# Package 'aRtsy'

# August 8, 2021

Title	Generative	Art	with	'ggplot'
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**Description** Combines several algorithms for creating artworks in the ggplot2 language that incorporate some form of randomness (depending on the set seed).

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BugReports https://github.com/koenderks/aRtsy/issues

URL https://github.com/koenderks/aRtsy

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Config/testthat/edition 3

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canvas	ant
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Paint Langton's Ant on a Canvas

#### **Description**

This function paints Langton's Ant. Langton's ant is a two-dimensional universal Turing machine with a very simple set of rules but complex emergent behavior.

#### Usage

#### **Arguments**

colors a character (vector) specifying the colors for the ant. background a character specifying the color of the background.

iterations the number of iterations of the ant.
width the width of the artwork in pixels.
height the height of the artwork in pixels.

#### Value

A ggplot object containing the artwork.

# Author(s)

Koen Derks, <koen-derks@hotmail.com>

#### References

```
https://en.wikipedia.org/wiki/Langton%27s_ant
```

#### **Examples**

```
canvas_ant(colors = '#000000', background = '#fafafa')
```

canvas\_arcs

Paint Arcs on a Canvas

#### **Description**

Inspired by the work of @ijeamaka\_a, this type of artwork mimics her beautiful Arc Series. For private use only.

# Usage

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#### **Arguments**

colors a character vector specifying the 3 colors used for the arcs.

background a character string specifying the color used for the background.

n an integer specifying how many arcs should be put on the canvas.

nrow an (optional) integer specifying the number of rows on the canvas.

ncol an (optional) integer specifying the number of columns on the canvas.

dir a character string specifying which direction the arcs turn. Can be one of "right"

(default) or "left".

starts a character sting specifying where the arcs should start. Can be one of "clockwise"

(default) or "random".

#### Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

#### **Examples**

```
aRtsy:::canvas_arcs(colors = c('darkgreen', 'goldenrod', 'firebrick'), n = 9)
```

canvas\_circlemap

Paint a Circle Map on a Canvas

# Description

This function is my attempt at a circle map.

## Usage

```
canvas_circlemap(colors, x_min = 0, x_max = 12.56, y_min = 0, y_max = 1, iterations = 10, width = 1500, height = 1500)
```

## **Arguments**

colors	a character specifying the color used for the function shape.
x_min	a numeric value specifying the minimum value for the x-axis.
x_max	a numeric value specifying the maximum value for the x-axis.
y_min	a numeric value specifying the minimum value for the y-axis.
y_max	a numeric value specifying the maximum value for the y-axis.

iterations the number of iterations.

width the width of the artwork in pixels.
height the height of the artwork in pixels.

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#### Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

#### References

```
https://linas.org/art-gallery/circle-map/circle-map.html
```

#### **Examples**

```
canvas_circlemap(colors = c('forestgreen', 'firebrick', 'goldenrod', 'navyblue'))
```

canvas\_diamonds

Paint A Diamond on Canvas

## **Description**

This function draws many diamonds on the canvas and places two lines behind them. The diamonds can be transparent or have a random color sampled from the input.

## Usage

#### **Arguments**

colors a character (vector) specifying the colors used for the strokes.

background a character specifying the color used for the borders.

col.line color of the lines.

radius radius of the diamonds.

alpha transparency of the diamonds If NULL, added layers become increasingly more

transparent.

size size of the borders
p takeover probability.

width the width of the artwork in pixels.
height the height of the artwork in pixels.

#### Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

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#### **Examples**

```
set.seed(1)
canvas_diamonds(colors = c('forestgreen', 'goldenrod', 'firebrick', 'navyblue'), radius = 10)
```

canvas\_function

Paint Functions on a Canvas

# Description

This function paints functions with random parameters and mimics the functionality of the generativeart package.

## Usage

```
canvas_function(color, background = '#fafafa')
```

# **Arguments**

color a character specifying the color used for the function shape.

background a character specifying the color used for the background.

#### Value

A ggplot object containing the artwork.

## Author(s)

Koen Derks, <koen-derks@hotmail.com>

# References

```
https://github.com/cutterkom/generativeart
```

# Examples

```
set.seed(1)
canvas_function(color = '#000000', background = '#fafafa')
```

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canvas	mondr	าลลท

Paint a Mondriaan on a Canvas

#### **Description**

This function paints a Mondriaan.

#### Usage

# Arguments

colors a character vector specifying the colors used in the squares.

background a character specifying the color used for the background (borders).

cuts the number of cuts to make.
ratio the 1:1 ratio for each cut.

width the width of the artwork in pixels.
height the height of the artwork in pixels.

#### Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

# Examples

```
set.seed(6)
canvas_mondriaan(colors = c('forestgreen', 'goldenrod', 'firebrick', 'navyblue'))
```

canvas\_planet

Paint a Planet on a Canvas

#### **Description**

This function paints one or multiple planets.

