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```
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Description Provides 'ggplot2' extensions to construct glyph-maps for
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     <doi:10.18637/jss.v110.i07>. The manuscript for this package is
     currently under preparation and can be found on GitHub at
     <https://github.com/maliny12/paper-sugarglider>.
License MIT + file LICENSE
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```

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add_glyph_boxes

Add Glyph Boxes layer to glyph plot

Description

This function introduces a custom layer to a ggplot, employing 'glyph boxes' to visually represent individual glyph. Users can specify various aesthetics including alpha, height, width, color, line type, and fill to customize the appearance.

Usage

```
add_glyph_boxes(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  x_major = NULL,
  y_major = NULL,
  height = "default",
  width = "default",
  fill = "white",
  linewidth = 0.1,
  inherit.aes = TRUE,
  show.legend = NA,
  ...
)
```

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Arguments

stat

mapping Set of aesthetic mappings created by aes(). If specified and inherit.aes =

TRUE (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.

The data to be displayed in this layer. If NULL, the default, the data is inherited data

from the plot data as specified in the call to ggplot().

The statistical transformation to use on the data for this layer. When using a geom_*() function to construct a layer, the stat argument can be used the override the default coupling between geoms and stats. The stat argument accepts the following:

• A Stat ggproto subclass, for example StatCount.

- A string naming the stat. To give the stat as a string, strip the function name of the stat_prefix. For example, to use stat_count(), give the stat as "count".
- For more information and other ways to specify the stat, see the layer stat documentation.

A position adjustment to use on the data for this layer. This can be used in various ways, including to prevent overplotting and improving the display. The position argument accepts the following:

- The result of calling a position function, such as position_jitter(). This method allows for passing extra arguments to the position.
- A string naming the position adjustment. To give the position as a string, strip the function name of the position_ prefix. For example, to use position_jitter(), give the position as "jitter".
- For more information and other ways to specify the position, see the layer position documentation.

x_major, y_major

Aesthetics to map plot coordinates for major and minor glyph components.

The height of each glyph. The 'default' is calculated using the ratio (1:1.618) height

relative to the 'width', to maintain a consistent aspect ratio.

width The width of each glyph. The 'default' is set to the smallest distance between

two consecutive coordinates, converted from meters to degrees of latitude using

the Haversine method.

fill The color used to fill the glyph box.

linewidth The thickness of the glyph box.

If FALSE, 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().

show.legend logical. Should this layer be included in the legends? NA, the default, includes if

any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.

Additional arguments passed on to function.

position

inherit.aes

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Value

A layer object that can be added to a ggplot.

add_glyph_legend

Add Legend Layer to a ggplot

Description

This function adds a custom legend layer to a ggplot object using the specified aesthetics and parameters.

Usage

```
add_glyph_legend(
 mapping = NULL,
 data = NULL,
  stat = "identity",
  position = "identity",
  show.legend = NA,
  x_minor = NULL,
  x_scale = identity,
 y_scale = identity,
  fill = "black",
  color = "black",
  linewidth = 0.5,
  alpha = 0.8,
  global_rescale = TRUE,
  inherit.aes = TRUE,
)
```

Arguments

mapping

Set of aesthetic mappings created by aes(). If specified and inherit.aes = TRUE (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 NULL, the default, the data is inherited from the plot data as specified in the call to ggplot().

A data. frame, 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 data. frame, and will be used as the layer data. A function can be created from a formula (e.g. \sim head(.x, 10)).

