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Title  Grammar Extensions to 'ggplot2'
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Description  Extensions to 'ggplot2' respecting the grammar of graphics paradigm. Geometries: geom_table(), geom_plot() and geom_grob() add insets to plots using native data coordinates, while geom_table_npc(), geom_plot_npc() and geom_grob_npc() do the same using "npc" coordinates through new aesthetics "npcx" and "npcy". Statistics: select observations based on 2D density. Positions: radial nudging away from a center point and nudging away from a line or curve; combined stacking and nudging; combined dodging and nudging.
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Description

Extensions to 'ggplot2' respecting the grammar of graphics paradigm. Geometries: geom_table(), geom_plot() and geom_grob() add insets to plots using native data coordinates, while geom_table_npc(), geom_plot_npc() and geom_grob_npc() do the same using "npc" coordinates through new aesthetics "npcx" and "npcy". Statistics: select observations based on 2D density. Positions: radial nudging away from a center point and nudging away from a line or curve; combined stacking and nudging; combined dodging and nudging.

Details

Package 'ggpp' provides functions that extend the grammar of graphics as implemented in 'ggplot2'. It attempts to stay true to the original grammar and to respect the naming conventions used in 'ggplot2'.

Extensions provided:

- Geoms adding support for plot, table and grob insets within the grammar. Geoms using a parallel pseudo-scale based on native plot coordinates (npc) to allow annotations consistent with the grammar and so supporting facets and grouping. Geoms for annotations on the edges of the plotting area. Geom for easily drawing lines separating the quadrants of a plot.
- Stats for filtering-out/filtering-in observations in regions of a panel or group where the density of observations is high. Statistics simultaneously computing summaries, optionally using different functions, along x and y. Stat computing quadrant counts.
- Position functions implementing multi-directional nudging based on the data.
- Scales. Pseudo-scales supporting npc coordinates for x and y.
- Specializations of the ggplot() generic accepting time series objects of classes ts and xts as data argument.

Acknowledgements

We thank Kamil Slowikowski not only for contributing ideas and code examples to this package but also for adding new features to his package 'ggrepel' that allow new use cases for stat_dens2d_labels(), position_nudge_center(), position_nudge_line() and position_nudge_to() from this package. This package includes code copied and/or modified from that in package 'ggplot2'.

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References

Package 'ggplot2' documentation is available at https://ggplot2.tidyverse.org/
Package 'ggplot2' source code at https://github.com/tidyverse/ggplot2

See Also

Useful links:

- https://docs.r4photobiology.info/ggpp/
- https://github.com/aphalo/ggpp
- Report bugs at https://github.com/aphalo/ggpp/issues

---

### annotate

**Annotations supporting NPC**

---

**Description**

A revised version of annotate() from package 'ggplot2' adding support for npcx and npcy position aesthetics, allowing use of the geometries defined in the current package such as geom_text_npc(). It also has a parameter label that directly accepts data frames, ggplots and grobs as arguments in addition to objects of atomic classes like character. When package 'ggpmisc' is loaded this definition of annotate() overrides that in package 'ggplot2'.

**Usage**

```r
annotate(
  geom, 
  x = NULL, 
  y = NULL, 
  xmin = NULL, 
  xmax = NULL, 
  ymin = NULL, 
  ymax = NULL, 
  xend = NULL, 
  yend = NULL, 
  npcx = NULL, 
 npcy = NULL, 
  label = NULL, 
  ...,
  na.rm = FALSE
)
```
Arguments

- **geom**: character. Name of geom to use for annotation.
- **x, y, xmin, ymin, xmax, ymax, xend, yend, npcx, npcy**: numeric. Positioning aesthetics - you must specify at least one of these.
- **label**: character, data.frame, ggplot or grob.
- **...**: Other named arguments passed on to `layer()`. These are often aesthetics, used to set an aesthetic to a fixed value, like color = "red" or size = 3. They may also be parameters to the paired geom/stat.
- **na.rm**: logical. If `FALSE`, the default, missing values are removed with a warning. If `TRUE`, missing values are silently removed.

Details

Note that all position aesthetics are scaled (i.e., they will expand the limits of the plot so they are visible), but all other aesthetics are set. This means that layers created with this function will never affect the legend.

Value

A plot layer instance.

Note

To use the original definition of `annotate()` after loading package 'ggpmisc', use `ggplot2::annotate()`.

Examples

```r
p <- ggplot(mtcars, aes(x = wt, y = mpg)) + geom_point()

# Works as ggplot2::annotate()
p + annotate("text", x = 5, y = 32, label = "Some text")
p + annotate("label", x = c(2, 5), y = c(15, 32),
              label = c("A", "B"))
p + annotate("table", x = 5, y = 30,
              label = data.frame(A = 1:2, B = letters[1:2]))
p + annotate("plot", x = 5.5, y = 34,
              label = p + theme_bw(9))
p + annotate("rect", xmin = 3, xmax = 4.2, ymin = 12, ymax = 21, alpha = .2)
p + annotate("segment", x = 2.5, xend = 4, y = 15, yend = 25, colour = "blue")
p + annotate("pointrange", x = 3.5, y = 20, ymin = 12, ymax = 28,
            colour = "red", size = 1.5)

# But ggpmisc::annotate() also works with npcx and npcy pseudo-aesthetics
p + annotate("label_npc", npcx = c(0.1, 0.9), npcy = c(0.1, 0.9),
             label = c("A", "B"))
p + annotate("label_npc", npcx = 0.9, npcy = c(0.1, 0.9),
             label = c("A", "B"))
p + annotate("text_npc", npcx = 0.9, npcy = 0.9, label = "Some text")
```
p + annotate("text_npc", npcx = "right", npcy = "top", label = "Some text")

p + annotate("table_npc", npcx = 0.9, npcy = 0.9,
              label = data.frame(A = 1:2, B = letters[1:2]))

p + annotate("plot_npc", npcx = 1, npcy = 1,
              label = p + theme_bw(9))
p + annotate("plot_npc", npcx = c(0, 1), npcy = c(0, 1),
              label = list(p + theme_bw(9), p + theme_grey(9)),
              vp.width = 0.3, vp.height = 0.4)

---

### compute_npcx

**Compute npc coordinates**

**Description**

Convert character-encoded positions to npc units and shift positions to avoid overlaps when grouping is active. If numeric, validate npc values.

**Usage**

```r
compute_npcx(x, group = 1L, h.step = 0.1, margin.npc = 0.05, each.len = 1)
compute_npcy(y, group = 1L, v.step = 0.1, margin.npc = 0.05, each.len = 1)
```

**Arguments**

- `x`: numeric or if character, one of "right", "left", "centre", "center" or "middle".
- `group`: integer vector, ggplot's group id. Used to shift coordinates to avoid overlaps.
- `margin.npc`: numeric [0..1] The margin added towards the nearest plotting area edge when converting character coordinates into npc. Usually « 1.
- `each.len`: integer The number of steps per group.
- `y`: numeric or if character, one of "top", "bottom", "centre", "center" or "middle".

**Details**

These functions use NPC (normalized plot coordinates) instead of data coordinates. They translate named positions into numeric values in [0..1] and they can also shift the position according to the group, e.g., for each increase in the group number displace the position inwards or outwards, by a user-supplied distance. They make it possible to set automatically set default positions for grouped text labels.

Out of bounds numeric values are constrained to [0..1]. Unrecognized character values are silently converted into `NA_integer_`. 
Value

A numeric vector with values in the range \([0..1]\) representing npc coordinates.

Note

These functions are used by several layer functions in packages `ggpp` and `ggpmisc`, and can be useful to developers of other `ggplot2` extensions.

Examples

```r
compute_npcx("right")
compute_npcx(c("left", "right"))
compute_npcy("bottom")
compute_npcy("bottom", group = 1L:3L)
compute_npcy("bottom", group = 2L)
compute_npcy(0.5)
compute_npcx(1)
```

---

**dark_or_light**  
*Chose between dark and light color*

Description

Chose between a pair of contrasting dark and light colors based on a weighted mean of RGB channels of a color. This function implements a simple approach to the choice for a color of a plot element to ensure it is visible against a background color.

