Package ‘plotwidgets’

October 14, 2022

Type Package

Title Spider Plots, ROC Curves, Pie Charts and More for Use in Other Plots

Version 0.5.1

Date 2022-05-10

Author January Weiner

Maintainer January Weiner <january.weiner@gmail.com>

Description Small self-contained plots for use in larger plots or to delegate plotting in other functions. Also contains a number of alternative color palettes and HSL color space based tools to modify colors or palettes.

License GPL (>= 2.0)

Imports methods, graphics

Suggests testthat, knitr

RoxygenNote 5.0.1

NeedsCompilation no

Repository CRAN

Date/Publication 2022-05-10 12:20:02 UTC

R topics documented:

colorConversions .................................................... 2
listPlotWidgets .................................................... 3
modCol ............................................................. 3
plotPals .............................................................. 5
plotwidgetGallery .................................................. 7
plotwidgets .......................................................... 8
showPals ............................................................. 11

Index 13
**Description**

Convert colors from and to RGB and HSL formats

**Usage**

```r
col2rgb.2(col)
col2hsl(col)
hsl2col(hsl)
rgb2col(rgb)
rgb2hsl(rgb)
hsl2rgb(hsl)
```

**Arguments**

- `col`: a character vector with colors to convert (palette)
- `hsl`: a numeric matrix with three or four rows (hue, saturation, luminosity and alpha)
- `rgb`: a numeric matrix with three or four rows (red, green, blue and alpha)

**Details**

These functions convert between RGB and HSL color spaces, and character vectors which contain color names or hash-encoded RGB values ("#FFCC00").

All functions support an alpha channel. For example, unlike the `grDevices::col2rgb`, `col2rgb.2` returns a matrix with four rows: three for R, G and B channels and one for the alpha channel.

**Value**

`col2rgb.2` and `col2hsl` return a four-row matrix. `rgb2col` and `hsl2col` return a character vector.

**Functions**

- `col2rgb.2`: Convert a character vector of color names (palette) to a matrix with RGB values
- `col2hsl`: Convert a character vector of color names (palette) to a matrix with HSL values
- `hsl2col`: Convert hsl matrix (3 or 4 row) to character vector of color names
- `rgb2col`: Convert rgb matrix (3 or 4 row) to character vector of color names
- `rgb2hsl`: Convert a 3- or 4-row matrix of RGB(A) values to a matrix of HSL(A) values
- `hsl2rgb`: Convert a matrix of HSL values into a matrix of RGB values
See Also

`modCol`, `modhueCol`, `darkenCol`, `saturateCol`

Examples

```r
haze <- plotPals("haze")
col2rgb(haze)
col2hsl(haze)
```

---

`listPlotWidgets`  
List available plot widgets

Description

List available plot widgets

Usage

```r
listPlotWidgets()
```

Details

Simply print out all available widgets. A list containing the widget function is returned invisibly.

Value

Invisibly returns a named list of widget functions

Examples

```r
listPlotWidgets()
```

---

`modCol`  
Modify colors

Description

Modify colors by shading, saturating and changing hue
modCol

Usage
modCol(col, darken = 0, saturate = 0, modhue = 0)
saturateCol(col, by = 0)
darkenCol(col, by = 0)
modhueCol(col, by = 0)
contrastcol(col, alpha = NULL)

Arguments
col: a character vector of colors (palette) to modify – a character vector
darken: Use negative values to lighten, and positive to darken.
saturate: Use negative values to desaturate, and positive to saturate
modhue: Change the hue by a number of degrees (0-360)
by: parameter for the saturateCol, darkenCol and modhueCol functions
alpha: alpha value (from 0, transparent, to 255, fully opaque)

Details
This function use the HSL (hue, saturation, luminosity) scheme to modify colors in a palette.
modCol is just a wrapper for the other three functions allowing to modify three parameters in one go.
saturateCol, darkenCol and modhueCol modify the saturation, luminosity and hue in the HSL color model.
contrastcol() returns black for each light color (with L > 0.5) and white for each dark color (with L < 0.5).