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stat

The statistical transformation to use on the data for this layer. When using a geom_*() function to construct a layer, the stat argument can be used the override the default coupling between geoms and stats. The stat argument accepts the following:

- A Stat ggproto subclass, for example StatCount.
- A string naming the stat. To give the stat as a string, strip the function name of the stat_prefix. For example, to use stat_count(), give the stat as "count".
- For more information and other ways to specify the stat, see the layer stat documentation.

position

A position adjustment to use on the data for this layer. This can be used in various ways, including to prevent overplotting and improving the display. The position argument accepts the following:

- The result of calling a position function, such as position_jitter(). This method allows for passing extra arguments to the position.
- A string naming the position adjustment. To give the position as a string, strip the function name of the position_ prefix. For example, to use position_jitter(), give the position as "jitter".
- For more information and other ways to specify the position, see the layer position documentation.

show.legend

logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.

x_minor
x_scale, y_scale

Aesthetics to map plot coordinates for major and minor glyph components.

The scaling function applied to each set of minor values within a grid cell. Defaults to 'identity'.

fill The fill color for the geometric object.

color The color of the geometric object's border or line.

linewidth The width of the geometric object's line.

alpha The transparency level of the geometric object, ranging from 0 (fully transpar-

ent) to 1 (fully opaque).

global_rescale A setting that determines whether to perform rescaling globally or on individual

glyphs.

inherit.aes If FALSE, 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().

... Additional arguments passed on to function.

Value

A ggplot2 layer.

6 add_ref_lines

add_ref_lines

Add reference lines to glyph plot

Description

This function draw reference lines that include both major and minor division markers.

Usage

```
add_ref_lines(
 mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  show.legend = NA,
  x_major = NULL,
 y_major = NULL,
 height = "default",
 width = "default",
  inherit.aes = TRUE,
  linewidth = 0.1,
)
```

Arguments

mapping

Set of aesthetic mappings created by aes(). If specified and inherit.aes = TRUE (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. If NULL, the default, the data is inherited from the plot data as specified in the call to ggplot().

stat

The statistical transformation to use on the data for this layer. When using a geom_*() function to construct a layer, the stat argument can be used the override the default coupling between geoms and stats. The stat argument accepts the following:

- A Stat ggproto subclass, for example StatCount.
- A string naming the stat. To give the stat as a string, strip the function name of the stat_ prefix. For example, to use stat_count(), give the stat as "count".
- For more information and other ways to specify the stat, see the layer stat documentation.

position

A position adjustment to use on the data for this layer. This can be used in various ways, including to prevent overplotting and improving the display. The position argument accepts the following:

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• The result of calling a position function, such as position_jitter(). This method allows for passing extra arguments to the position.

- A string naming the position adjustment. To give the position as a string, strip the function name of the position_ prefix. For example, to use position_jitter(), give the position as "jitter".
- For more information and other ways to specify the position, see the layer position documentation.

show.legend

logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.

x_major, y_major

Aesthetics to map plot coordinates for major and minor glyph components.

height The height of each glyph. The 'default' is calculated using the ratio (1:1.618)

relative to the 'width', to maintain a consistent aspect ratio.

width The width of each glyph. The 'default' is set to the smallest distance between

two consecutive coordinates, converted from meters to degrees of latitude using

the Haversine method.

inherit.aes If FALSE, 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().

linewidth The thickness of the reference line.

. . . Additional arguments passed on to function.

Value

A ggplot2 layer.

	4 W W A D A 2022	
aus_temp	Australian Weather Data for 2022	

Description

This dataset contains aggregated monthly average temperatures (minimum and maximum) and precipitation for selected Australian weather stations for the year 2022. Stations were selected based on specific criteria such as operational status and completeness of data for the year.

Usage

aus_temp

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Format

A data frame with the following columns:

id Station ID.

long Longitude of the station.

lat Latitude of the station.

month Month for the aggregated data.

tmin Monthly average minimum temperature (in degrees Celsius).

tmax Monthly average maximum temperature (in degrees Celsius).

prcp Monthly average precipitation (in mm).

Source

GHCN Daily data via 'meteo_pull_monitors' from the 'rnoaa' package.

flights

Flight Summary from Airports with the Most Cancellations

Description

This dataset contains information on the minimum and maximum number of flights that originated from the top 10 U.S. airports with the highest number of flight cancellations. The airports included are Denver (DEN), Orlando (MCO), Seattle (SEA), Atlanta (ATL), Dallas/Fort Worth (DFW), Chicago O'Hare (ORD), Las Vegas (LAS), Los Angeles (LAX), and Phoenix (PHX).