Usage

```r
dark_or_light(
  colors,
  threshold = 0.45,
  dark.color = "black",
  light.color = "white"
)
```

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>colors</td>
<td>A vector of color definitions or color names in the background.</td>
</tr>
<tr>
<td>threshold</td>
<td>numeric A value of luminance in ([0..1]) indicating the switch point between dark and light background.</td>
</tr>
<tr>
<td>dark.color, light.color</td>
<td>A color definition or color name to return as dark and light colors to contrast light and dark backgrounds respectively.</td>
</tr>
</tbody>
</table>
Details

The switch between dark and light color is based on a quick and dirty approximation of the luminance of colors computed from RGB values. This easily computed approximation seems to work well enough. The default threshold chosen for a switch between black and white may need to be adjusted for other pairs of colors. Graphic devices can differ in the color spaces they support, but this is unlikely to affect the choice between black and white or other pairs of colors with large differences in luminance.

Note

The current implementation of `dark_or_light()` ignores alpha, the transparency component, of all its arguments.

Examples

dark_or_light("yellow")
dark_or_light("darkblue")
dark_or_light(c("darkblue", "yellow", "red"))
dark_or_light("#FFFFFF")
dark_or_light("#FFFFFF", dark.color = "darkblue", light.color = "lightgrey")
dark_or_light("#000000", dark.color = "darkblue", light.color = "lightgrey")

Description

gem_grob and `geom_grob_npc` add Grobs as insets to the ggplot using syntax similar to that of `geom_text`, `geom_text_s` and `geom_text_npc`. In most respects they behave as any other ggplot geometry: they add a layer containing one or more grobs and grouping and faceting works as usual. The most common use of `geom_grob` is to add data labels that are graphical objects rather than text. `geom_grob_npc` is used to add grobs as annotations to plots, but contrary to layer function `annotate()`, `geom_grob_npc` is data driven and respects grouping and facets, thus plot insets can differ among panels. Of these two geoms only `geom_grob` supports the plotting of segments, as `geom_grob_npc` uses a coordinate system that is unrelated to data units and data.

Usage

gem_grob(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...
  nudge_x = 0,
 geom_grob

nudge_y = 0,
default.colour = "black",
default.color = default.colour,
colour.target = "segment",
color.target = colour.target,
default.alpha = 1,
alpha.target = "segment",
add.segments = TRUE,
box.padding = 0.25,
point.padding = 1e-06,
segment.linewidth = 0.5,
min.segment.length = 0,
ar = NULL,
na.rm = FALSE,
show.legend = FALSE,
inherit.aes = FALSE
)

geom_grob_npc(
  mapping = NULL,
data = NULL,
stat = "identity",
position = "identity",
...,  
na.rm = FALSE,
show.legend = FALSE,
inherit.aes = FALSE
)

Arguments

mapping  The aesthetic mapping, usually constructed with aes. Only needs to be set at
the layer level if you are overriding the plot defaults.
data A layer specific dataset - only needed if you want to override the plot defaults.
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 adjust-
ment function.
... other arguments passed on to layer. This can include aesthetics whose values
you want to set, not map. See layer for more details.
nudge_x, nudge_y Horizontal and vertical adjustments to nudge the starting position of each text
label. The units for nudge_x and nudge_y are the same as for the data units on
the x-axis and y-axis.
default.colour, default.color A colour definition to use for elements not targeted by the colour aesthetic.
colour.target, color.target A vector of character strings; "all", "text", "box" and "segment" or "none".
default.alpha numeric in [0..1] A transparency value to use for elements not targeted by the alpha aesthetic.

alpha.target A vector of character strings: "all", "text", "segment", "box", "box.line", and "box.fill" or "none".

add.segments logical Display connecting segments or arrows between original positions and displaced ones if both are available.

box.padding, point.padding numeric By how much each end of the segments should shortened in mm.

segment.linewidth numeric By how much each end of the segments should shortened in mm.

min.segment.length numeric Width of the segments or arrows in mm.

arrow specification for arrow heads, as created by arrow

na.rm If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.

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.

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.

Details

You can modify the size of insets with the vp.width and vp.height aesthetics. These can take a number between 0 (smallest possible inset) and 1 (whole plotting area width or height). The default value for for both of these aesthetics is 1/5. Thus, in contrast to geom_text, geom_label, geom_text_s and geom_label_s the size of the insets remains the same relative to the size of the plotting area irrespective of the size the plot is rendered at. The aspect ratio of insets is preserved and size is adjusted until the whole inset fits within the viewport.

By default geom_grob uses position_nudge_center and justification "position", while geom_grob_npc uses position_nudge and justification "inward". In contrast to position_nudge, position_nudge_center and all other position functions defined in packages 'ggpp' keep the original coordinates thus allowing the plotting of connecting segments and arrows.

This geom_grob and geom_grob_npc require the use tibbles as argument for data, as the grobs should be stored as a list of graphics objects ("grob") to be mapped to the label aesthetic.

The x and y aesthetics determine the position of the whole inset grob, similarly to that of a text label, justification is interpreted as indicating the position of the grob with respect to its x and y coordinates in the data, and angle is used to rotate the grob as a whole.

Value

A plot layer instance.
Plot boundaries and clipping

The "width" and "height" of an inset as for a text element are 0, so stacking and dodging inset plots will not work by default, and axis limits are not automatically expanded to include all inset plots. Obviously, insets do have height and width, but they are physical units, not data units. The amount of space they occupy on the main plot is not constant in data units of the base plot: when you modify scale limits, inset plots stay the same size relative to the physical size of the base plot.

Alignment

You can modify text alignment with the vjust and hjust aesthetics. These can either be a number between 0 (right/bottom) and 1 (top/left) or a character ("left", "middle", "right", "bottom", "center", "top"). In addition, you can use special alignments for justification including "position", "inward" and "outward". Inward always aligns text towards the center of the plotting area, and outward aligns it away from the center of the plotting area. If tagged with _mean or _median (e.g., "outward_mean") the mean or median of the data in the panel along the corresponding axis is used as center. If the characters following the underscore represent a number (e.g., "outward_10.5") the reference point will be this value in data units. Position justification is computed based on the direction of the displacement of the position of the label so that each individual text or label is justified outwards from its original position. The default justification is "position".

If no position displacement is applied, or a position function defined in 'ggplot2' is used, these geometries behave similarly to the corresponding ones from package 'ggplot2' with a default justification of 0.5 and no segment drawn.

Position functions

Many layer functions from package 'ggpp' are designed to work seamlessly with position functions that keep, rather than discard, the original x and y positions in data when computing a new displaced position. See position_nudge_keep, position_dodge_keep, position_jitter_keep, position_nudge_center, position_nudge_line, position_nudge_to, position_dodgenudge, position_jitternudge, and position_stacknudge for examples and details of their use.

Note

The insets are stored nested within the main ggplot object and contain their own copy of the data, and are rendered as grid grobs as normal ggplots at the time the main ggplot is rendered. They can have different themes.

Use annotate as redefined in 'ggpp' when adding insets as annotations (automatically available unless 'ggpp' is not attached). annotate cannot be used with the npcx and npcy pseudo-aesthetics.

References

The idea of implementing a geom_custom() for grobs has been discussed as an issue at https://github.com/tidyverse/ggplot2/issues/1399.

See Also

grid-package, geom_text, and other documentation of package 'ggplot2'.
Examples

library(tibble)

df <- tibble(x = 2, y = 15, grob = list(grid::circleGrob(r = 0.2)))

# without nudging no segments are drawn
ggplot(data = mtcars, 
aes(wt, mpg)) +
  geom_point(aes(colour = factor(cyl))) +
  geom_grob(data = df,
    aes(x, y, label = grob))

# with nudging segments are drawn

ggplot(data = mtcars, 
aes(wt, mpg)) +
  geom_point(aes(colour = factor(cyl))) +
  geom_grob(data = df,
    aes(x, y, label = grob),
    nudge_x = 0.5,
    colour = "red",
    hjust = 0.5,
    vjust = 0.5)

# with nudging plotting of segments can be disabled

ggplot(data = mtcars, 
aes(wt, mpg)) +
  geom_point(aes(colour = factor(cyl))) +
  geom_grob(data = df,
    aes(x, y, label = grob),
    add.segments = FALSE,
    nudge_x = 0.5,
    hjust = 0.5,
    vjust = 0.5)
**geom_label_npc**

**Description**

`geom_text_npc()` adds text directly to the plot. `geom_label_npc()` draws a rectangle behind the text, making it easier to read. The difference is that x and y mappings are expected to be given in `npc` graphic units, using pseudo-aesthetics. Their intended use is to add annotations to a plot.

