

Package ‘ggvoronoi’

October 13, 2022

Version 0.8.5

Date 2022-08-25

Title Voronoi Diagrams and Heatmaps with 'ggplot2'

Author Robert C. Garrett [aut, cre],
Austin Nar [aut],
Thomas J. Fisher [aut],
Karsten Maurer [ctb],
Duncan Murdoch [ctb]

Maintainer Robert C. Garrett <garretrc@miamioh.edu>

Description

Easy creation and manipulation of Voronoi diagrams using 'deldir' with visualization in 'ggplot2'. Convenient functions are provided to create nearest neighbor diagrams and heatmaps. Diagrams are computed with 'deldir' and processed to work with the 'sp' framework. Results are provided in a convenient spatial data structure and displayed with 'ggplot2'. An outline can be provided by the user to specify the spatial domain of interest.

Depends R (>= 2.10), ggplot2 (>= 2.2.0)

Imports deldir, sp, rgeos, raster, methods

License MIT + file LICENSE

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Suggests knitr, rmarkdown, ggmap, dplyr, scales, testthat, vdiff,
mapproj

VignetteBuilder knitr, ggmap, mapproj

URL <https://github.com/garretrc/ggvoronoi/>

NeedsCompilation no

Repository CRAN

Date/Publication 2022-08-26 22:12:02 UTC

R topics documented:

fortify_voronoi	2
geom_voronoi	3
ncdc_locations	4
oxford_bikes	5
oxford_map	5
stat_voronoi	6
voronoi_polygon	7
Index	9

fortify_voronoi	<i>Create Data Frame from voronoi_polygons output</i>
-----------------	---

Description

Allows output of [voronoi_polygon](#) to be plotted using [geom_polygon](#).

Usage

```
fortify_voronoi(vor_spdf)
```

Arguments

vor_spdf Output from [voronoi_polygon](#) ([SpatialPolygonsDataFrame](#))

Value

A data.frame containing coordinates to trace the paths of the provided voronoi diagram.

Examples

```
set.seed(45056)
x <- sample(1:200,100)
y <- sample(1:200,100)
points <- data.frame(x, y,
                     distance = sqrt((x-100)^2 + (y-100)^2))
circle <- data.frame(x = 100*(1+cos(seq(0, 2*pi, length.out = 2500))),
                    y = 100*(1+sin(seq(0, 2*pi, length.out = 2500))),
                    group = rep(1,2500))

vor_spdf <- voronoi_polygon(data=points,x="x",y="y",outline=circle)
vor_df <- fortify_voronoi(vor_spdf)

ggplot(vor_df) +
  geom_polygon(aes(x=x,y=y,fill=distance,group=group))
```

Description

Convenience function for use with `stat_voronoi`. Uses `geom_polygon` as the default geom and `stat_voronoi` as the default stat. To plot region borders instead of a choropleth map, use `stat_voronoi` with `geom="path"`, or use `fill=NA` with `color="black"`.

Usage

```
geom_voronoi(mapping = NULL, data = NULL, stat = StatVoronoi,
             position = "identity", ..., na.rm = FALSE, show.legend = NA,
             inherit.aes = TRUE, outline = NULL)
```

Arguments

mapping	Set of aesthetic mappings created by <code>aes()</code> or <code>aes_()</code> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	The data to be displayed in this layer. There are three options: If <code>NULL</code> , the default, the data is inherited from the plot data as specified in the call to <code>ggplot()</code> . A <code>data.frame</code> , or other object, will override the plot data. All objects will be fortified to produce a data frame. See <code>fortify()</code> for which variables will be created. A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code> , and will be used as the layer data.
stat	The statistical transformation to use on the data for this layer, as a string.
position	Position adjustment, either as a string, or the result of a call to a position adjustment function.
...	Other arguments passed on to <code>layer()</code> . These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code> . They may also be parameters to the paired geom/stat.
na.rm	If <code>FALSE</code> , the default, missing values are removed with a warning. If <code>TRUE</code> , missing values are silently removed.
show.legend	logical. Should this layer be included in the legends? <code>NA</code> , the default, includes if any aesthetics are mapped. <code>FALSE</code> never includes, and <code>TRUE</code> always includes. It can also be a named logical vector to finely select the aesthetics to display.
inherit.aes	If <code>FALSE</code> , overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <code>borders()</code> .
outline	<code>data.frame</code> with first column <code>x/longitude</code> , second column <code>y/latitude</code> , and a group column denoting islands or pieces.

