

Package ‘ggredist’

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Title Scales, Geometries, and Extensions of 'ggplot2' for Election Mapping

Version 0.0.2

Description Provides 'ggplot2' extensions for political map making. Implements new geometries for groups of simple feature geometries. Adds palettes and scales for red to blue color mapping and for discrete maps. Implements tools for easy label generation and placement, automatic map coloring, and themes.

Depends R (>= 2.10)

Imports grDevices, ggplot2, scales

Suggests sf, geos, redist

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URL <https://github.com/alarm-redist/ggredist>,
<https://alarm-redist.org/ggredist/>

BugReports <https://github.com/alarm-redist/ggredist/issues>

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cities	<i>U.S. Cities</i>
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Description

This data contains the location, name, and 2020 population of U.S. cities and large towns.

Usage

```
data("cities")
```

Format

sf object

name City name.

state City state.

pop_2020 City population in 2020

GEOID Census GEOID for the corresponding Census Designated Place.

geometry The sf geometry column containing the geographic information.

Examples

```
data(cities)
```

geom_district	<i>Aggregate and Plot Map Regions</i>
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Description

Aggregates shapefile according to the group aesthetic. If just group is provided, then by default map regions will be colored by group so that adjacent regions do not share a color (set fill to force a particular color, or NA for no fill). If fill is provided, the values in fill will be summed within the groups defined by group. If denom is provided, the values in denom will be summed within the groups defined by group, and then used to divide the summed values of fill. For example, fill and denom can be used together to plot the partisan or demographic characteristics congressional districts (see examples).

Usage

```
geom_district(  
  mapping = NULL,  
  data = NULL,  
  position = "identity",  
  na.rm = FALSE,  
  is_coverage = FALSE,  
  min_col = FALSE,  
  buffer = 0,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...  
)
```

```
stat_district(  
  mapping = NULL,  
  data = NULL,  
  geom = GeomDistrict,  
  position = "identity",  
  na.rm = FALSE,  
  is_coverage = FALSE,  
  min_col = FALSE,  
  buffer = 0,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...  
)
```

Arguments

mapping	Set of aesthetic mappings created by <code>aes()</code>
data	The data to be displayed in this layer

position	Position adjustment
na.rm	if TRUE, will silently remove missing values from calculations
is_coverage	As in <code>sf::st_union()</code> . May speed up plotting for large shapefiles if geos is not installed or the shapefile is not projected.
min_col	If TRUE, try to minimize the number of colors used. May be necessary for short palettes.
buffer	Optionally buffer the merged geometries. Negative values will shrink geometries towards the center and can be used for a "glowing boundary" effect (see examples).
show.legend	Should this layer be included in the legends?
inherit.aes	If FALSE, overrides the default aesthetics, rather than combining with them.
...	Passed onto the underlying geoms.
geom	The geometric object to use display the data

Value

a ggproto object

Examples

```
library(ggplot2)
data(oregon)

ggplot(oregon, aes(group=county)) +
  geom_district() +
  scale_fill_penn82() +
  theme_map()

ggplot(oregon, aes(group=county, fill=pop)) +
  geom_district() +
  theme_map()

ggplot(oregon, aes(group=cd_2020, fill=ndv, denom=ndv+nrv)) +
  geom_district() +
  scale_fill_party_c(limits=c(0.4, 0.6)) +
  theme_map()

ggplot(oregon, aes(group=county)) +
  geom_district() +
  geom_district(buffer=-5000, fill="#ffffffcc", color=NA) +
  scale_fill_natgeo() +
  theme_map()
```

geom_district_text *Label Map Regions*

Description

Aggregates shapefile according to the group aesthetic and positions labels for each region defined by group. By default, labels will be sized in rough proportion to the available area.

Usage

```
geom_district_text(  
  mapping = NULL,  
  data = NULL,  
  position = "identity",  
  na.rm = FALSE,  
  adjust = 1,  
  check_overlap = FALSE,  
  parse = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...  
)  
  
geom_district_label(  
  mapping = NULL,  
  data = NULL,  
  position = "identity",  
  na.rm = FALSE,  
  label.padding = ggplot2::unit(0.25, "lines"),  
  label.r = ggplot2::unit(0.15, "lines"),  
  label.size = 0.25,  
  check_overlap = FALSE,  
  parse = FALSE,  
  adjust = 1,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...  
)  
  
stat_district_coordinates(  
  mapping = NULL,  
  data = NULL,  
  geom = "text",  
  position = "identity",  
  na.rm = FALSE,  
  adjust = 1,  
  show.legend = NA,
```

```

  inherit.aes = TRUE,
  ...
)