**Usage**

```r
geom_label_npc(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ..., 
  parse = FALSE,
  nudge_x = 0,
  nudge_y = 0,
  label.padding = grid::unit(0.25, "lines"),
  label.r = grid::unit(0.15, "lines"),
  label.size = 0.25,
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = FALSE
)
```

```r
geom_text_npc(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ..., 
  parse = FALSE,
  nudge_x = 0,
  nudge_y = 0,
  check_overlap = FALSE,
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = FALSE
)
```

**Arguments**

- `mapping` The aesthetic mapping, usually constructed with `aes`. Only needs to be set at the layer level if you are overriding the plot defaults.
- `data` A layer specific data set - only needed if you want to override the plot defaults.
- `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 layer. This can include aesthetics whose values
you want to set, not map. See layer for more details.

parse If TRUE, the labels will be parsed into expressions and displayed as described
in ?plotmath.

nudge_x, nudge_y Horizontal and vertical adjustment to nudge labels by. Useful for offsetting text
from points, particularly on discrete scales.

label.padding Amount of padding around label. Defaults to 0.25 lines.

label.r Radius of rounded corners. Defaults to 0.15 lines.

label.size Size of label border, in mm.

na.rm If FALSE (the default), removes missing values with a warning. If TRUE silently
removes missing values.

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.

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.

check_overlap If ‘TRUE’, text that overlaps previous text in the same layer will not be plotted.

Details

This geom is identical to 'ggplot2' geom_text except that it interprets npcx andnpcy positions in
rpc units. It translates npcx andnpcy coordinates using a pseudo-aesthetic with a fixed scale. The
generation of grobs is done with calls to functions imported from package 'ggplot2'.

Alignment

With textual positions and groups a shift is added to successive labels to avoid overlaps. The shift is
based on grouping, however unused levels are not dropped. In plots with faceting, if not all groups
appear in each panel, there will be blank spaces in between labels. To solve this pass numeric values
for the npc coordinates of each label instead of character strings.

You can modify text alignment with the vjust and hjust aesthetics. These can either be a number
between 0 (right/bottom) and 1 (top/left) or a character ("left", "middle", "right", "bottom",
"center", "top"). In addition, you can use special alignments for justification including "position",
"inward" and "outward". Inward always aligns text towards the center of the plotting area, and
outward aligns it away from the center of the plotting area. If tagged with _mean or _median (e.g.,
"outward_mean") the mean or median of the data in the panel along the corresponding axis is used
as center. If the characters following the underscore represent a number (e.g., "outward_10.5") the
reference point will be this value in data units. Position justification is computed based on the
direction of the displacement of the position of the label so that each individual text or label is
justified outwards from its original position. The default justification is "position".

If no position displacement is applied, or a position function defined in 'ggplot2' is used, these
geometries behave similarly to the corresponding ones from package 'ggplot2' with a default justi-
fication of 0.5 and no segment drawn.
### geom_label_s

#### Plot boundaries and clipping

Note that when you change the scale limits for x and/or y of a plot, text labels stay the same size, as determined by the size aesthetic, given in millimetres. The actual size as seen in the plotted output is decided during the rendering of the plot to a graphics device. Limits are expanded only to include the anchor point of the labels because the "width" and "height" of a text element are 0 (as seen by ggplot2). Text labels do have height and width, but in grid units, not data units.

### See Also

- geom_text

### Examples

```r
df <- data.frame(
x = c(0, 0, 1, 1, 0.5),
x.chr = c("left", "left", "right", "right", "center"),
y = c(0, 1, 0, 1, 0.5),
y.chr = c("bottom", "top", "bottom", "top", "middle"),
text = c("bottom-left", "top-left", "bottom-right", "top-right", "center-middle")
)

ggplot(df) +
  geom_text_npc(aes(npcx = x, npcy = y, label = text))

ggplot(df) +
  geom_text_npc(aes(npcx = x.chr, npcy = y.chr, label = text))

ggplot(data = mtcars, mapping = aes(wt, mpg)) +
  geom_point() +
  geom_text_npc(data = df, aes(npcx = x, npcy = y, label = text))

ggplot(data = mtcars, mapping = aes(wt, mpg)) +
  geom_point() +
  geom_text_npc(data = df, aes(npcx = x, npcy = y, label = text)) +
  expand_limits(y = 40, x = 6)

ggplot(data = mtcars) +
  geom_point(mapping = aes(wt, mpg)) +
  geom_label_npc(data = df, aes(npcx = x, npcy = y, label = text))
```

### Description

Linked text geometries are most useful for adding data labels to plots. `geom_text_s()` and `geom_label_s()` add text to the plot and for nudged positions link the original location to the nudged text with a segment or arrow.
Usage

geom_label_s(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...
  parse = FALSE,
  nudge_x = 0,
  nudge_y = 0,
  default.colour = "black",
  colour.target = c("text", "box"),
  default.alpha = 1,
  alpha.target = "all",
  label.padding = grid::unit(0.25, "lines"),
  label.r = grid::unit(0.15, "lines"),
  segment.linewidth = 0.5,
  add.segments = TRUE,
  box.padding = 1e-06,
  point.padding = 1e-06,
  min.segment.length = 0,
  arrow = NULL,
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE
)

gem_text_s(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...
  parse = FALSE,
  nudge_x = 0,
  nudge_y = 0,
  default.colour = "black",
  default.color = default.colour,
  colour.target = "text",
  color.target = colour.target,
  default.alpha = 1,
  alpha.target = "all",
  add.segments = TRUE,
  box.padding = 0.25,
  point.padding = 1e-06,
  segment.linewidth = 0.5,
  min.segment.length = 0,
  arrow = NULL,
geom_label_s

check_overlap = FALSE,
na.rm = FALSE,
show.legend = NA,
inherit.aes = TRUE
)

Arguments

mapping    Set of aesthetic mappings created by aes. If specified and with inherit.aes = TRUE (the default), it is combined with the default mapping at the top level of the plot. You only need to supply mapping if there isn't a mapping defined for the plot.

data       A data frame. If specified, overrides the default data frame defined at the top level of the plot.

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 layer. There are three types of arguments you can use here:

• Aesthetics: to set an aesthetic to a fixed value, like colour = "red" or size = 3.

• Other arguments to the layer, for example you override the default stat associated with the layer.

• Other arguments passed on to the stat.

parse      If TRUE, the labels will be parsed into expressions and displayed as described in ?plotmath.

nudge_x, nudge_y  Horizontal and vertical adjustments to nudge the starting position of each text label. The units for nudge_x and nudge_y are the same as for the data units on the x-axis and y-axis.

default.colour, default.color  A colour definition to use for elements not targeted by the colour aesthetic.

colour.target, color.target  A vector of character strings; "all", "text", "segment", "box", "box.line", and "box.fill" or "none".

default.alpha  numeric in [0..1] A transparency value to use for elements not targeted by the alpha aesthetic.

alpha.target  A vector of character strings; "all", "text", "segment", "box", "box.line", and "box.fill" or "none".

label.padding  Amount of padding around label. Defaults to 0.25 lines.

circle          Radius of rounded corners. Defaults to 0.15 lines.

segment.linewidth  numeric Width of the segments or arrows in mm.

add.segments  logical Display connecting segments or arrows between original positions and displaced ones if both are available.
box.padding, point.padding
  numeric By how much each end of the segments should shortened in mm.

min.segment.length
  numeric Segments shorter that the minimum length are not rendered, in mm.

arrow
  specification for arrow heads, as created by arrow

na.rm
  If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.

show.legend
  logical. Should this layer be included in the legends? NA, the default, includes a legend if any aesthetics are mapped. FALSE never includes it, and TRUE always includes it.

inherit.aes
  If FALSE, overrides the default aesthetics, rather than combining 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.

checkoverlap
  If TRUE, text that overlaps previous text in the same layer will not be plotted. checkoverlap takes place at draw time and in the order of the data, thus its action depends of the size at which the plot is drawn.