Value
a character vector containing the modified palette

Functions
- saturateCol: Change the saturation of a color or palette by a fraction of "by"
- darkenCol: Modify the darkness of a color or palette (positive by - darken, negative by – lighten)
- modhueCol: Modify the hue of a character vector of colors by by degrees
- contrastcol: Return white for dark colors, return black for light colors
Examples

```r
plot.new()
## Loop over a few saturation / lightness values
par(usr=c(-0.5, 0.5, -0.5, 0.5))
v <- c(10, 9, 19, 9, 15, 5)
pal <- plotPals("zeileis")
for(sat in seq.int(-0.4, 0.4, length.out=5)) {
  for(lgh in seq.int(-0.4, 0.4, length.out=5)) {
    cols <- saturateCol(darkenCol(pal, by=sat), by=lgh)
    wgPlanets(x=sat, y=lgh, w=0.16, h=0.16, v=v, col=cols)
  }
}
axis(1)
axis(2)
title(xlab="Darkness (L) by="", ylab="Saturation (S) by="")
```

```r
## Now loop over hues
a2xy <- function(a, r=1, full=FALSE) {
  t <- pi/2 - 2 * pi * a / 360
  list( x=r * cos(t), y=r * sin(t) )
}
plot.new()
par(usr=c(-1,1,-1,1))
hues <- seq(0, 360, by=30)
pos <- a2xy(hues, r=0.75)
for(i in 1:length(hues)) {
  cols <- modhueCol(pal, by=hues[i])
  wgPlanets(x=pos$x[i], y=pos$y[i], w=0.5, h=0.5, v=v, col=cols)
}
pos <- a2xy(hues[-1], r=0.4)
text(pos$x, pos$y, hues[-1])
```

plotPals

Return all or selected color palettes

Description

Return all or selected color palettes from the plotwidget palette set

Usage

```r
plotPals(pal = NULL, alpha = 1, drop.alpha = TRUE)
```

Arguments

- `pal` Name of the palette(s) to return
alpha  Control transparency - set alpha channel to alpha (0 - fully transparent, 1 - fully opaque)
drop.alpha  If true, and if alpha is NULL, the "FF" string of the alpha channel will not be attached to the produced RGB codes

Details

The plotwidgets package contains a number of predefined palettes, different from those in RColorBrewer.

- default: a standard, relatively safe (see below) palette
- neon: a bright palette suitable for drawing on dark backgrounds
- pastel: a dimmed pastel palette
- haze: very delicate pastel colors
- dark: same hues as haze, but much darker
- grey: different shades of grey
- alphabet: based on "A colour alphabet..." by Paul Green-Armytage
- few: a palette based on Stephen Few’s book
- zeileis: based on Zeileis et al. 2009
- vizi: automatically generated palette

You can get all the names of palettes with names(plotPals()), and showcase them with showPalettes(). Furthermore, you can use the pal parameter to plotwidgetGallery to see how this palette looks like with different plot widgets.

Value

Either a list of palettes, or (if only one palette was selected) a character vector with colors

See Also

col2rgb.2, rgb2col, hsl2col, col2hs1, modCol, modhueCol, darkenCol, saturateCol
Examples
safe <- plotPals("safe") # colorblind-safe palette
plotwidgetGallery(pal=safe)

plotwidgetGallery A showcase of all plot types available in plotwidgets

Description
A showcase of all plot types available in plotwidgets

Usage
plotwidgetGallery(theme = "default", pal = NULL, ...)

Arguments
theme sets both the palette and a suitable background (e.g. dark for "neon")
pal color palette to use (a character vector with colors)
... all subsequent parameters will be passed to the plotWidget() function.

Details
plotwidgetGallery() simply draws all available plot widgets on a single plot.

Value
Invisibly returns the example data used to generate the plots
Examples

plotwidgetGallery()
## automatically set black bg
plotwidgetGallery(theme="neon")
## yuck, ugly:
plotwidgetGallery(pal=c("red", "#FF9900", "blue", "green", "cyan", "yellow"))
## much better:
plotwidgetGallery(pal=plotPals("pastel", alpha=0.8))

Description

A collection of plotting widgets (pie charts, spider plots etc.)

Usage

plotWidget(type = "pie", x = 0.5, y = 0.5, w = 1, h = 1, v,
          col = NULL, border = NA, new = FALSE, aspect = 1, ...)

wgPie(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL, border = NA,
      new = FALSE, res = 100, aspect = 1, adj = 0, labels = NULL,
      label.params = NULL)

wgRing(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL, border = NA,
       new = FALSE, res = 100, aspect = 1, adj = 0, start = 0.5,
       labels = NULL, label.params = NULL)

wgPlanets(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL,
        border = NA, new = FALSE, res = 100, aspect = 1, adj = 0,
        labels = NULL, label.params = NULL)

wgBurst(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL, border = NA,
        new = FALSE, res = 100, aspect = 1, adj = 0, max = NULL,
        labels = NULL, label.params = NULL)