Usage

flights

Format

'flights' A data frame with 120 rows and 6 columns:

origin The origin airport for that flight

month The month of the flight

long Longitude of the airport

lat Latitude of the airport

min_flights The minimum number of flights that originated from the airport

max_flights The maximum number of flights that originated from the airport

geom_glyph_ribbon 9

geom_glyph_ribbon

Create a Glyph Ribbon plot using ggplot2

Description

This function creates a ribbon geometry designed to display glyphs based on the combination of 'x_major' and 'y_major'. For each 'x_minor' value, 'geom_glyph_ribbon()' displays a y interval defined by 'ymin_minor' and 'ymax_minor'.

Usage

```
geom_glyph_ribbon(
 mapping = NULL,
  data = NULL,
  show.legend = NA,
  stat = "identity",
  position = "identity",
 x_major = NULL,
 y_major = NULL,
 x_minor = NULL,
 ymin_minor = NULL,
  ymax_minor = NULL,
  height = "default",
 width = "default",
 x_scale = identity,
  y_scale = identity,
  global_rescale = TRUE,
  inherit.aes = TRUE,
)
```

Arguments

mapping

Set of aesthetic mappings created by aes(). If specified and inherit.aes = TRUE (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 NULL, the default, the data is inherited from the plot data as specified in the call to ggplot().

A data.frame, 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 data. frame, and will be used as the layer data. A function can be created from a formula (e.g. \sim head(.x, 10)).

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show.legend

logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.

stat

The statistical transformation to use on the data for this layer. When using a geom_*() function to construct a layer, the stat argument can be used the override the default coupling between geoms and stats. The stat argument accepts the following:

- A Stat ggproto subclass, for example StatCount.
- A string naming the stat. To give the stat as a string, strip the function name of the stat_ prefix. For example, to use stat_count(), give the stat as "count".
- For more information and other ways to specify the stat, see the layer stat documentation.

position

A position adjustment to use on the data for this layer. This can be used in various ways, including to prevent overplotting and improving the display. The position argument accepts the following:

- The result of calling a position function, such as position_jitter(). This method allows for passing extra arguments to the position.
- A string naming the position adjustment. To give the position as a string, strip the function name of the position_ prefix. For example, to use position_jitter(), give the position as "jitter".
- For more information and other ways to specify the position, see the layer position documentation.

x_major, y_major, x_minor, ymin_minor, ymax_minor

Each combination of 'x_major' and 'y_major' forms a unique grid cell. 'ymin_minor' and 'ymax minor' define the lower and upper bounds of the geom ribbon.

height

The height of each glyph. The 'default' is calculated using the ratio (1:1.618) relative to the 'width', to maintain a consistent aspect ratio.

width

The width of each glyph. The 'default' is set to the smallest distance between two consecutive coordinates, converted from meters to degrees of latitude using the Haversine method.

x_scale, y_scale

The scaling function applied to each set of minor values within a grid cell. Defaults to 'identity'.

global_rescale A setting that determines whether to perform rescaling globally or on individual glyphs.

inherit.aes

If FALSE, 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().

Additional arguments passed on to function.

Value

A ggplot object.

