Package 'artpack'

August 24, 2023

Title Creates Generative Art Data

Version 0.1.0

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Description Create data that displays generative art when mapped into a 'ggplot2' plot. Functionality includes specialized data frame creation for geometric shapes, tools that define artistic color palettes, tools for geometrically transforming data, and other miscellaneous tools that are helpful when using 'ggplot2' for generative art.

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URL https://meghansaha.github.io/artpack/

BugReports https://github.com/Meghansaha/artpack/issues

Imports cli, dplyr (>= 1.0.8), grDevices, knitr, purrr (>= 0.3.4), rlang, stringr (>= 1.5.0), tibble (>= 3.1.6)

Suggests covr, rmarkdown, spelling, testthat (>= 3.0.0), ggplot2 (>= 3.4.2), withr

VignetteBuilder knitr

Config/testthat/edition 3

Encoding UTF-8

Language en-US

RoxygenNote 7.2.3

NeedsCompilation no

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Repository CRAN

Date/Publication 2023-08-24 09:00:02 UTC

R topics documented:

`art_pals` *Custom-built artpack Color Palettes*

Description

The artpack palette picker. The `art_pals` function consists of 18 palettes: "arctic", "beach", "bw", "brood", "cosmos", "explorer", "gemstones", "grays", "icecream", "imagination", "majestic", "nature", "neon", "ocean", "plants", "rainbow", "sunnyside", "super"

Usage

```
art_pals(pal = NULL, n = 5, direction = "regular")
```

Arguments

`pal`	A character string of the desired artpack palette. The 18 artpack palettes include: • "arctic" - Icy blue and white colors • "beach" - Sand-colored tans and ocean-colored blue colors • "bw" - A gradient of black to white colors • "brood" - A gradient of different shades of dark gray and black colors • "cosmos" - Nebula-inspired blue, purple, and pink colors • "explorer" - Pokemon-type inspired colors • "gemstones" - Birthstone/Mineral-inspired colors • "grays" - A gradient of dark, medium, and light gray colors • "icecream" - A light pastel palette of cream, blue, brown, and pink colors • "imagination" - 90's school supply-inspired colors • "majestic" - Shades of majestic purple colors • "nature" - A mix of tan, brown, green, and red colors • "neon" - A neon spectrum of rainbow colors • "ocean" - A gradient of dark to light blue colors • "plants" - A gradient of dark to light green colors • "rainbow" - A vibrant mix of rainbow colors • "sunnyside" - A retro-inspired mix of pink, orange, and yellow colors • "super" - A marveling mix of heroic colors
`n`	The numbers of colors desired in the output. Default is 5. `n` must be a positive integer with a value greater than 0
`direction`	The direction of the palette Default is "regular". Only two options accepted: "regular" or "reverse"

Value

A Character Vector.

Examples

```
library(ggplot2)
dots <- data.frame(x = c(1:10), y = 2.5)
dots$fills <- art_pals("rainbow", 10)

dots |>
  ggplot(aes(x, y)) +
  theme_void() +
  geom_point(
    shape = 21,
    fill = dots$fills,
    color = "#000000",
    size = 10,
    stroke = 2
  )


dots_rev <- data.frame(x = c(1:10), y = 2.5)
dots_rev$fills <- art_pals("rainbow", 10, "reverse")

dots_rev |>
  ggplot(aes(x, y)) +
  theme_void() +
  geom_point(
    shape = 21,
    fill = dots_rev$fills,
    color = "#000000",
    size = 10,
    stroke = 2
  )
```

`circle_data` *Data Generation for Circles*

Description

A tool for creating a data frame of values that create a circle with a specified radius when plotted.

The `geom_path` and `geom_polygon` geoms are recommended with this data for use in `ggplot2` for generative art.

Usage

```
circle_data(
  x,
  y,
  radius,
  color = NULL,
  fill = NULL,
  n_points = 100,
  group_var = FALSE,
  group_prefix = "circle_"
)
```

Arguments

x	Numeric value of length 1 - The center x coordinate value of the circle.
y	Numeric value of length 1 - The center y coordinate value of the circle.
radius	Numeric value of length 1 that must be greater than 0 - The radius of the circle.
color	Character value of length 1 - The color of the square's border. A valid R color from colors() or a standard 6 digit hexadecimal webcolor like "#000000"
fill	Character value of length 1 - The color of the square. A valid R color from colors() or a standard 6 digit hexadecimal webcolor like "#000000"
n_points	Numeric value. Default is 100. This determines how many points the square will have. This option can come in handy when using jitter options or other texture/illusion methods. Must be of length 1 and at least a value of 100.
group_var	Logical. Default is FALSE. If TRUE, a group variable will be added to the dataframe. Useful in iterative data generation.
group_prefix	Character string of length 1 - The prefix used for the group variable. Default is "square_"

