Package 'tmap.cartogram'

May 8, 2026

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Title Extension to 'tmap' for Creating Cartograms

Type Package

Description Provides new layer functions to 'tmap' for creating various types of cartograms. A cartogram is a type of thematic map in which geographic areas are resized or distorted based on a quantitative variable, such as population. The goal is to make the area sizes proportional to the selected variable while preserving geographic positions as much as possible.

Version 0.2

Encoding UTF-8

Depends R (>= 3.5.0),

Imports tmap (>= 4.1), sf, cartogram

Suggests knitr, transformr, gifski

Config/Needs/check Nowosad/spDataLarge, lwgeom, r-tmap/tmap

Config/Needs/coverage Nowosad/spDataLarge, lwgeom

Config/Needs/website bookdown, rmarkdown, r-tmap/tmap

URL https://github.com/r-tmap/tmap.cartogram, https://r-tmap.github.io/tmap.cartogram/

BugReports https://github.com/r-tmap/tmap.cartogram/issues

RoxygenNote 7.3.2

NeedsCompilation no

Author Martijn Tennekes [aut, cre], Sebastian Jeworutzki [ctb]

Maintainer Martijn Tennekes <mtennekes@gmail.com>

Repository CRAN

Date/Publication 2025-05-14 12:40:01 UTC

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`tm_cartogram` *Map layer: cartogram*

Description

Map layer that draws a cartogram. See details for types. It is recommended to specify a proper crs in [tmap::tm_shape()].

Usage

```
tm_cartogram(
  size = 1,
  size.scale = tmap::tm_scale(),
  size.legend = tmap::tm_legend_hide(),
  size.chart = tmap::tm_chart_none(),
  size.free = NA,
  plot.order = tmap::tm_plot_order("size", reverse = FALSE),
  options = opt_tm_cartogram(),
  ...
)

tm_cartogram_ncont(
  size = 1,
  size.scale = tm_scale(),
  size.legend = tm_legend_hide(),
  size.chart = tm_chart_none(),
  size.free = NA,
  plot.order = tm_plot_order("size", reverse = FALSE),
  options = opt_tm_cartogram_ncont(),
  ...
)

tm_cartogram_dorling(
  size = 1,
  size.scale = tm_scale(),
  size.legend = tm_legend_hide(),
  size.chart = tm_chart_none(),
  size.free = NA,
  plot.order = tm_plot_order("size", reverse = FALSE),
  options = opt_tm_cartogram_dorling(),
  ...
)

opt_tm_cartogram(type = "cont", itermax = 15, ...)

opt_tm_cartogram_ncont(type = "ncont", expansion = 1, inplace = FALSE, ...)
```

```
opt_tm_cartogram_dorling(type = "dorling", share = 5, itermax = 1000, ...)
```

Arguments

size, size.scale, size.legend, size.chart, size.free	Visual variable that specifies the polygon sizes.
plot.order	Specification in which order the spatial features are drawn. See [tmap:tm_plot_order()] for details.
options	passed on to the corresponding 'opt_<layer_function>' function
...	arguments passed on to [cartogram::cartogram_cont()]
type	cartogram type, one of: "cont" for contiguous cartogram, "ncont" for non-contiguous cartogram and "dorling" for Dorling cartograms
itermax	maximum number of iterations (see [cartogram::cartogram_cont()])
expansion	factor expansion, see [cartogram::cartogram_ncont()] (argument 'k')
inplace	should each polygon be modified in its original place? ('TRUE' by default)
share	share of the bounding box filled with the larger circle (see [cartogram::cartogram_dorling()] argument 'k')

Details

In the contiguous cartogram polygons are distorted where the geographic relations are maintained. The algorithm by Dougenik et al. (1985) is used via [cartogram::cartogram_cont()].

In the non-contiguous cartogram polygons are resized only. The used algorithm has been proposed by Olson (1976) and implemented in [cartogram::cartogram_ncont()].

The Dorling cartogram (Dorling, 1996) generates proportional bubbles and is implemented in [cartogram::cartogram_dorling()].

Value

a [tmap::tmap-element], supposed to be stacked after [tmap::tm_shape()] using the '+' operator. The 'opt_<layer_function>' function returns a list that should be passed on to the 'options' argument.

References

Dougenik, J. A., Chrisman, N. R., & Niemeyer, D. R. (1985). An Algorithm To Construct Continuous Area Cartograms. In The Professional Geographer, 37(1), 75-81.

Olson, J. M. (1976). Noncontiguous Area Cartograms. In The Professional Geographer, 28(4), 371-380.

Dorling, D. (1996). Area Cartograms: Their Use and Creation. In Concepts and Techniques in Modern Geography (CATMOG), 59.

Examples

```
library(tmap)

Africa = World[World$continent == "Africa", ]

tm_shape(Africa, crs = "+proj=robin") +
  tm_cartogram_ncont(size = "pop_est", options = opt_tm_cartogram_ncont())


tm_shape(Africa, crs = "+proj=robin") +
  tm_cartogram(size = "pop_est", options = opt_tm_cartogram(itermax = 15))

tm_shape(World, crs = "+proj=robin") +
  tm_polygons() +
  tm_cartogram_ncont(size = "pop_est", fill = "yellow")

# with animation
if (requireNamespace("transformr")) {
tm_shape(Africa, crs = "+proj=robin") +
  tm_cartogram(
    size = "*pop_est",
    fill = "footprint", options = opt_tm_cartogram(itermax = 15))
}
```

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