Value

Adds a path or polygon layer depicting a nearest neighbor diagram to a 'ggplot' figure.

Examples

```
set.seed(45056)
x <- sample(1:200,100)
y <- sample(1:200,100)
points <- data.frame(x, y,
                     distance = sqrt((x-100)^2 + (y-100)^2))
circle <- data.frame(x = 100*(1+cos(seq(0, 2*pi, length.out = 2500))),
                    y = 100*(1+sin(seq(0, 2*pi, length.out = 2500))),
                    group = rep(1,2500))

ggplot(points) +
  geom_voronoi(aes(x=x,y=y,fill=distance))

ggplot(points) +
  geom_voronoi(aes(x=x,y=y,fill=distance),outline=circle)

ggplot(points) +
  geom_voronoi(aes(x=x,y=y,fill=distance),fill=NA,color="black")
```

ncdc_locations

Locations and Elevation of NCDC Weather Stations

Description

A dataset containing identifying information as well as coordinates and elevation for each unique North American land-based weather station in the National Climatic Data Center. Note that sites with a missing elevation in the raw data (recorded as -999.9) have been removed. Some sites have a potentially erroneous recorded elevation of zero meters.

Usage

```
ncdc_locations
```

Format

A data frame with 65804 rows and 6 variables:

ID ID number to connect the data back to other NCDC data
country country that the site is in. USA, Canada or Mexico
state two character state/province abbreviation that the site is in
lat latitude coordinate
long longitude coordinate
elev site elevation in meters

Source

National Climatic Data Center

oxford_bikes *Bike Rack Locations in Oxford, Ohio.*

Description

A dataset with the location of bike racks in Oxford, Ohio. Includes Miami University's campus and Uptown Oxford. GPS coordinates were measured for each bike rack via handheld GPS receivers. Off-campus data were gathered for a Miami University GIS class project and On-campus data were gathered for a Miami University Kinesiology research project.

Usage

oxford_bikes

Format

A data frame with 205 rows and 3 variables:

x longitude coordinate

y latitude coordinate

name location name, if recorded

Source

Madeline Maurer (Miami University Department of Geography); Justin Hopkins, Dr. Helaine Alessio and Amanda Meiring (Miami University Department of Kinesiology)

oxford_map *Google Map of Oxford, Ohio.*

Description

A ggmap object containing a static google map image of Oxford, Ohio. Zoomed in to show the Uptown Oxford and Miami University campus areas.

Usage

oxford_map

Format

Large ggmap object

Source

Google Maps static map api (accessed from 'ggmap' package)

 stat_voronoi

Voronoi Diagrams with ggplot2

Description

See [geom_voronoi](#) for general use. Use `geom="polygon"` for choropleth heatmap or `geom="path"` for region borders.

Usage

```
stat_voronoi(mapping = NULL, data = NULL, geom = "polygon",
             position = "identity", na.rm = FALSE, show.legend = NA,
             inherit.aes = TRUE, outline = NULL, ...)
```