Value

A Tibble

Examples

```
# Creating one circle

library(ggplot2)
one_circle <- circle_data(x = 0, y = 0, radius = 5)

# Plot The Data
one_circle |>
  ggplot(aes(x, y)) +
  geom_path(color = "green") +
  coord_equal()
```

```
# To create multiple circles, use your preferred method of iteration:
# Creating two circles

library(purrr)
library(dplyr)

# Make your specs
x_vals <- c(0, 10)
y_vals <- c(0, 0)
radi <- c(1, 3)
fills <- c("purple", "yellow")
circle_n <- 1:2

# Prep for your iteration
lst_circle_specs <-
  list(
    x_vals,
    y_vals,
    radi,
    fills,
    circle_n
  )

# Use `circle_data()` in your preferred iteration methods
two_circles <- pmap(lst_circle_specs, ~ circle_data(
  x = ..1,
  y = ..2,
  radi = ..3,
  fill = ..4,
  color = "#000000",
  group_var = TRUE
) |>
  # circle_data adds a `group` variable if `group_var` = TRUE.
  # For multiple circles, a unique identifier should be added/pasted in.
  mutate(group = paste0(group, ..5))) |>
  list_rbind()

# Plot the data

two_circles |>
  ggplot(aes(x, y, group = group)) +
  theme(legend.position = "none") +
  geom_polygon(
    color = two_circles$color,
    fill = two_circles$fill
  ) +
  coord_equal() #Always use coord_equal() or coord_fixed for circles!
```

Description

Creates a dataframe of x and y points to visualize a square grid based on given x and y limits. Providing a color palette and fill style are optional.

Usage

```
grid_maker(
  xlim,
  ylim,
  size,
  fill_pal = NULL,
  fill_style = "range",
  color_pal = NULL,
  color_style = "range"
)
```

Arguments

xlim	A numeric vector with two X limits. A minimum and maximum limit for the X axis. Must be a length of 2.
ylim	A numeric vector with two Y limits. A minimum and maximum limit for the Y axis. Must be a length of 2.
size	A numeric input. The size of the grid. How many shapes will appear in a single row or column. Must be a length of 1, greater than 0, and less than or equal to the max xlim and max ylim.
fill_pal	Optional. A character vector of 6 digit hexadecimal webcolor code, or R colors() color strings to be applied to fill the grid.
fill_style	Optional. A character input. "range" or "random". Determines how the fill color palette is mapped.
color_pal	Optional. A character vector of 6 digit hexadecimal webcolor code, or R colors() color strings to be applied to borders of the grid.
color_style	Optional. A character input. "range" or "random". Determines how the border color palette is mapped.

Value

A Tibble

Examples

```
# Creating data for a grid:

library(ggplot2)
grid_data <- grid_maker(
  xlim = c(0, 50),
  ylim = c(0, 50),
```

```
  size = 10,
  fill_pal = c("turquoise", "black", "purple"),
  color_pal = c("black", "limegreen")
)

ggplot() +
  geom_polygon(
    data = grid_data,
    aes(x, y, group = group),
    fill = grid_data$fill,
    color = grid_data$color
  ) +
  coord_equal()
```

`group_numbers` *Convert Numbers into Padded Strings for Easier Group Numbering*

Description

Convert Numbers into Padded Strings for Easier Group Numbering

Usage

```
group_numbers(numbers)
```

Arguments

`numbers`	A numeric vector with a length of at least 1.

Value

A Character Vector

Examples

```
# Useful for easier group numbering so groups are ordered as intended
# Expects a numeric vector of numbers to convert to padded numbers
regular_numbers <- 1:19
padded_numbers <- group_numbers(regular_numbers)

# The padding matters when creating labels for groupings
# as numbers will be converted to characters if attached to strings.
# Sorts as expected:
sort(regular_numbers)

# Does not as a character:
sort(paste0("group_", regular_numbers))

# Will sort as expected when padded:
sort(paste0("group_", padded_numbers))
```

packer *Data Generation for Circle Packing*

Description

A tool for creating a data frame of values that create a circle packing design when plotted. When the default `circle_type` "whole" is used, the output should mapped with `geom_polygon` in a ggplot. When "swirl" is used, the output should be mapped with `geom_path` for the best results.

