

Package ‘colorblindcheck’

September 9, 2021

Title Check Color Palettes for Problems with Color Vision Deficiency

Version 1.0.0

Description Compare color palettes with simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia.

It includes calculation of distances between colors, and creating summaries of differences between a color palette and simulations of color vision deficiencies.

This work was inspired by the blog post at <http://www.vis4.net/blog/2018/02/automate-colorblind-checking/>.

Imports colorspace, methods, spacesXYZ

Suggests rcartocolor, testthat, knitr, rmarkdown, covr, vdiff

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Encoding UTF-8

LazyData false

RoxygenNote 7.1.1

VignetteBuilder knitr

URL <https://github.com/Nowosad/colorblindcheck>

BugReports <https://github.com/Nowosad/colorblindcheck/issues>

NeedsCompilation no

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palette_bivariate_plot

Plot Bivariate Palette And Its Color Vision Deficiencies

Description

Plot of the original input bivariate palette and simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia.

Usage

```
palette_bivariate_plot(x, severity = 1)
```

Arguments

x	A vector of hexadecimal color descriptions
severity	Severity of the color vision defect, a number between 0 and 1

Value

A plot with the original input palette and simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia

See Also

palette_plot

Examples

```
palette_bivariate_plot(x = rcartocolor::carto_pal(4, "Sunset"))
```

palette_check

Compare Palette with Color Vision Deficiencies

Description

Comparison of the original input palette and simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia.

Usage

```
palette_check(
  x,
  tolerance = NULL,
  plot = FALSE,
  bivariate = FALSE,
  severity = 1,
  ...
)
```

Arguments

x	A vector of hexadecimal color descriptions
tolerance	The minimal value of acceptable difference between the colors to distinguish between them. As the default, minimal distance between colors in the original input palette is given.
plot	If TRUE, display a plot comparing the original input palette and simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia
bivariate	If TRUE (and plot = TRUE), display a bivariate plot (plot where colors are located in columns and rows) comparing the original input palette and simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia
severity	Severity of the color vision defect, a number between 0 and 1
...	Other arguments passed on to <code>palette_dist()</code> to control the color metric

Value

A data.frame with 4 observations and 8 variables:

- name: original input color palette (normal), deuteranopia, protanopia, and tritanopia
- n: number of colors
- tolerance: minimal value of acceptable difference between the colors to distinguish between them
- ncp: number of color pairs
- ndcp: number of differentiable color pairs (color pairs with distances above the tolerance value)
- min_dist: minimal distance between colors
- mean_dist: average distance between colors
- max_dist: maximal distance between colors

Additionally, a plot comparing the original input palette and simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia can be shown.

Examples

```
rainbow_pal = rainbow(n = 7)
rainbow_pal
palette_check(rainbow_pal, plot = TRUE)

x = rcartocolor::carto_pal(11, "Vivid")
palette_check(x)
palette_check(x, plot = TRUE)
palette_check(x, tolerance = 1)
palette_check(x, tolerance = 10, metric = 1976)
palette_check(x, plot = TRUE, severity = 0.5)

y = rcartocolor::carto_pal(4, "Sunset")
palette_check(y, plot = TRUE, bivariate = TRUE, severity = 0.5)
```

palette_dist

Distance Between Colors

Description

Calculation of the distances between the colors in the input palette. It also allows for calculation of the distances between the colors in a simulations of the color vision deficiency - deuteranopia, protanopia, and tritanopia.

Usage

```
palette_dist(x, cvd = NULL, severity = 1, metric = 2000)
```

Arguments

x	A vector of hexadecimal color descriptions
cvd	A type of color vision deficiency (CVD): "pro" (protanomaly), "deu" (deutanomaly), or "tri" (tritanomaly)
severity	Severity of the color vision defect, a number between 0 and 1
metric	A vector of color metric specifiers. Valid values are '1976', '1994', and '2000' (default), which refer to the year the metric was recommended by the CIE

Value

A matrix of distances between the original input palette and a simulation of the selected color vision deficiency - deuteranopia, protanopia, and tritanopia

Examples

```
rainbow_pal = rainbow(n = 7)
rainbow_pal
palette_dist(rainbow_pal)
palette_dist(rainbow_pal, cvd = "deu")

x = rcartocolor::carto_pal(11, "Vivid")
palette_dist(x)
palette_dist(x, cvd = "pro", severity = 1)
palette_dist(x, cvd = "pro", severity = 0.2)
```

palette_plot

Plot Palette And Its Color Vision Deficiencies

Description

Plot of the original input palette and simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia.

Usage

```
palette_plot(x, severity = 1)
```

Arguments

x	A vector of hexadecimal color descriptions
severity	Severity of the color vision defect, a number between 0 and 1

Value

A plot with the original input palette and simulations of color vision deficiencies - deuteranopia, protanopia, and tritanopia

See Also

`palette_bivariate_plot`

Examples

```
rainbow_pal = rainbow(n = 7)
rainbow_pal
palette_plot(rainbow_pal)

palette_plot(x = rcartocolor::carto_pal(7, "Sunset"))
palette_plot(x = rcartocolor::carto_pal(11, "Safe"))
palette_plot(x = rcartocolor::carto_pal(7, "Earth"))
palette_plot(x = rcartocolor::carto_pal(11, "Vivid"))
```

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