wgRug(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL, border = NA,
      labels = NULL, label.params = NULL, new = FALSE, aspect = NULL,
      horizontal = TRUE, rev = FALSE)

wgBarplot(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL,
        border = NA, labels = NULL, label.params = NULL, new = FALSE,
        aspect = NULL, max = NULL)

wgBoxpie(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL, border = NA,
        labels = NULL, label.params = NULL, new = FALSE, aspect = 1,
grid = 3)

wgRoccurve(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL,
    border = NA, new = FALSE, fill = FALSE, lwd = 1, aspect = 1)

wgSpider(x = 0.5, y = 0.5, w = 1, h = 1, v, col = NULL, border = NA,
    new = FALSE, min = NA, max = NA, tick.labels = FALSE, fill = FALSE,
    lwd = 1, aspect = 1)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>what kind of plot. To list all available plot types, use <code>listPlotWidgets</code>. Instead of the canonical name such as &quot;wgSpider&quot;, you can simply use &quot;spider&quot;</td>
</tr>
<tr>
<td>x, y</td>
<td>coordinates at which to draw the plot</td>
</tr>
<tr>
<td>w, h</td>
<td>width and height of the plot</td>
</tr>
<tr>
<td>v</td>
<td>sizes of the slices</td>
</tr>
<tr>
<td>col</td>
<td>character vector with colors (palette). A default palette is chosen if the argument is NULL</td>
</tr>
<tr>
<td>border</td>
<td>color of the border. Use NA (default) for no border, and NULL for a border in the par(&quot;fg&quot;) color. No effect in spider plots.</td>
</tr>
<tr>
<td>new</td>
<td>Whether to call <code>plot.new()</code> before drawing the widget</td>
</tr>
<tr>
<td>aspect</td>
<td>the actual ratio between screen width and screen height. Parameters w and h will be scaled accordingly.</td>
</tr>
<tr>
<td>...</td>
<td>Any further arguments passed to plotting functions</td>
</tr>
<tr>
<td>res</td>
<td>for pies, rings, planets and bursts: resolution (number of polygon edges in a full circle)</td>
</tr>
<tr>
<td>adj</td>
<td>for spider plots, burst plots, planet plots and pies: adjust the start by &quot;adj&quot; degrees. For example, to turn the plot clockwise by 90 degrees, use adj = 90</td>
</tr>
<tr>
<td>labels</td>
<td>character vector</td>
</tr>
<tr>
<td>label.params</td>
<td>a named list with arguments passed to <code>text()</code> for drawing labels (e.g. cex, col etc.)</td>
</tr>
<tr>
<td>start</td>
<td>For ring plots, the inner radius of the ring</td>
</tr>
<tr>
<td>max</td>
<td>For burst plots – a maximum value used to scale other values to make different plots comparable. For spider plots: the maximum of the scale on spider plot spikes.</td>
</tr>
<tr>
<td>horizontal</td>
<td>for rug plots: whether the stacked bar should be horizontal (default), or vertical</td>
</tr>
<tr>
<td>rev</td>
<td>logical, for rug plots: right to left or top to bottom rather than the default left to right or bottom to top</td>
</tr>
<tr>
<td>grid</td>
<td>boxpie only: the grid over which the areas are distributed. Should be roughly equal to the number of areas shown.</td>
</tr>
<tr>
<td>fill</td>
<td>for spider plots and roc curves: whether to draw filled polygons rather than lines</td>
</tr>
<tr>
<td>lwd</td>
<td>Line width to use</td>
</tr>
<tr>
<td>min</td>
<td>For spider plots: the minimum of the scale on spider plot spikes</td>
</tr>
<tr>
<td>tick.labels</td>
<td>For spider plots: labels for the scale ticks</td>
</tr>
</tbody>
</table>
Details

A widget here is a mini-plot which can be placed anywhere on any other plot, at an area specified by the center point coordinates x and y, and width and height. The widgets do not influence the layout of the plot, or change any parameters with `par()`; it only uses basic graphic primitives for maximal compatibility.

The `plotWidget()` function is a generic to call the available widgets from one place. Any widget-specific parameters are passed on through the ellipsis (...). See the documentation for specific widgets for more information. Use the functions `listPlotWidgets` and `plotWidgetGallery` to see available widgets.

The pie function draws a simple pie chart at specified coordinates with specified width, height and color. The rug function draws a corresponding rug plot, while boxpie creates a "rectangular pie chart" that is considered to be better legible than the regular pie.