#### Usage

7 canvas\_polylines

#### **Arguments**

colors a character specifying the colors used for the planet(s). Can also be a list where each entry is a vector of colors for each planet. a character specifying the threshold for a color take. threshold

iterations the number of iterations of the planets

starprob the probability of drawing a star in outer space.

fade the fading factor.

radius a numeric (vector) specifying the radius of the planet(s). center.x the x-axis coordinate(s) for the center(s) of the planet(s). center.y the y-axis coordinate(s) for the center(s) of the planet(s). whether to draw the light from the right or the left. light.right

width the width of the artwork in pixels. height the height of the artwork in pixels.

#### Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

#### **Examples**

```
# Sun behind Earth and Moon
set.seed(1)
colors <- list(c("khaki1", "lightcoral", "lightsalmon"),</pre>
               c("dodgerblue", "forestgreen", "white"),
               c("gray", "darkgray", "beige"))
canvas_planet(colors, radius = c(800, 400, 150),
              center.x = c(1, 500, 1100),
              center.y = c(1400, 500, 1000),
              starprob = 0.005)
```

canvas\_polylines

Paint Polygons and Lines on Canvas

#### **Description**

This function draws many points on the canvas and connects these points into a polygon. After repeating this for all the colors, the edges of all polygons are drawn on top of the artwork.

#### Usage

```
canvas_polylines(colors, background = '#fafafa', ratio = 0.5, iterations = 1000,
                 alpha = NULL, size = 0.1, width = 500, height = 500)
```

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#### **Arguments**

colors a character (vector) specifying the colors used for the strokes.

background a character specifying the color used for the borders.
ratio width of the polygons. Larger ratios cause more overlap.

iterations the number of points for each polygon.

alpha transparency of the polygons. If NULL, added layers become increasingly more

transparent.

size size of the borders.

width the width of the artwork in pixels.
height the height of the artwork in pixels.

#### Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

#### **Examples**

```
set.seed(1)
canvas_polylines(colors = c('forestgreen', 'goldenrod', 'firebrick', 'navyblue'))
```

canvas\_ribbons

Paint Ribbons on a Canvas

### **Description**

This function paints ribbons and (optionally) a triangle in the middle.

#### Usage

```
canvas_ribbons(colors, background = '#fdf5e6', triangle = TRUE)
```

# **Arguments**

colors a character (vector) specifying the colors for the ribbons. Colors determine the

number of ribbons.

background a character specifying the color of the background.

triangle logical. Whether to draw the triangle that breaks the ribbon polygons.

#### Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

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#### **Examples**

```
set.seed(1)
canvas_ribbons(colors = c("forestgreen", "firebrick", "dodgerblue", "goldenrod"))
```

canvas\_strokes

Paint Strokes on a Canvas

# Description

This function creates an artwork that resembles paints strokes. The algorithm is based on the simple idea that each next point on the grid has a chance to take over the color of an adjacent colored point but also has a change of generating a new color.

# Usage

#### **Arguments**

colors	a character (vector) specifying the colors used for the strokes.
neighbors	the number of neighbors a block considers when taking over a color. More neighbors fades the artwork.
p	the probability of selecting a new color at each block. A higher probability adds more noise to the artwork.
iterations	the number of iterations on the artwork. More iterations fade the artwork.
width	the width of the artwork in pixels.
height	the height of the artwork in pixels.
side	whether to turn the artwork on its side.

### Value

A ggplot object containing the artwork.

# Author(s)

```
Koen Derks, <koen-derks@hotmail.com>
```

## **Examples**

```
set.seed(1)
canvas_strokes(colors = c('forestgreen', 'goldenrod', 'firebrick', 'navyblue'))
```

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canvas\_turmite

Paint a Turmite on a Canvas

# Description

This function paints a turmite. A turmite is a Turing machine which has an orientation in addition to a current state and a "tape" that consists of a two-dimensional grid of cells. The algorithm is simple: 1) turn on the spot (left, right, up, down) 2) change the color of the square 3) move forward one square.

#### Usage

#### **Arguments**

color a character specifying the color used for the turmite.

background a character specifying the color used for the background.

p the probability of a state switch within the turmite.

iterations the number of iterations of the turmite.
width the width of the artwork in pixels.

height the height of the artwork in pixels.

# Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

#### References

```
https://en.wikipedia.org/wiki/Turmite
```

# **Examples**

```
set.seed(1)
canvas_turmite(color = "#000000", background = "#fafafa")
```

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saveCanvas	Save a canvas to an external device.	

# Description

This function is a wrapper around ggplot2::ggsave. It provides a suggested export with square dimensions for a canvas created using the aRtsy package.

# Usage

```
saveCanvas(plot, filename)
```

# Arguments

x a ggplot2 object.

#### Value

A ggplot object containing the artwork.

#### Author(s)

Koen Derks, <koen-derks@hotmail.com>

 $the {\tt meCanvas}$ 

Canvas theme for ggplot2 objects

#### **Description**

Add a canvas theme to the plot. The canvas theme by default has no margins and fills any empty canvas with a background color.

## Usage

```
themeCanvas(x, background = '#fafafa', margin = -1.25)
```

# Arguments

x a ggplot2 object.

background a character specifying the color used for the empty canvas.

margin margins of the plot.

## Value

A ggplot object containing the artwork.

## Author(s)

Koen Derks, <koen-derks@hotmail.com>

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