Details

Geometries geom_text_s() and geom_label_s() have an interface similar to that of geom_text and geom_label, but support additional features. Similarly to geom_text_repel() and geom_label_repel() when used together with position functions defined in package ‘ggpp’ they draw a segment linking the label at a displaced position to the original position, usually a point corresponding to an observation to which the label refers. Another difference is that they allow control of to which graphical elements the mappings to colour and alpha aesthetics are applied. Differently to geom_label(), geom_label_s() obeys aesthetic mappings to linewidth and linetype applied to the line at the edge of the label box.

Layer functions geom_text_s() and geom_label_s() use by default position_nudge_keep which is backwards compatible with position_nudge. In contrast to position_nudge, position_nudge_keep and all other position functions defined in packages ‘ggpp’ and ‘ggrepel’ keep the original coordinates, thus allowing the plotting of connecting segments and arrows.

Differently to geom_text_repel() and geom_label_repel(), geom_text_s() and geom_label_s() do not make use of additional aesthetics for the segments or boxes, but instead allow the choice of which elements are targeted by the aesthetics and which are rendered in a default colour. In the grammar of graphics using the same aesthetic with multiple meanings is not allowed, thus, the approach used in our geoms attempts to enforce this.

Value

A plot layer instance.

Under development!

These two geometries are still under development and their user interface subject to change. In ‘ggpp’ (== 0.5.0) support for aesthetics related to segments was removed, and replaced with parameters and a new mechanism for targeting a the usual aesthetics to text, border, and segment was added.
Plot boundaries and clipping

Note that when you change the scale limits for \( x \) and/or \( y \) of a plot, text labels stay the same size, as determined by the size aesthetic, given in millimetres. The actual size as seen in the plotted output is decided during the rendering of the plot to a graphics device. Limits are expanded only to include the anchor point of the labels because the "width" and "height" of a text element are 0 (as seen by ggplot2). Text labels do have height and width, but in grid units, not data units.

Alignment

You can modify text alignment with the \texttt{vjust} and \texttt{hjust} aesthetics. These can either be a number between 0 (right/bottom) and 1 (top/left) or a character ("left", "middle", "right", "bottom", "center", "top"). In addition, you can use special alignments for justification including "position", "inward" and "outward". Inward always aligns text towards the center of the plotting area, and outward aligns it away from the center of the plotting area. If tagged with _mean or _median (e.g., "outward_mean") the mean or median of the data in the panel along the corresponding axis is used as center. If the characters following the underscore represent a number (e.g., "outward_10.5") the reference point will be this value in data units. Position justification is computed based on the direction of the displacement of the position of the label so that each individual text or label is justified outwards from its original position. The default justification is "position".

If no position displacement is applied, or a position function defined in 'ggplot2' is used, these geometries behave similarly to the corresponding ones from package 'ggplot2' with a default justification of 0.5 and no segment drawn.

Aesthetics

Layer functions \texttt{geom_text(s)} and \texttt{geom_label(s)} require aesthetics \( x \), \( y \) and \texttt{label} and support aesthetics: \texttt{alpha}, \texttt{colour}, \texttt{group}, \texttt{size (of text)}, \texttt{family}, \texttt{fontface}, \texttt{lineheight}, \texttt{hjust} and \texttt{vjust}. In addition, \texttt{geom_text(s)} supports \texttt{angle} and \texttt{geom_label(s)} supports \texttt{fill}, \texttt{linewidth} and \texttt{linetype}. See \texttt{aes_colour_fill_alpha}, \texttt{aes_linetype_size_shape}, \texttt{aes_position}, and \texttt{aes_group_order}.

Position functions

Many layer functions from package 'ggpp' are designed to work seamlessly with position functions that keep, rather than discard, the original \( x \) and \( y \) positions in data when computing a new displaced position. See \texttt{position_nudge_keep}, \texttt{position_dodge_keep}, \texttt{position_jitter_keep}, \texttt{position_nudge_center}, \texttt{position_nudge_line}, \texttt{position_nudge_to}, \texttt{position_dodgenudge}, \texttt{position_jitternudge}, and \texttt{position_stacknudge} for examples and details of their use.

See Also

\texttt{geom_text}, \texttt{geom_label} and other documentation of package 'ggplot2'.

Examples

```r
my.cars <- mtcars[c(TRUE, FALSE, FALSE, FALSE), ]
my.cars$\texttt{name} <- rownames(my.cars)
p <- ggplot(my.cars, aes(wt, mpg, label = name)) +
```
geom_point(color = "red")

# Use nudging
p +
  geom_text_s(nudge_x = 0.12) +
  expand_limits(x = 6.2)
p +
  geom_text_s(nudge_x = -0.12) +
  expand_limits(x = 1.5)
p +
  geom_text_s(nudge_x = 0.12,
              arrow = arrow(length = grid::unit(1.5, "mm"))) +
  expand_limits(x = 6.2)
p +
  geom_text_s(nudge_x = 0.12,
              arrow = arrow(length = grid::unit(1.5, "mm")),
              point.padding = 0.4) +
  expand_limits(x = 6.2)
p +
  geom_text_s(hjust = "left", nudge_x = 0.12) +
  expand_limits(x = 6.2)
p +
  geom_text_s(nudge_y = 0.1, nudge_x = 0.07) +
  expand_limits(x = 6.2)
p +
  geom_text_s(nudge_y = 1, angle = 90) +
  expand_limits(y = 30)
p +
  geom_text_s(angle = 90, nudge_y = 1,
              arrow = arrow(length = grid::unit(1.5, "mm")),
              colour.target = "segment", colour = "red") +
  expand_limits(y = 30)
p +
  geom_text_s(angle = 90, nudge_y = 1,
              arrow = arrow(length = grid::unit(1.5, "mm")),
              alpha.target = "segment", alpha = 0.3) +
  expand_limits(y = 30)
p +
  geom_label_s(nudge_x = 0.12) +
  expand_limits(x = 6.2)
p +
  geom_label_s(nudge_x = 0.12, linetype = "dotted", linewidth = 0.4) +
  expand_limits(x = 6.2)
p +
  geom_label_s(nudge_x = 0.12, linewidth = 0.5, label.r = unit(0, "lines")) +
  expand_limits(x = 6.2)
p +
  geom_label_s(nudge_x = 0.12, linewidth = 0) +
  expand_limits(x = 6.2)

# Nudging away from arbitrary point
p +
```r
# Add aesthetic mappings and adjust arrows
p +
  geom_text_s(aes(colour = factor(cyl)),
               angle = 90,
               nudge_y = 1,
               arrow = arrow(angle = 20,
                              length = grid::unit(1.5, "mm"),
                              ends = "first",
                              type = "closed"),
               show.legend = FALSE) +
  scale_colour_discrete(l = 40) + # luminance, make colours darker
  expand_limits(y = 27)

p +
  geom_text_s(aes(colour = factor(cyl)),
               colour.target = "text",
               angle = 90,
               nudge_y = 1,
               arrow = arrow(angle = 20,
                              length = grid::unit(1.5, "mm"),
                              ends = "first",
                              type = "closed"),
               show.legend = FALSE) +
  scale_colour_discrete(l = 40) + # luminance, make colours darker
  expand_limits(y = 27)

p +
  geom_label_s(aes(colour = factor(cyl)),
               nudge_x = 0.3,
               arrow = arrow(angle = 20,
                              length = grid::unit(1/3, "lines"))) +
  scale_colour_discrete(l = 40) + # luminance, make colours darker
  expand_limits(x = 7)

p +
  geom_label_s(aes(colour = factor(cyl)),
               nudge_x = 0.3,
               colour.target = c("box", "segment"),
               linewidth = 0.6,
               arrow = arrow(angle = 20,
                              length = grid::unit(1/3, "lines"))) +
  scale_colour_discrete(l = 40) + # luminance, make colours darker
  expand_limits(x = 7)

p +
  geom_label_s(aes(colour = factor(cyl), fill = factor(cyl)),
               nudge_x = 0.3,
               alpha.target = "box",
               expand_limits(x = 7))
```

geom_plot

alpha = 0.1,
linewidth = 0.5,
arrow = arrow(angle = 20,
    length = grid::unit(1/3, "lines")) +
scale_colour_discrete(l = 40) + # luminance, make colours darker
expand_limits(x = 7)# # Scale height of text, rather than sqrt(height)

p +
  geom_text_s(aes(size = wt), nudge_x = -0.1) +
  scale_radius(range = c(3, 6)) + # override scale_area()
  expand_limits(x = c(1.8, 5.5))