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Examples

```
library(ggplot2)
# Basic glyph map with base map and custom theme
aus temp |>
 ggplot(aes(x_major = long, y_major = lat,
         x_minor = month, ymin_minor = tmin, ymax_minor = tmax)) +
 geom_sf(data = ozmaps::abs_ste, fill = "grey95",
          color = "white",inherit.aes = FALSE) +
 geom_glyph_ribbon() +
 ggthemes::theme_map()
# Adjust width and height of the glyph
aus_temp |>
 ggplot(aes(x_major = long, y_major = lat,
         x_minor = month, ymin_minor = tmin, ymax_minor = tmax)) +
 geom_sf(data = ozmaps::abs_ste, fill = "grey95",
          color = "white",inherit.aes = FALSE) +
 geom_glyph_ribbon(width = rel(4.5), height = rel(3)) +
 ggthemes::theme_map()
# Extend glyph map with reference box and line
aus_temp |>
 ggplot(aes(x_major = long, y_major = lat,
         x_minor = month, ymin_minor = tmin, ymax_minor = tmax)) +
 geom_sf(data = ozmaps::abs_ste, fill = "grey95",
          color = "white",inherit.aes = FALSE) +
 add_glyph_boxes() +
 add_ref_lines() +
 geom_glyph_ribbon() +
 ggthemes::theme_map()
```

geom_glyph_segment

Create a Glyph Segment plot using ggplot2

Description

This function enables the creation of segment glyphs by defining major coordinates (longitude and latitude) and minor segment structures within a grid cell. Each glyph's appearance can be customized by specifying its height, width, and scaling, allowing for flexible data representation in a visual context.

Usage

```
geom_glyph_segment(
  mapping = NULL,
  data = NULL,
  stat = "identity",
```

```
position = "identity",
  x_{major} = NULL
  x_minor = NULL,
 y_major = NULL,
 y_minor = NULL,
 yend_minor = NULL,
 width = "default",
  x_scale = identity,
  y_scale = identity,
  height = "default",
  global_rescale = TRUE,
  show.legend = NA,
  inherit.aes = TRUE
)
```

Arguments

mapping

Set of aesthetic mappings created by aes(). If specified and inherit.aes = TRUE (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 NULL, the default, the data is inherited from the plot data as specified in the call to ggplot().

A data. frame, 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 data.frame, and will be used as the layer data. A function can be created from a formula (e.g. ~ head(.x, 10)).

stat

The statistical transformation to use on the data for this layer, either as a ggproto Geom subclass or as a string naming the stat stripped of the stat_ prefix (e.g. "count" rather than "stat_count")

position

Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use position_jitter), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.

Other arguments passed on to layer(). These are often aesthetics, used to set an aesthetic to a fixed value, like colour = "red" or size = 3. They may also be parameters to the paired geom/stat.

x_major, x_minor, y_major, y_minor, yend_minor

The name of the variable (as a string) for the major and minor x and y axes. x_major and y_major specify a longitude and latitude on a map while x_minor, y_minor, and yend_minor provide the structure for glyph.

width

The width of each glyph. The 'default' is set to the smallest distance between two consecutive coordinates, converted from meters to degrees of latitude using the Haversine method.

geom_glyph_segment 13

y_scale, x_scale

The scaling function to be applied to each set of minor values within a grid cell.

The default is identity which produces a result without scaling.

height The height of each glyph. The 'default' is calculated using the ratio (1:1.618)

relative to the 'width', to maintain a consistent aspect ratio.

global_rescale Determines whether or not the rescaling is performed globally or separately for

each individual glyph.

show. legend logical. Should this layer be included in the legends? NA, the default, includes if

any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.

inherit.aes If FALSE, 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().

Value

a ggplot object

Examples

```
library(ggplot2)
# Basic glyph map with base map and custom theme
aus_temp |>
 ggplot(aes(x_major = long, y_major = lat,
         x_minor = month, y_minor = tmin, yend_minor = tmax)) +
 geom_sf(data = ozmaps::abs_ste, fill = "grey95",
          color = "white",inherit.aes = FALSE) +
 geom_glyph_segment() +
 ggthemes::theme_map()
# Adjust width and height of the glyph
aus_temp |>
 ggplot(aes(x_major = long, y_major = lat,
         x_minor = month, y_minor = tmin, yend_minor = tmax)) +
 geom_sf(data = ozmaps::abs_ste, fill = "grey95",
          color = "white",inherit.aes = FALSE) +
 geom_glyph_segment(width = rel(4.5), height = rel(3)) +
 ggthemes::theme_map()
# Extend glyph map with reference box and line
aus_temp |>
 ggplot(aes(x_major = long, y_major = lat,
         x_minor = month, y_minor = tmin, yend_minor = tmax)) +
 geom_sf(data = ozmaps::abs_ste, fill = "grey95",
          color = "white",inherit.aes = FALSE) +
 add_glyph_boxes() +
 add_ref_lines() +
 geom_glyph_segment() +
 ggthemes::theme_map()
```