Usage

```
packer(
  n,
  min_x = 0,
  max_x = 100,
  min_y = 0,
  max_y = 100,
  big_r = 5,
  med_r = 3,
  small_r = 1,
  color_pal = NULL,
  color_type = "regular",
  circle_type = "whole"
)
```

Arguments

`n`	The total number of circles you would like the function to attempt to create. A single numeric value with a minimum value of 10.
`min_x`	The minimum limit of the x-axis - the left 'border' of the canvas A single numeric value.
`max_x`	The maximum limit of the x-axis - the right 'border' of the canvas A single numeric value.
`min_y`	The minimum limit of the y-axis - the bottom 'border' of the canvas A single numeric value.
`max_y`	The maximum limit of the y-axis - the top 'border' of the canvas A single numeric value.
`big_r`	The radius used for your 'big' sized circles A single numeric value.
`med_r`	The radius used for your 'medium' sized circles. A single numeric value.
`small_r`	The radius used for your 'small' sized circles. A single numeric value.
`color_pal`	A vector of hex color codes that will be mapped to the data.
`color_type`	Default is "regular" - The colors will be mapped in order from big circles to small circles. "reverse" - The colors will be mapped in reversed order from small to big circles. "random" - The colors will be mapped randomly to any sized circle.

circle_type	Default is "whole" - Regular circles. "swirl" - circles are replaced with spirals. Spirals should be mapped with geom_path in a ggplot for the best results.

Value

A Tibble

Examples

```
library(ggplot2)
set.seed(0310)
packed_circles <- packer(
  n = 50, big_r = 5, med_r = 3, small_r = 1,
  min_x = 0, max_x = 100, min_y = 0, max_y = 100
)
packed_circles

packed_circles |>
  ggplot(aes(x, y, group = group)) +
  theme_void() +
  theme(plot.background = element_rect(fill = "black")) +
  geom_polygon(fill = "white", color = "red") +
  coord_equal()
```

---

rotator *Rotate Points in a Data Frame Based on an Anchor Point*

Description

Rotates the x and y points in a given data frame by a given angle based on a designated anchor point.

Usage

```
rotator(data, x, y, angle = 5, anchor = "center", drop = FALSE)
```

Arguments

data	A data frame or tibble with at least x and y variables
x	A numeric variable in data. The variable intended to be plotted on the x axis in a ggplot.
y	A numeric variable in data. The variable intended to be plotted on the y axis in a ggplot.
angle	The angle (in degrees) the points in data will be rotated around it's anchor

anchor	The anchor point for the rotation. Default is "center". Options include:"center", "bottom", "top", "left", and "right"
drop	Logical TRUE or FALSE that determines if all other variables that are not being rotated are removed from the final output. Default is FALSE.

Value

A data frame

Examples

```
library(ggplot2)
original_square <- data.frame(
  x = c(0, 3, 3, 0, 0),
  y = c(0, 0, 3, 3, 0)
)
rotated_square <- rotator(data = original_square,
                          x = x,
                          y = y,
                          angle = 45,
                          anchor = "center")

ggplot()+
  geom_path(data = original_square,
                     aes(x,y),
                     color = "red")+
  geom_polygon(data = rotated_square,
                        aes(x,y),
                        fill = "purple")+
  coord_equal()
```

---

square_data *Data Generation for Squares*

Description

A tool for creating a data frame of values that create a square with a specified size when plotted.

The geom_path and geom_polygon geoms are recommended with this data for use in ggplot2 for generative art.

Usage

```
square_data(
  x,
  y,
  size,
  color = NULL,
  fill = NULL,
  n_points = 100,
  group_var = FALSE,
  group_prefix = "square_"
)
```

Arguments

x	Numeric value of length 1 - The bottom left x value of the square.
y	Numeric value of length 1 - The bottom left y value of the square.
size	Numeric value of length 1 that must be greater than 0 - The size of the square.
color	Character value of length 1 - The color of the square's border. A valid R color from colors() or a standard 6 digit hexadecimal webcolor like "#000000"
fill	Character value of length 1 - The color of the square. A valid R color from colors() or a standard 6 digit hexadecimal webcolor like "#000000"
n_points	Numeric value. Default is 100. This determines how many points the square will have. This option can come in handy when using jitter options or other texture/illusion methods. Must be of length 1 and at least a value of 4.
group_var	Logical. Default is FALSE. If TRUE, a group variable will be added to the dataframe. Useful in iterative data generation.
group_prefix	Character string of length 1 - The prefix used for the group variable. Default is "square_"