```

Arguments

mapping	Set of aesthetic mappings created by aes()
data	The data to be displayed in this layer
position	Position adjustment
na.rm	if TRUE, will silently remove missing values from calculations
adjust	A multiplicative scaling factor for the default label sizes
check_overlap	If TRUE, text that overlaps previous text in the same layer will not be plotted.
parse	If TRUE, the labels will be parsed into expressions and displayed as described in ?plotmath .
show.legend	Should this layer be included in the legends?
inherit.aes	If FALSE, overrides the default aesthetics, rather than combining with them.
...	Passed onto the underlying geoms.
label.padding	Padding around label
label.r	Radius of rounded corners
label.size	Size of label border (mm)
geom	The geometric object to use display the data

Value

a ggproto object

Examples

```

library(ggplot2)
data(oregon)

ggplot(oregon, aes(group=county)) +
  geom_district() +
  geom_district_text() +
  scale_fill_randmcnally() +
  theme_map()

ggplot(oregon, aes(group=cd_2020)) +
  geom_district(lwd=0.9, color="#442222") +
  geom_district(aes(group=county), lwd=0.4, lty="dashed", fill=NA) +
  geom_district_text(aes(group=county, label=toupper(county)),
    size=2.2, check_overlap=TRUE) +
  geom_district_text(adjust=2) +
  scale_fill_penn82() +
  theme_map()

```

`geom_places`*Emphasize Populated Regions of a Map with greyed out Places*

Description

Identifies relevant census places and plots them.

Usage

```
geom_places(  
  mapping = NULL,  
  data = NULL,  
  position = "identity",  
  na.rm = FALSE,  
  state = NULL,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...  
)  
  
stat_places(  
  mapping = NULL,  
  data = NULL,  
  geom = ggplot2::GeomSf,  
  position = "identity",  
  na.rm = FALSE,  
  state = NULL,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...  
)
```

Arguments

<code>mapping</code>	Set of aesthetic mappings created by <code>aes()</code>
<code>data</code>	The data to be displayed in this layer
<code>position</code>	Position adjustment
<code>na.rm</code>	if TRUE, will silently remove missing values from calculations
<code>state</code>	state to use. Guesses based on overlap if not provided.
<code>show.legend</code>	Should this layer be included in the legends?
<code>inherit.aes</code>	If FALSE, overrides the default aesthetics, rather than combining with them.
<code>...</code>	Passed onto the underlying geoms.
<code>geom</code>	The geometric object to use display the data

Value

a ggproto object

Examples

```
library(ggplot2)
data(oregon)

ggplot(oregon, aes(group = cd_2020)) +
  geom_district() +
  theme_map()
ggplot(oregon, aes(group = cd_2020)) +
  geom_district() +
  theme_map()
```

ggredist

Redistricting Color Palettes

Description

Included palettes:

- **partisan**, a perceptually uniform red-white-blue scale
- **dra**, the Dave's Redistricting App classic color palette
- **penn82**, historic categorical color palette from the 1982 published Pennsylvania congressional district map
- **randmcnally** and **natgeo**, colors taken from Rand-McNally and National Geographic political maps
- **coast** and **larch**, inspired by natural scenery

Usage

```
ggredist
```

Format

list of character vectors of type palette (which supports a plot() generic for visualization)

Examples

```
plot(ggredist$partisan)
plot(ggredist$dra)
plot(ggredist$penn82)
plot(ggredist$randmcnally)
plot(ggredist$natgeo)
plot(ggredist$coast)
plot(ggredist$larch)
```

interstates	<i>Insterstate Shapefile</i>
-------------	------------------------------

Description

This data contains geometry information for the U.S. Interstate Highway System. It was processed from the U.S. Census Bureau TIGER/Line Shapefile system.

Usage

```
data("interstates")
```

Format

sf object

name Census Bureau name for the interstate

geometry The sf geometry column containing the geographic information.

Examples

```
data(interstates)
```

label_party_margin	<i>Label Partisan Vote Shares</i>
--------------------	-----------------------------------

Description

For example, a 45% Democratic vote share becomes "R+10" or "55% R".

Usage

```
label_party_margin(midpoint = 0.5, reverse = FALSE, accuracy = 1)
```

```
label_party_pct(midpoint = 0.5, reverse = FALSE, accuracy = 1)
```

Arguments

midpoint	Either 0.5, the default, or 0. For <code>label_party_margin()</code> , if zero, scale will not be doubled (0.05 becomes "D+5" with <code>midpoint=0</code> , while 0.55 becomes "D+10" with <code>midpoint=0.5</code>)
reverse	If TRUE, reverse "D" and "R".
accuracy	As with scales::number_format

Value

A labeling function

Examples

```
labeler = label_party_margin(accuracy=0.1)
labeler(c(0.3, 0.5, 0.543))
labeler = label_party_margin(reverse=TRUE)
labeler(c(0.3, 0.5, 0.543))
```

map_coloring

Produce a Map Coloring

Description

Finds colors for every element of a shapefile so that adjacent elements don't have the same color.