14 historical_temp

historical_temp

Historical Australian Weather Data from 2021-2022

Description

This dataset contains aggregated monthly average temperatures (minimum and maximum) and precipitation for selected Australian weather stations for the years 2021 and 2022. It provides a broader historical perspective compared to 'aus_temp'. Stations were selected based on operational status and data completeness.

Usage

historical_temp

Format

A data frame with the following columns:

id Station ID.

long Longitude of the station.

lat Latitude of the station.

month Month for the aggregated data.

year Year for the aggregated data, either 2021 or 2022.

tmin Monthly average minimum temperature (in degrees Celsius).

tmax Monthly average maximum temperature (in degrees Celsius).

prcp Monthly average precipitation (in mm).

Source

GHCN Daily data via 'meteo_pull_monitors' from the 'rnoaa' package.

theme_glyph 15

theme_glyph

Customized Theme for Glyph Plots

Description

'theme_glyph()' provides a customized theme for glyph maps, built on top of 'theme_map()' from 'ggthemes'. It adjusts the plot's appearance, including the legend position, text styles, and background settings, to create a clean, visually consistent layout for glyph visualizations.

Usage

```
theme_glyph(
  control = list(plot.title = rel(1.5), plot.subtitle = rel(1.3), plot.caption = rel(1),
    legend.text = rel(1), legend.title = rel(1))
)
```

Arguments

control

A list specifying the relative font sizes for different plot elements. The list can contain the following components:

plot.title Font size for the plot title (default: rel(1.5)).
plot.subtitle Font size for the plot subtitle (default: rel(1.3)).
plot.caption Font size for the plot caption (default: rel(1)).
legend.text Font size for the legend text (default: rel(1)).
legend.title Font size for the legend title (default: rel(1)).

Details

This theme includes:

- Legend positioned inside the plot, at the bottom left corner.
- Horizontal legend direction with 'mono' font for text.
- Centered plot titles with bold, 'mono' font.
- 'mono' fonts for subtitles and captions.
- White background for both the panel and plot.

Value

A ggplot2 theme object with customized settings for glyph plots.

See Also

```
[ggthemes::theme_map()], [ggplot2::theme()]
```

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Examples

train

Hourly Train Station Patronage 2023-2024

Description

This data set provides a comprehensive hourly summary of patronage at each train station in Victoria for the fiscal year 2023-2024. The number of patronage is definded by the total number of boarding and alighting at each station. This data set includes detailed breakdowns by day types such as weekdays, weekends, and holidays (including school and public holidays). Note the influence of station closures which may skew or omit data on particular days.

Usage

```
data(train)
```

Format

A data frame with each row representing aggregated monthly data per station, containing:

station_name Name of the train station.

hour Operating hour ranging from 5AM to 12PM.

long Longitude of the train station.

lat Latitude of the train station.

services Number of unique services passing through the station.

mode Transportation mode, such as 'Metro', 'VLine', or both.

min_weekday Minimum hourly patronage on a typical weekday.

max_weekday Maximum hourly patronage on a typical weekday.

min_weekend Minimum hourly patronage on weekends.

max_weekend Maximum hourly patronage on weekends.

min_holiday Minimum hourly patronage during school and public holidays.

max_holiday Maximum hourly patronage during school and public holidays.

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Note

Stations with incomplete entries due to closure are not included in this dataset.

Source

https://discover.data.vic.gov.au/dataset/train-service-passenger-counts

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