Value

A Tibble

Examples

```
# Creating one square
library(ggplot2)
one_square <- square_data(x = 0, y = 0, size = 5)

# Plot The Data
one_square |>
  ggplot(aes(x,y))+
  geom_path(color = "green")+
  coord_equal()

# To create multiple squares, use your preferred method of iteration:
```

```
# Creating two squares

library(purrr)
library(dplyr)

# Make your specs
x_vals <- c(0,4)
y_vals <- c(0,0)
sizes <- c(1,3)
fills <- c("purple", "yellow")
square_n <- 1:2

# Prep for your iteration
lst_square_specs <-
  list(
    x_vals,
    y_vals,
    sizes,
    fills,
    square_n
  )

# Use `square_data()` in your preferred iteration methods
two_squares <- pmap(lst_square_specs, ~square_data(
  x = ..1,
  y = ..2,
  size = ..3,
  fill = ..4,
  color = "#000000",
  group_var = TRUE
) |>
  # square_data adds a `group` variable if `group_var` = TRUE.
  # For multiple squares, a unique identifier should be added/pasted in.
  mutate(group = paste0(group,..5))
) |>
  list_rbind()

# Plot the data

two_squares |>
  ggplot(aes(x, y, group = group))+
  theme(legend.position = "none")+
  geom_polygon(color = two_squares$color,
               fill = two_squares$fill) +
  coord_equal()
```

---

wave_data *Data Generation for 2D Sine and Cosine Waves*

Description

A tool for making data frames filled with data that displays sine or cosine waves when graphed.

The geom_path and geom_polygon geoms are recommended with this data for use in ggplot2 for generative art.

Usage

```
wave_data(
  start,
  end,
  size = 1,
  type = "sin",
  orientation = "horizontal",
  freq = 3,
  n_points = 500,
  color = NULL,
  fill = NULL,
  group_var = FALSE,
  dampen = NULL,
  amplify = NULL
)
```

Arguments

start	Numeric value. The starting point of the wave on the coordinate system. By default refers to the x-axis. Will refer to the y-axis if orientation is set to vertical. Must be of length 1.
end	Numeric value. The ending point of the wave on the coordinate system. By default refers to the x-axis. Will refer to the y-axis if orientation is set to vertical Must be of length 1.
size	Numeric value. The height or width of the wave. Orientation is set to horizontal by default, thus size will affect height by default. When orientation is set to vertical, size controls the width of the wave. Must be a positive numeric value. Must be of length 1.
type	String value. "sin" or "cos" for sine or cosine waves. sin is default. Must be of length 1.
orientation	String value. Default is horizontal which will draw the wave from left to right (x-axis) on the coordinate system. vertical will draw the wave from bottom to top (y-axis) on the coordinate system. Must be of length 1.
freq	Numeric value. Default is 3 cycles per second. This affects how many "peaks" are created in the wave. Must be a positive numeric value. Must be of length 1.
n_points	Numeric value. Default is 500. This determines how many points each half of the wave will have. This option can come in handy when using jitter options or other texture/illusion methods. Must be of length 1.
color	Optional String Value. A 6 digit hexadecimal webcolor code, or R colors() color string for the border color of the wave. Must be of length 1.

fill	Optional String Value. A 6 digit hexadecimal webcolor code, or R colors() color string for the fill color of the wave. Must be of length 1.
group_var	Logic value. TRUE or FALSE. Default is FALSE. If TRUE, Adds a group variable to the data frame. Useful for iterative work to make multiple waves in a single data frame.
dampen	Optional. A factor in which to dampen the wave (make "flatter"). Must be of length 1.
amplify	Optional. A factor in which to amplify the wave (make "sharper"). Must be of length 1.

Value

A Tibble

Examples

```
library(ggplot2)
wave_df <- wave_data(
  start = 0, end = 10,
  fill = "purple",
  color = "green"
)

wave_df |>
  ggplot(aes(x, y)) +
  theme_void() +
  geom_polygon(
    fill = wave_df$fill,
    color = wave_df$color,
    linewidth = 3
  ) +
  coord_equal()
```

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