---

**Description**

`geom_plot` and `geom_plot_npc` add ggplot objects as insets to the base ggplot, using syntax similar to that of `geom_label` and `geom_text_s`. In most respects they behave as any other ggplot geometry: they add a layer containing one or more grobs and grouping and faceting works as usual. The most common use of `geom_plot` is to add data labels that are themselves ggplots rather than text. `geom_plot_npc` is used to add ggplots as annotations to plots, but contrary to layer function `annotate()`, `geom_plot_npc` is data driven and respects grouping and facets, thus plot insets can differ among panels.

**Usage**

```r
geom_plot(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ..., 
  nudge_x = 0,
  nudge_y = 0,
  default.colour = "black",
  default.color = default.colour,
  colour.target = "box",
  color.target = colour.target,
  default.alpha = 1,
  alpha.target = "all",
  add.segments = TRUE,
  box.padding = 0.25,
  point.padding = 1e-06,
  segment.linewidth = 0.5,
  min.segment.length = 0,
  arrow = NULL,
)```

Inset plots
Arguments

- **mapping**
  The aesthetic mapping, usually constructed with `aes`. Only needs to be set at the layer level if you are overriding the plot defaults.

- **data**
  A layer specific data set - only needed if you want to override the plot defaults.

- **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 `layer`. This can include aesthetics whose values you want to set, not map. See `layer` for more details.

- **nudge_x, nudge_y**
  Horizontal and vertical adjustments to nudge the starting position of each text label. The units for `nudge_x` and `nudge_y` are the same as for the data units on the x-axis and y-axis.

- **default.colour, default.color**
  A colour definition to use for elements not targeted by the colour aesthetic.

- **colour.target, color.target**
  A vector of character strings; "all", "text", "box" and "segment".

- **default.alpha**
  Numeric in [0..1] A transparency value to use for elements not targeted by the alpha aesthetic.

- **alpha.target**
  A vector of character strings; "all", "text", "segment", "box", "box.line", and "box.fill".

- **add.segments**
  Logical. Display connecting segments or arrows between original positions and displaced ones if both are available.

- **box.padding, point.padding**
  Numeric. By how much each end of the segments should shortened in mm.

- **segment.linewidth**
  Numeric. Width of the segments or arrows in mm.

- **min.segment.length**
  Numeric. Segments shorter that the minimum length are not rendered, in mm.
**arrow** specification for arrow heads, as created by `arrow`.

**na.rm** If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.

**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.

**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`.

### Details

You can modify the size of inset plots with the `vp.width` and `vp.height` aesthetics. These can take a number between 0 (smallest possible inset) and 1 (whole plotting area width or height). The default value for both of these aesthetics is 1/5. Thus, in contrast to `geom_text` and `geom_text_s` the size of the insets remains the same relative to the size of the plotting area irrespective of how the plot is rendered. The aspect ratio of insets is preserved and size is adjusted until the whole inset fits within the viewport.

By default this geom uses `position_nudge_center` which is backwards compatible with `position_nudge` but provides additional control on the direction of the nudging. In contrast to `position_nudge`, `position_nudge_center` and all other position functions defined in packages 'ggpp' and 'ggrepel' keep the original coordinates thus allowing the plotting of connecting segments and arrows.

This geom works only with tibbles as data, as it expects a list of ggplot objects ("gg" class) to be mapped to the `label` aesthetic.

The `x` and `y` aesthetics determine the position of the whole inset plot, similarly to that of a text label, justification is interpreted as indicating the position of the plot with respect to its `x` and `y` coordinates in the data, and `angle` is used to rotate the plot as a whole.

Of these two geoms only `geom_plot` supports the plotting of segments, as `geom_plot_npc` uses a coordinate system that is unrelated to data units and data. In the case of `geom_plot_npc()`, `npcx` and `npcy` aesthetics determine the position of the inset plot.

### Value

A plot layer instance.

### Alignment

You can modify text alignment with the `vjust` and `hjust` aesthetics. These can either be a number between 0 (right/bottom) and 1 (top/left) or a character ("left", "middle", "right", "bottom", "center", "top"). In addition, you can use special alignments for justification including "position", "inward" and "outward". Inward always aligns text towards the center of the plotting area, and outward aligns it away from the center of the plotting area. If tagged with _mean or _median (e.g., "outward_mean") the mean or median of the data in the panel along the corresponding axis is used as center. If the characters following the underscore represent a number (e.g., "outward_10.5") the reference point will be this value in data units. Position justification is computed based on the direction of the displacement of the position of the label so that each individual text or label is justified outwards from its original position. The default justification is "position".
If no position displacement is applied, or a position function defined in 'ggplot2' is used, these geometries behave similarly to the corresponding ones from package 'ggplot2' with a default justification of 0.5 and no segment drawn.

**Position functions**

Many layer functions from package 'ggpp' are designed to work seamlessly with position functions that keep, rather than discard, the original x and y positions in data when computing a new displaced position. See `position_nudge_keep`, `position_dodge_keep`, `position_jitter_keep`, `position_nudge_center`, `position_nudge_line`, `position_nudge_to`, `position_dodgenudge`, `position_jitternudge`, and `position_stacknudge` for examples and details of their use.

**Plot boundaries and clipping**

The "width" and "height" of an inset as for a text element are 0, so stacking and dodging inset plots will not work by default, and axis limits are not automatically expanded to include all inset plots. Obviously, insets do have height and width, but they are physical units, not data units. The amount of space they occupy on the main plot is not constant in data units of the base plot: when you modify scale limits, inset plots stay the same size relative to the physical size of the base plot.

**Note**

The insets are stored nested within the main ggplot object and contain their own copy of the data, and are rendered as grid grobs as normal ggplots at the time the main ggplot is rendered. They can have different themes.

Use `annotate` as redefined in 'ggpp' when adding insets as annotations (automatically available unless 'ggpp' is not attached). `annotate` cannot be used with thenpcx and npcy pseudo-aesthetics.

**References**

The idea of implementing a `geom_custom()` for grobs has been discussed as an issue at https://github.com/tidyverse/ggplot2/issues/1399.

**See Also**

Other geometries adding layers with insets: `geom_table()`

**Examples**

```r
# inset plot with enlarged detail from a region of the main plot
library(tibble)
p <-
ggplot(data = mtcars, mapping = aes(wt, mpg)) + geom_point()
df <- tibble(x = 0.01,
y = 0.01,
plot = list(p +
coord_cartesian(xlim = c(3, 4),
ylim = c(13, 16)) +
```
The geometry "geom_point_s" provides a super set of the capabilities of geom geom_point from package 'ggplot2' by allowing plotting of arrows or segments joining the original position of displaced observations to their current position rendered as points or graphic symbols. The most common use is to demonstrate the action of different position functions. It can be also used to highlight observations.

**Usage**