Functions

- **wgPie** `pie()` draws a pie chart with width w and height h at coordinates (x,y). The angle width of the slices is taken from the numeric vector v, and their color from the character vector col. Note that one of the main goals of the plotwidget package is to give sufficient alternatives to pie charts, hoping to help eradicate pie charts from the surface of this planet.
- **wgRing**: A pie with the center removed.
- **wgPlanets**: Produces a circular arrangement of circles, which vary in their size proportionally to the values in v.
- **wgBurst**: Burst plots are similar to pies. However, instead of approximating numbers by arc length, wgBurst approximates by area, making the pie slices stand out from the plot in the process.
- **wgRug**: A stacked, horizontal or vertical bar plot.
- **wgBarplot**: A minimalistic bar plot. Use the `max` parameter to scale the bars on several different widgets to the same value.
- **wgBoxpie**: Rectangular pies are thought to represent information better than pies. Here, the values in v correspond to areas rather than angles, which makes it easier to interpret it visually.
- **wgRoccurve**: This is one of two widgets that take use a different data type. `wgRoccurve` takes either a vector of T/F values, or a list of such vectors, and draws a ROC curve for each of these vectors.
- **wgSpider**: Spider plots can illustrate multivariate data. Different spikes may illustrate different variables, while different lines correspond to different samples – or vice versa. Consequently, wgSpider accepts either a vector (for a single line) or a matrix (in which each column will correspond to a single line on the plot). The length of the vector (or the number of rows in the matrix) corresponds to the number of spikes on the spider plot.

See Also

`wgPie`, `wgBoxpie`, `wgSpider`, `wgRug`, `wgBurst`, `wgRing`, `wgBarplot`, `wgPlanets`, `wgRoccurve`
Examples

```r
# demonstration of the three widgets
plot.new()
par(usr=c(0,3,0,3))
v <- c(7, 5, 11)
col <- plotPals("safe")
b <- "black"
wgRug(0.5, 1.5, 0.8, 0.8, v=v, col=col, border=b)
wgPie(1.5, 1.5, 0.8, 0.8, v=v, col=col, border=b)
wgBoxpie(2.5, 1.5, 0.8, 0.8, v=v, col=col, border=b)

# using pie as plotting symbol
plot(NULL, xlim=1:2, ylim=1:2, xlab="", ylab="")
col <- c("#cc000099", "#0000cc99")
for(i in 1:125) {
  x <- runif(1) + 1
  y <- runif(1) + 1
  wgPie(x, y, 0.05, 0.05, c(x,y), col)
}

# square filled with box pies
n <- 10
w <- h <- 1/(n+1)
plot.new()
for(i in 1:n) for(j in 1:n)
  wgBoxpie(x=1/n*(i-1/2), y=1/n*(j-1/2), w, h, v=runif(3), col=plotPals("zeileis"))
```

showPals

Demonstrate selected palettes

Description

Show a plot demonstrating all colors in the provided palettes

Usage

```r
showPals(pal = NULL, numbers = T)
```

Arguments

- **pal**: Either a character vector of colors or a list of character vectors
- **numbers**: On each of the colors, show a number

Examples

```r
## Show all palettes in plotwidget
showPals(plotPals())
```
## Show just a few colors

```r
showPals(c("red", "green", "blue"))
```
Index

col2hsl, 6
col2hsl (colorConversions), 2
col2rgb, 2, 6
col2rgb (colorConversions), 2
colorConversions, 2
contrastCol (modCol), 3
darkenCol, 3, 6
darkenCol (modCol), 3
hsl2col, 6
hsl2col (colorConversions), 2
hsl2rgb (colorConversions), 2
listPlotWidgets, 3, 10
modCol, 3, 3, 6
modhueCol, 3, 6
modhueCol (modCol), 3
plotPals, 5
plotWidget (plotwidgets), 8
plotwidgetGallery, 6, 7, 10
plotwidgets, 8
plotwidgets-package (plotwidgets), 8
rgb2col, 6
rgb2col (colorConversions), 2
rgb2hsl (colorConversions), 2
saturationCol, 3, 6
saturationCol (modCol), 3
showPals, 11
wgBarplot, 10
wgBarplot (plotwidgets), 8
wgBoxpie, 10
wgBoxpie (plotwidgets), 8
wgBurst, 10
wgBurst (plotwidgets), 8
wgPie, 10
wgPlanets, 10
wgPlanets (plotwidgets), 8
wgRing, 10
wgRing (plotwidgets), 8
wgRoccurve, 10
wgRoccurve (plotwidgets), 8
wgRug, 10
wgRug (plotwidgets), 8
wgSpider, 10
wgSpider (plotwidgets), 8