Usage

```
map_coloring(shp, min_coloring = TRUE)
```

Arguments

shp an sf object
min_coloring if TRUE, try to minimize the number of colors used

Value

an integer vector of the same length as shp, corresponding to the coloring.

Examples

```
data(oregon)
or_short = oregon[30:50, ]
map_coloring(or_short)

library(ggplot2)
ggplot(or_short, aes(fill = map_coloring(or_short))) +
  geom_sf() +
  theme_map()
```

`oregon`*Oregon Redistricting File*

Description

This data contains geographic, demographic, and political information on the 1,071 census tracts of the state of Oregon.

Usage

```
data("oregon")
```

Format

`sf` object

`county` The county the tract belongs to.

`cd_2020` The 2210 congressional district assignment for the tract.

`pop` The total population of the tract, according to the 2020 Census.

`pop_white` The non-Hispanic white population of the precinct.

`ndv` Average number of votes for Democratic candidates in recent statewide elections.

`nrsv` Average number of votes for Republican candidates in recent statewide elections.

`geometry` The `sf` geometry column containing the geographic information.

Examples

```
data(oregon)
oregon[, 1:6]
```

`scale_fill_538`*FiveThirtyEight scales for ggplot2*

Description

`FiveThirtyEight` scales for `ggplot2`

Usage

```
scale_fill_538(...)
```

```
scale_color_538(...)
```

Arguments

`...` additional arguments to `ggplot::scale_*` functions

Value

ggplot scale function

Examples

```
scale_fill_538()
scale_color_538()
```

scale_fill_coast

Nature-derived Color Scales for ggplot2

Description

Nature-derived Color Scales for ggplot2

Usage

```
scale_fill_coast(...)
scale_color_coast(...)
scale_colour_coast(...)
scale_fill_larch(...)
scale_color_larch(...)
scale_colour_larch(...)
```

Arguments

... Arguments passed on to `ggplot2::discrete_scale()`

Value

ggplot scale function

Examples

```
library(ggplot2)
data(oregon)

ggplot(oregon, aes(group = county)) +
  geom_district() +
  scale_fill_coast() +
  theme_map()

ggplot(oregon, aes(group = county)) +
```

```
geom_district() +  
scale_fill_larch() +  
theme_map()
```

scale_fill_dra	<i>Dave's Redistricting App classic scale for ggplot2</i>
----------------	---

Description

Dave's Redistricting App classic scale for ggplot2

Usage

```
scale_fill_dra(...)  
scale_color_dra(...)  
scale_colour_dra(...)
```

Arguments

... Arguments passed on to `ggplot2::discrete_scale()`

Value

ggplot scale function

Examples

```
library(ggplot2)  
data(oregon)  
  
ggplot(oregon, aes(group = county, fill=county)) +  
  geom_district() +  
  scale_fill_dra() +  
  theme_map()
```

scale_fill_penn82 *Historical Pennsylvania Color Scale for ggplot2*

Description

Historical Pennsylvania Color Scale for ggplot2

Usage

```
scale_fill_penn82(...)  
scale_color_penn82(...)  
scale_colour_penn82(...)
```

Arguments

... Arguments passed on to `ggplot2::discrete_scale()`

Value

ggplot scale function

Examples

```
library(ggplot2)  
data(oregon)  
  
ggplot(oregon, aes(group = county)) +  
  geom_district() +  
  scale_fill_penn82() +  
  theme_map()
```

scale_fill_randmcnally
Rand-McNally and National Geographic Color Scales for ggplot2

Description

Rand-McNally and National Geographic Color Scales for ggplot2

Usage

```
scale_fill_randmcnally(...)  
scale_color_randmcnally(...)  
scale_colour_randmcnally(...)  
scale_fill_natgeo(...)  
scale_color_natgeo(...)  
scale_colour_natgeo(...)
```

Arguments

... Arguments passed on to `ggplot2::discrete_scale()`

Value

ggplot scale function

Examples

```
library(ggplot2)  
data(oregon)  
  
ggplot(oregon, aes(group = county)) +  
  geom_district() +  
  scale_fill_randmcnally() +  
  theme_map()  
  
ggplot(oregon, aes(group = county)) +  
  geom_district() +  
  scale_fill_natgeo() +  
  theme_map()
```