```
geom_point_s(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...
)
```
nudge_y = 0,
      arrow = grid::arrow(length = unit(1/3, "lines")),
      default.colour = "black",
      default.color = default.colour,
      colour.target = "point",
      color.target = colour.target,
      default.alpha = 1,
      alpha.target = "all",
      add.segments = TRUE,
      box.padding = 0.25,
      point.padding = 1e-06,
      segment.linewidth = 0.5,
      min.segment.length = 0,
      na.rm = FALSE,
      show.legend = NA,
      inherit.aes = TRUE
    )

Arguments

mapping Set of aesthetic mappings created by aes. If specified and inherit.aes = TRUE (the default), is combined with the default mapping at the top level of the plot. You only need to supply mapping if there isn’t a mapping defined for the plot.
data A data frame. If specified, overrides the default data frame defined at the top level of the plot.
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 layer. There are three types of arguments you can use here:
    • Aesthetics: to set an aesthetic to a fixed value, like colour = "red" or size = 3.
    • Other arguments to the layer, for example you override the default stat associated with the layer.
    • Other arguments passed on to the stat.
nudge_x, nudge_y Horizontal and vertical adjustments to nudge the starting position of each text label. The units for nudge_x and nudge_y are the same as for the data units on the x-axis and y-axis.
arrow specification for arrow heads, as created by arrow
default.colour, default.color A colour definition to use for elements not targeted by the colour aesthetic.
colour.target, color.target A character string, one of "all", "point" and "segment" or "none".
default.alpha numeric in [0..1] A transparency value to use for elements not targeted by the alpha aesthetic.
alpha.target  A character string, one of "all", "segment", "point", or "none".
add.segments  logical Display connecting segments or arrows between original positions and displaced ones if both are available.
box.padding, point.padding  numeric By how much each end of the segments should shortened in mm.
segment.linewidth  numeric Width of the segments or arrows in mm.
min.segment.length  numeric Segments shorter that the minimum length are not rendered, in mm.
na.rm  If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.
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.
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.

Details
The plotting of segments is similar in idea to that implemented in geom_text_repel and relies on position functions that rename instead of only replacing the original x and y coordinates from the data object.

By default this geom uses position_nudge_center which is backwards compatible with position_nudge but provides additional control on the direction of the nudging.

Value
A plot layer instance.

Position functions
Many layer functions from package ‘gapp’ are designed to work seamlessly with position functions that keep, rather than discard, the original x and y positions in data when computing a new displaced position. See position_nudge_keep, position_dodge_keep, position_jitter_keep, position_nudge_center, position_nudge_line, position_nudge_to, position_dodgenudge, position_jitternudge, and position_stacknudge for examples and details of their use.

Note
The insets are stored nested within the main ggplot object and contain their own copy of the data, and are rendered as grid grobs as normal ggplots at the time the main ggplot is rendered. They can have different themes.

Use annotate as redefined in ‘gapp’ when adding insets as annotations (automatically available unless ‘gapp’ is not attached). annotate cannot be used with thenpcx and npcy pseudo-aesthetics.

See Also
geom_point.
Examples

# Same output as with geom_point()
```r
ggplot(mpg[1:20],
aes(cyl, hwy)) + geom_point_s(colour = "blue")
```

# with segment drawn after nudging
```r
ggplot(mpg[1:20],
aes(cyl, hwy, label = drv)) + geom_point_s(position = position_nudge_keep(x = 0.2),
  colour = "red") + geom_point_s(colour = "blue")
```

# with segment drawn after nudging
```r
ggplot(mpg[1:20],
aes(cyl, hwy, label = drv)) + geom_point_s(position = position_nudge_keep(x = 0.2),
  colour = "red",
  colour.target = "all") + geom_point_s(colour = "blue")
```

```r
ggplot(mpg[1:20],
aes(cyl, hwy, label = drv)) + geom_point_s(position = position_nudge_keep(x = 0.2),
  colour = "red",
  colour.target = "segment") + geom_point_s(colour = "blue")
```

```r
ggplot(mpg[1:20],
aes(cyl, hwy, label = drv)) + geom_point_s(position = position_nudge_keep(x = 0.2),
  colour = "red",
  colour.target = "point") + geom_point_s(colour = "blue")
```

```r
ggplot(mpg[1:50],
aes(cyl, hwy, label = drv)) + geom_point_s(position = position_jitternudge(width = 0.66, height = 2,
  seed = 456,
  nudge.from = "jittered",
  kept.origin = "original"),
  colour = "red",
  arrow = grid::arrow(length = grid::unit(0.4, "lines"))) + geom_point_s(colour = "blue")
```
Description

geom_vhlines() adds in a single layer both vertical and horizontal guide lines. Can be thought of as a convenience function that helps with producing consistent vertical and horizontal guide lines. It behaves like geom_vline() and geom_hline(). geom_quadrant_lines() displays the boundaries of four quadrants with an arbitrary origin. The quadrants are specified in the same way as in stat_quadrant_counts() and is intended to be used to add guide lines consistent with the counts by quadrant computed by this stat.

Usage

geom_quadrant_lines(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  pool.along = c("none", "x", "y", "xy"),
  xintercept = 0,
  yintercept = 0,
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = FALSE,
  ...
)

geom_vhlines(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  xintercept = NULL,
  yintercept = NULL,
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = FALSE,
  ...
)

Arguments

mapping The aesthetic mapping, usually constructed with aes. Only needs to be set at the layer level if you are overriding the plot defaults.
data A layer specific data set - only needed if you want to override the plot defaults.
stat The statistic object to use display the data
position The position adjustment to use for overlapping points on this layer
pool.along character, one of "none", "x", "y", or "xy" indicating whether to plot or not lines separating quadrants.
**geom_quadrant_lines**

- `xintercept, yintercept`:
  numeric vectors the coordinates of the origin of the quadrants.

- `na.rm`:
  a logical indicating whether NA values should be stripped before the computation proceeds.

- `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.

- `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 should not inherit behaviour from the default plot specification, e.g. `borders`.

- `...`:
  other arguments passed on to `layer`. This can include aesthetics whose values you want to set, not map. See `layer` for more details.

**Details**

While `geom_vhlines()` does not provide defaults for the intercepts and accepts vectors of length > 1, `geom_quadrant_lines()` sets by default the intercepts to zero producing the natural quadrants and only accepts vectors of length one per panel. That is, `geom_vhlines()` can be used to plot a grid while `geom_quadrant_lines()` plots at most one vertical and one horizontal line. In the case of `geom_quadrant_lines()` the pooling along axes can be specified in the same way as in `stat_quadrant_counts()`.

**Value**

A plot layer instance.

**See Also**

- `geom_abline`, the topic where `geom_vline()` and `geom_hline()` are described.
- Other Functions for quadrant and volcano plots: `stat_panel_counts()`, `stat_quadrant_counts()`

**Examples**

```r
# generate artificial data
set.seed(4321)
x <- 1:100
y <- rnorm(length(x), mean = 10)
my.data <- data.frame(x, y)

ggplot(my.data, aes(x, y)) +
  geom_quadrant_lines() +
  geom_point()

ggplot(my.data, aes(x, y)) +
  geom_quadrant_lines(linetype = "dotted") +
  geom_point()

ggplot(my.data, aes(x, y)) +
  geom_quadrant_lines(xintercept = 50,
                      yintercept = 10,
                      colour = "blue") +
  geom_point()
```