Arguments

mapping	Set of aesthetic mappings created by aes() or aes_() . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	The data to be displayed in this layer. There are three options: If <code>NULL</code> , the default, the data is inherited from the plot data as specified in the call to ggplot() . A <code>data.frame</code> , or other object, will override the plot data. All objects will be fortified to produce a data frame. See fortify() for which variables will be created. A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code> , and will be used as the layer data.
geom	The geometric object to use display the data
position	Position adjustment, either as a string, or the result of a call to a position adjustment function.
na.rm	If <code>FALSE</code> , the default, missing values are removed with a warning. If <code>TRUE</code> , missing values are silently removed.
show.legend	logical. Should this layer be included in the legends? <code>NA</code> , the default, includes if any aesthetics are mapped. <code>FALSE</code> never includes, and <code>TRUE</code> always includes. It can also be a named logical vector to finely select the aesthetics to display.
inherit.aes	If <code>FALSE</code> , overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. borders() .
outline	<code>data.frame</code> with first column <code>x/longitude</code> , second column <code>y/latitude</code> , and a group column denoting islands or pieces.
...	Other arguments passed on to layer() . These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code> . They may also be parameters to the paired <code>geom/stat</code> .

Examples

```

set.seed(45056)
x <- sample(1:200,100)
y <- sample(1:200,100)
points <- data.frame(x, y,
                     distance = sqrt((x-100)^2 + (y-100)^2))
circle <- data.frame(x = 100*(1+cos(seq(0, 2*pi, length.out = 2500))),
                    y = 100*(1+sin(seq(0, 2*pi, length.out = 2500))),
                    group = rep(1,2500))

ggplot(points) +
  stat_voronoi(aes(x=x,y=y,fill=distance))

ggplot(points) +
  stat_voronoi(aes(x=x,y=y),geom="path")

ggplot(points) +
  stat_voronoi(aes(x=x,y=y,fill=distance),outline=circle)

```

 voronoi_polygon

Voronoi Diagram from Data Frame

Description

Create a Voronoi diagram for analysis or plotting with [geom_polygon](#).

Usage

```

voronoi_polygon(data, x = "x", y = "y", outline = NULL,
               data.frame = FALSE)

```

Arguments

data	data.frame containing a set of points to make voronoi regions and any additional desired columns.
x	numeric vector (for example longitude).
y	numeric vector (for example latitude).
outline	data.frame with first column x/longitude, second column y/latitude, and a group column denoting islands or pieces.
data.frame	output as data.frame? You will lose information if you do this. For use in StatVoronoi .

Value

Returns a [SpatialPolygonsDataFrame](#) containing the polygon tiles of the nearest neighbor diagram generated by the provided (x,y) coordinates.

Examples

```
set.seed(45056)
x <- sample(1:200,100)
y <- sample(1:200,100)
points <- data.frame(x, y,
                     distance = sqrt((x-100)^2 + (y-100)^2))
circle <- data.frame(x = 100*(1+cos(seq(0, 2*pi, length.out = 2500))),
                    y = 100*(1+sin(seq(0, 2*pi, length.out = 2500))),
                    group = rep(1,2500))

vor_spdf <- voronoi_polygon(data=points,x="x",y="y",outline=circle)
vor_df <- fortify_voronoi(vor_spdf)

ggplot(vor_df) +
  geom_polygon(aes(x=x,y=y,fill=distance,group=group))
```


Index

* **choropleth**

- fortify_voronoi, 2
- geom_voronoi, 3
- stat_voronoi, 6
- voronoi_polygon, 7

* **datasets**

- ncdc_locations, 4
- oxford_bikes, 5
- oxford_map, 5
- stat_voronoi, 6

* **voronoi**

- fortify_voronoi, 2
- geom_voronoi, 3
- stat_voronoi, 6
- voronoi_polygon, 7

aes(), 3, 6

aes_(), 3, 6

borders(), 3, 6

fortify(), 3, 6

fortify_voronoi, 2

geom_polygon, 2, 3, 7

geom_voronoi, 3, 6

ggplot(), 3, 6

layer(), 3, 6

ncdc_locations, 4

oxford_bikes, 5

oxford_map, 5

SpatialPolygonsDataFrame, 2, 7

stat_voronoi, 3, 6

StatVoronoi, 7

StatVoronoi (stat_voronoi), 6

voronoi_polygon, 2, 7