Description

Partisan scales for ggplot2

Usage

```

scale_fill_party_c(
  name = "Vote share",
  midpoint = 0.5,
  limits = 0:1,
  labels = label_party_pct(),
  oob = scales::squish,
  reverse = FALSE,
  ...
)

scale_color_party_c(
  name = "Vote share",
  midpoint = 0.5,
  limits = 0:1,
  labels = label_party_pct(),
  oob = scales::squish,
  reverse = FALSE,
  ...
)

scale_fill_party_d(labels = c("Rep.", "Dem."), reverse = FALSE, ...)

scale_color_party_d(labels = c("Rep.", "Dem."), reverse = FALSE, ...)

scale_fill_party_b(
  name = "Vote share",
  midpoint = 0.5,
  limits = 0:1,
  labels = label_party_pct(),
  oob = scales::squish,
  reverse = FALSE,
  nice.breaks = FALSE,
  ...
)

scale_color_party_b(
  name = "Vote share",
  midpoint = 0.5,
  limits = 0:1,
  labels = label_party_pct(),
  oob = scales::squish,
  reverse = FALSE,
  nice.breaks = FALSE,
  ...
)

scale_colour_party_d(labels = c("Rep.", "Dem."), reverse = FALSE, ...)

```



```

scale_colour_party_c(
  name = "Vote share",
  midpoint = 0.5,
  limits = 0:1,
  labels = label_party_pct(),
  oob = scales::squish,
  reverse = FALSE,
  ...
)

scale_colour_party_b(
  name = "Vote share",
  midpoint = 0.5,
  limits = 0:1,
  labels = label_party_pct(),
  oob = scales::squish,
  reverse = FALSE,
  nice.breaks = FALSE,
  ...
)

```

Arguments

name	Name for scale. Default is "Vote share".
midpoint	Scale midpoint value. Default is 0.5.
limits	Lower and upper limits for scale. Default is 0:1.
labels	Function to adjust scale labels. Default is scales::percent.
oob	Function to deal with out of bounds. Default is scales::squish().
reverse	Whether to reverse red and blue.
...	Additional arguments to ggplot::scale_* functions
nice.breaks	If TRUE, attempt to place breaks at nice values instead of exactly evenly spaced between the limits.

Value

ggplot scale function

Examples

```

library(ggplot2)
data(oregon)

ggplot(oregon, aes(fill = ndv / (ndv + nrv))) +
  geom_sf(size = 0) +
  scale_fill_party_c(limits=c(0.3, 0.7)) +
  theme_map()

```

```
ggplot(oregon, aes(fill = ndv / (ndv + nrv))) +
  geom_sf(size = 0) +
  scale_fill_party_b() +
  theme_map()
```

stat_cities

Annotate a Map with Roads and Cities

Description

Clips the [interstates](#) and [cities](#) datasets to the bounding box of the map and plots them.

Usage

```
stat_cities(
  mapping = NULL,
  data = NULL,
  geom = ggplot2::GeomSf,
  position = "identity",
  na.rm = FALSE,
  adjust = 1,
  min_pop = 1e+05,
  show.legend = NA,
  inherit.aes = TRUE,
  ...
)
```

```
stat_interstates(
  mapping = NULL,
  data = NULL,
  geom = ggplot2::GeomSf,
  position = "identity",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  ...
)
```

Arguments

mapping	Set of aesthetic mappings created by aes()
data	The data to be displayed in this layer
geom	The geometric object to use display the data
position	Position adjustment
na.rm	if TRUE, will silently remove missing values from calculations

adjust	A multiplicative scaling factor for the default label sizes
min_pop	The minimum population a city must have had in 2006 to be shown.
show.legend	Should this layer be included in the legends?
inherit.aes	If FALSE, overrides the default aesthetics, rather than combining with them.
...	Passed onto the underlying geoms.

Value

a ggproto object

Examples

```
library(ggplot2)
data(oregon)

ggplot(oregon, aes(group=cd_2020)) +
  geom_district() +
  stat_interstates(size=1.4, color="#0044aa55") +
  stat_cities(geom="text", min_pop=130e3, fontface="bold", adjust=0.8) +
  scale_fill_penn82() +
  theme_map()
```

 theme_map

Map Theme

Description

Theme for maps which uses the 'Times' family and has a transparent background.

Usage

```
theme_map(...)
```

Arguments

... additional parameters

Value

ggplot2 theme

Examples

```
library(ggplot2)
data(oregon)

ggplot(oregon, aes(group = county)) +
  geom_district() +
  scale_fill_penn82() +
  theme_map()
```

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