```r
geom_point()

ggplot(my.data, aes(x, y)) +
  geom_quadrant_lines(xintercept = 50,
                      pool.along = "y",
                      colour = "blue") +
  geom_point()

geom_point()

ggplot(my.data, aes(x, y)) +
  geom_vhlines(xintercept = c(25, 50, 75),
               yintercept = 10,
               linetype = "dotted",
               colour = "red") +
  geom_point() +
  theme_bw()

ggplot(my.data, aes(x, y)) +
  geom_vhlines(xintercept = c(25, 50, 75),
               yintercept = c(10, 8),
               linetype = "dotted",
               colour = "red") +
  geom_point() +
  theme_bw()
```

---

**geom_table**

**Inset tables**

**Description**

`geom_table` and `geom_table_npc` add data frames as table insets to the base `ggplot`, using syntax similar to that of `geom_text` and `geom_text_s`. In most respects they behave as any other `ggplot` geometry: they add a layer containing one or more grobs and grouping and faceting works as usual. The most common use of `geom_table` is to add data labels that are whole tables rather than text. `geom_table_npc` is used to add tables as annotations to plots, but contrary to layer function `annotate`, `geom_table_npc` is data driven and respects grouping and facets, thus plot insets can differ among panels.

**Usage**

`geom_table(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...,
  nudge_x = 0,
  nudge_y = 0,
  default.colour = "black",
)"
default.color = default.colour,
colour.target = "box",
color.target = colour.target,
default.alpha = 1,
alpha.target = "all",
add.segments = TRUE,
box.padding = 0.25,
point.padding = 1e-06,
segment.linewidth = 0.5,
min.segment.length = 0,
arrow = NULL,
table.theme = NULL,
table.rownames = FALSE,
table.colnames = TRUE,
table.hjust = 0.5,
parse = FALSE,
na.rm = FALSE,
show.legend = FALSE,
inherit.aes = FALSE
}

geom_table_npc(
mapping = NULL,
data = NULL,
stat = "identity",
position = "identity",
...,
table.theme = NULL,
table.rownames = FALSE,
table.colnames = TRUE,
table.hjust = 0.5,
parse = FALSE,
na.rm = FALSE,
show.legend = FALSE,
inherit.aes = FALSE
)

Arguments

mapping The aesthetic mapping, usually constructed with aes. Only needs to be set at the layer level if you are overriding the plot defaults.
data A layer specific data set - only needed if you want to override the plot defaults.
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
... other arguments passed on to layer. This can include aesthetics whose values you want to set, not map. See layer for more details.
nudge_x, nudge_y Horizontal and vertical adjustments to nudge the starting position of each text
The units for `nudge_x` and `nudge_y` are the same as for the data units on the x-axis and y-axis.

- **default.colour, default.color**
  A colour definition to use for elements not targeted by the colour aesthetic.

- **colour.target, color.target**
  A vector of character strings; "all", "box" and "segment" or "none".

- **default.alpha**
  numeric in [0..1] A transparency value to use for elements not targeted by the alpha aesthetic.

- **alpha.target**
  A vector of character strings; "all", "segment", "box", "box.line", and "box.fill" or "none".

- **add.segments**
  logical Display connecting segments or arrows between original positions and displaced ones if both are available.

- **box.padding, point.padding**
  numeric By how much each end of the segments should shortened in mm.

- **segment.linewidth**
  numeric Width of the segments or arrows in mm.

- **min.segment.length**
  numeric Segments shorter that the minimum length are not rendered, in mm.

- **arrow**
  specification for arrow heads, as created by `arrow`

- **table.theme**
  NULL, list or function A gridExtra theme definition, or a constructor for a theme or NULL for default.

- **table.rownames, table.colnames**
  logical flag to enable or disable printing of row names and column names.

- **table.hjust**
  numeric Horizontal justification for the core and column headings of the table.

- **parse**
  If TRUE, the labels will be parsed into expressions and displayed as described in ?plotmath.

- **na.rm**
  If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.

- **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.

- **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.

### Details

By default `geom_table()` uses `position_nudge_center` which is backwards compatible with `position_nudge` but provides additional control on the direction of the nudging. In contrast to `position_nudge`, `position_nudge_center` and all other position functions defined in packages ‘ggpp’ and ‘ggrepel’ keep the original coordinates thus allowing the plotting of connecting segments and arrows.

This geom works only with tibbles as data, as its expects a list of data frames (or tibbles) to be mapped to the label aesthetic. A table is built with function `gridExtra::gtable` for each data frame in the list, and formatted according to a table theme or ttheme. The character strings in the data frame can be parsed into R expressions so the inset tables can include maths.
If the argument passed to `table.theme` is a constructor function (passing its name without parenthesis), the values mapped to `size`, `colour`, `fill`, `alpha`, and `family` aesthetics will the passed to this theme constructor for each individual table. In contrast, if a ready constructed `ttheme` stored as a list object is passed as argument (e.g., by calling the constructor, using constructor name followed by parenthesis), it will be used as is, i.e., mappings to aesthetics such as `colour` are ignored if present. By default the constructor `ttheme_gtdefault` is used and `colour` and `fill`, are mapped to NA. Mapping these aesthetics to NA triggers the use of the default base_colour of the ttheme. As the table is built with function `gridExtra::gtable()`, for formatting details, please, consult `tableGrob`.

The x and y aesthetics determine the position of the whole inset table, similarly to that of a text label, justification is interpreted as indicating the position of the inset table with respect to its horizontal and vertical axes (rows and columns in the data frame), and angle is used to rotate the inset table as a whole.

Of these two geoms only `geom_grob` supports the plotting of segments, as `geom_grob_npc` uses a coordinate system that is unrelated to data units and data. In the case of `geom_table_npc`, NPCx and NPCy aesthetics determine the position of the inset table. Justification as described above for .

**Value**

A plot layer instance.

**Alignment**

You can modify text alignment with the `vjust` and `hjust` aesthetics. These can either be a number between 0 (right/bottom) and 1 (top/left) or a character ("left", "middle", "right", "bottom", "center", "top"). In addition, you can use special alignments for justification including "position", "inward" and "outward". Inward always aligns text towards the center of the plotting area, and outward aligns it away from the center of the plotting area. If tagged with _mean or _median (e.g., "outward_mean") the mean or median of the data in the panel along the corresponding axis is used as center. If the characters following the underscore represent a number (e.g., "outward_10.5") the reference point will be this value in data units. Position justification is computed based on the direction of the displacement of the position of the label so that each individual text or label is justified outwards from its original position. The default justification is "position".

If no position displacement is applied, or a position function defined in `ggplot2` is used, these geometries behave similarly to the corresponding ones from package `ggplot2` with a default justification of 0.5 and no segment drawn.

**Position functions**

Many layer functions from package 'ggpp' are designed to work seamlessly with position functions that keep, rather than discard, the original x and y positions in data when computing a new displaced position. See `position_nudge_keep`, `position_dodge_keep`, `position_jitter_keep`, `position_nudge_center`, `position_nudge_line`, `position_nudge_to`, `position_dodgenudge`, `position_jitternudge`, and `position_stacknudge` for examples and details of their use.

**Plot boundaries and clipping**

The "width" and "height" of an inset as for a text element are 0, so stacking and dodging inset plots will not work by default, and axis limits are not automatically expanded to include all inset plots.
Obviously, insets do have height and width, but they are physical units, not data units. The amount of space they occupy on the main plot is not constant in data units of the base plot: when you modify scale limits, inset plots stay the same size relative to the physical size of the base plot.

**Note**

Complex tables with annotations or different colouring of rows or cells can be constructed with functions in package ‘gridExtra’ or in any other way as long as they can be saved as grid graphical objects and then added to a ggplot as a new layer with `geom_grob`.

**References**

This geometry is inspired on answers to two questions in Stackoverflow. In contrast to these earlier examples, the current geom obeys the grammar of graphics, and attempts to be consistent with the behaviour of ’ggplot2’ geometries. https://stackoverflow.com/questions/12318120/adding-table-within-the-plotting-region-of-a-ggplot-in-r https://stackoverflow.com/questions/25554548/adding-sub-tables-on-each-panel-of-a-facet-ggplot-in-r?

**See Also**

Formatting of tables `stat_fmt_table`, `ttheme_gtdefault`, `ttheme_set`, `tableGrob`.

Other geometries adding layers with insets: `geom_plot()`

**Examples**

```r
library(dplyr)
library(tibble)

mtcars %>%
  group_by(cyl) %>%
  summarize(wt = mean(wt), mpg = mean(mpg)) %>%
  ungroup() %>%
  mutate(wt = sprintf("%.2f", wt),
        mpg = sprintf("%.1f", mpg)) -> tb

df <- tibble(x = 5.45, y = 34, tb = list(tb))

