0 to 1)
- fig.title: Figure title
- fig.cap: Figure caption
- draw.legend: Logical if TRUE (default) will draw the legend
- icon: A `grImport` Picture for the icon, overwrites `icon.style`
- icon.dim: The dimensions of icon as a vector `c(width, height)` as numerical. Calculated from the dimensions if not supplied
- icon.style: A numeric from 1-11 indicating which of the included icons to use, they are mostly variations on the theme
- n.icons: Number of icons to draw, defaults to 100
plot.width      The percentage of width that the main plotting area should take (with respect to the frame)
dimensions      A vector of c(rows, columns) for the dimensions of the grid
fudge           Fudge factor for the icon size, substracted from the icon.size
legend.show.zeros Logical if TRUE indicating whether to show zero (0) values in the legend.
force.fill      A character vector of 'ignore' (default), 'most', 'least', or one of the names from data. Defines the behaviour for cases when the rounding doesn't add up to n.icons. 'ignore' simply draws less icons, 'most' adds an icon to the largest group, 'least' to the smallest. If a name from data is supplied it will added to that element
round.fn        Function that is applied to round the percentages from data to n.icons. See also force.fill
colors          A vector of names to colors, must match the names in data. Uses gray.colors style if none supplied

Details

Supplying your own icon: You can supply your own icon by setting icon to a grImport Picture. A Picture can be loaded with grImport::readPicture which requires a grImport XML file. Obtaining this file from a standard SVG or PDF graphics file requires conversion. The easiest way is to convert your original file to PDF and then to PostScript (PS) with the command-line pdf2ps tool, then tracing it with grImport::PostScriptTrace. See the grImport package documentation for more details.

Value

None.

Examples

data <- list(first=0.9, second=0.1)
personograph(data)
  # With colors
  personograph(data, colors=list(first="red", second="blue"))
  # With different icon.style
  personograph(data, icon.style=4) # numeric from 1-11
  # Plot a thousand in a 20x50 grid
  personograph(data, n.icons=1000, dimensions=c(20,50), plot.width=0.75)

uplift                    "Uplift" from IER and CER
Description
Calculates the percentage (from 0 to 1) of people who have an intervention benefit, intervention harm, bad outcome regardless, and good outcome regardless from the Intervention Event Rates (IER) and Control Event Rates (CER). Note that the result depends on the direction of the outcome measure, e.g. higher_is_better = T (default) for intervention efficacy, higher_is_better = F for adverse events.

Usage
uplift(ier, cer, higher_is_better = NULL)

Arguments
ier Interventions Event Rates
cer Control Event Rates
higher_is_better 
logical indicating the direction of the outcome measure, default TRUE

Details
The adopted terminology is similar to that of Uplift modelling https://en.wikipedia.org/wiki/Uplift_modelling

Value
A list of S3 class personograph.uplift with the following elements:

- good outcome people who have a good outcome regardless of intervention
- bad outcome people who have a bad outcome regardless of intervention
- intervention benefit people who benefit from intervention
- intervention harm people who are harmed by intervention

Can be plotted as a personograph with the S3 generic plot.

Examples
ier <- 0.06368133
cer <- 0.1115242
u <- uplift(ier, cer, higher_is_better=TRUE)
plot(u)
w.approx.cer  Calculate the CER (Control Event Rates)

Description

Calculates the CER from the data, this is approximation of absolute risk in the control population (from 0 to 1).

Usage

w.approx.cer(ev.ctrl, n.ctrl)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ev.ctrl</td>
<td>Vector of event rates in the control group (/arm)</td>
</tr>
<tr>
<td>n.ctrl</td>
<td>Vector of sample sizes in the control group (/arm)</td>
</tr>
</tbody>
</table>

Details

By default it uses a weighted median of the individual control event rates. The weighted median has the benefit of always returning an event rate that actually did occur. However, it is possible that this might return a CER of 0. In this case we fall back to a weighted mean, and throw a warning. If this too returns a CER of 0, it probably means that there was not enough data to estimate the control risk accurately. In this case we recommend you obtain an estimate of the risk in the control group, for example from an observational study or expert opinion.

Value

Approximated Control Event Rates (CER)
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