# using defaults
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df,
             aes(x = x, y = y, label = tb))

ggplot(mtcars,
       aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df,
             aes(x = x, y = y, label = tb),
             table.rownames = TRUE,
             table.theme = ttheme_gtstripes)
```
# settings aesthetics to constants
ggplot(mtcars,  
aes(wt, mpg, colour = factor(cyl))) +
geom_point() +
geom_table(data = df,  
aes(x = x, y = y, label = tb),
  color = "red", fill = "#FFCCCC",
  family = "serif", size = 5,
  angle = 90, vjust = 0)

# passing a theme constructor as argument
ggplot(mtcars,  
aes(wt, mpg, colour = factor(cyl))) +
geom_point() +
geom_table(data = df,  
aes(x = x, y = y, label = tb),
  table.theme = ttheme_gtminimal) +
theme_classic()

df2 <- tibble(x = 5.45,
  y = c(34, 29, 24),
  x1 = c(2.29, 3.12, 4.00),
  y1 = c(26.6, 19.7, 15.1),
  cyl = c(4, 6, 8),
  tb = list(tb[1, 1:3], tb[2, 1:3], tb[3, 1:3]))

# mapped aesthetics
ggplot(mtcars,  
aes(wt, mpg, color = factor(cyl))) +
geom_point() +
geom_table(data = df2,  
  inherit.aes = TRUE,  
  mapping = aes(x = x, y = y, label = tb))

# nudging and segments
ggplot(mtcars,  
aes(wt, mpg, color = factor(cyl))) +
geom_point(show.legend = FALSE) +
geom_table(data = df2,  
  inherit.aes = TRUE,  
  mapping = aes(x = x1, y = y1, label = tb),
  nudge_x = 0.7, nudge_y = 3,
  vjust = 0.5, hjust = 0.5,
  arrow = arrow(length = unit(0.5, "lines")) +
  theme_classic()}

# Using native plot coordinates instead of data coordinates
dfnpc <- tibble(x = 0.95,  
y = 0.95,  
tb = list(tb))

ggplot(mtcars,  
aes(wt, mpg, colour = factor(cyl))) +
geom_point() +
geom_table_npc(data = dfnpc,  
  angle = 90, vjust = 0)
Reference arrows on the margins

Description
Small arrows on plot margins can supplement a 2d display with annotations. Arrows can be used to highlight specific values along a margin. The geometries `geom_x_margin_arrow()` and `geom_y_margin_arrow()` behave similarly `geom_vline()` and `geom_hline()` and share their "double personality" as both annotations and geometries.

Usage
```r
geom_x_margin_arrow(
mapping = NULL,
data = NULL,
stat = "identity",
position = "identity",
..., 
xintercept,
sides = "b",
arrow.length = 0.03,
na.rm = FALSE,
show.legend = FALSE,
inherit.aes = FALSE
)

geom_y_margin_arrow(
mapping = NULL,
data = NULL,
stat = "identity",
position = "identity",
..., 
yintercept,
sides = "l",
arrow.length = 0.03,
na.rm = FALSE,
show.legend = FALSE,
inherit.aes = FALSE
)
```

Arguments
- `mapping` The aesthetic mapping, usually constructed with `aes`. Only needs to be set at the layer level if you are overriding the plot defaults.
data
A layer specific dataset - only needed if you want to override the plot defaults.

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 layer. This can include aesthetics whose values you want to set, not map. See layer for more details.

xintercept, yintercept
numeric Parameters that control the position of the marginal points. If these are set, data, mapping and show.legend are overridden.

sides
A string that controls which sides of the plot the rugs appear on. It can be set to a string containing any combination of "trbl", for top, right, bottom, and left.

arrow.length
numeric value expressed in npc units for the length of the arrows inwards from the edge of the plotting area.

na.rm
If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.

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.

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 plot layer instance.

See Also
Other Geometries for marginal annotations in ggplots: geom_x_margin_grob(), geom_x_margin_point()

Examples

p <- ggplot(mtcars, aes(wt, mpg)) +
  geom_point()
p
p + geom_x_margin_arrow(xintercept = 3.5)
p + geom_y_margin_arrow(yintercept = c(18, 28, 15))
p + geom_x_margin_arrow(data = data.frame(x = c(2.5, 4.5)),
  mapping = aes(xintercept = x))
p + geom_x_margin_arrow(data = data.frame(x = c(2.5, 4.5)),
  mapping = aes(xintercept = x),
  sides="tb")
**Description**

Margin grobs can supplement a 2d display with annotations. Margin grobs such as icons or symbols can highlight individual values along a margin. The geometries `geom_x_margin_grob()` and `geom_y_margin_grob()` behave similarly `geom_vline()` and `geom_hline()` and share their "double personality" as both annotations and geometries.

**Usage**

```r
geom_x_margin_grob(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...
  xintercept,
  sides = "b",
  grob.shift = 0,
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = FALSE
)

geom_y_margin_grob(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...
  yintercept,
  sides = "l",
  grob.shift = 0,
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = FALSE
)
```

**Arguments**

- **mapping**
  The aesthetic mapping, usually constructed with `aes`. Only needs to be set at the layer level if you are overriding the plot defaults.

- **data**
  A layer specific dataset - only needed if you want to override the plot defaults.

- **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 `layer`. This can include aesthetics whose values you want to set, not map. See `layer` for more details.

**xintercept, yintercept**

numeric Parameters that control the position of the marginal points. If these are set, data, mapping and show.legend are overridden.

**sides**

A character string of length one that controls on which side of the plot the grob annotations appear on. It can be set to a string containing one of "t", "r", "b" or "l", for top, right, bottom, and left.

**grob.shift**

numeric value expressed in npc units for the shift of the marginal grob inwards from the edge of the plotting area.

**na.rm**

If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.

**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.

**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 plot layer instance.

**Alignment**

You can modify text alignment with the `vjust` and `hjust` aesthetics. These can either be a number between 0 (right/bottom) and 1 (top/left) or a character ("left", "middle", "right", "bottom", "center", "top"). In addition, you can use special alignments for justification including "position", "inward" and "outward". Inward always aligns text towards the center of the plotting area, and outward aligns it away from the center of the plotting area. If tagged with _mean or _median (e.g., "outward_mean") the mean or median of the data in the panel along the corresponding axis is used as center. If the characters following the underscore represent a number (e.g., "outward_10.5") the reference point will be this value in data units. Position justification is computed based on the direction of the displacement of the position of the label so that each individual text or label is justified outwards from its original position. The default justification is "position".

If no position displacement is applied, or a position function defined in 'ggplot2' is used, these geometries behave similarly to the corresponding ones from package 'ggplot2' with a default justification of 0.5 and no segment drawn.

**Position functions**

Many layer functions from package 'ggpp' are designed to work seamlessly with position functions that keep, rather than discard, the original x and y positions in data when computing a new displaced position. See `position_nudge_keep`, `position_dodge_keep`, `position_jitter_keep`, `position_nudge_center`, `position_nudge_line`, `position_nudge_to`, `position_dodgenudge`, `position_jitternudge`, and `position_stacknudge` for examples and details of their use.
See Also

grid-package, geom_rug, and other documentation of package 'ggplot2'.

Other Geometries for marginal annotations in ggplots: geom_x_margin_arrow(), geom_x_margin_point()

Examples

# We can add icons to the margin of a plot to signal events

---

**geom_x_margin_point**  Reference points on the margins

### Description

Margin points can supplement a 2d display with annotations. Margin points can highlight individual values along a margin. The geometries geom_x_margin_point() and geom_y_margin_point() behave similarly geom_vline() and geom_hline() and share their "double personality" as both annotations and geometries.

### Usage

```r
geom_x_margin_point(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...,
  xintercept,
  sides = "b",
  point.shift = 0.017,
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = FALSE
)
```

```r
geom_y_margin_point(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...,
  yintercept,
  sides = "1",
  point.shift = 0.017,
)```
geom_x_margin_point

na.rm = FALSE,
show.legend = FALSE,
inherit.aes = FALSE
)

Arguments

mapping    The aesthetic mapping, usually constructed with aes. Only needs to be set at
            the layer level if you are overriding the plot defaults.
data       A layer specific dataset - only needed if you want to override the plot defaults.
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 adjust-
            ment function.
...        other arguments passed on to layer. This can include aesthetics whose values
            you want to set, not map. See layer for more details.
xintercept, yintercept
            numeric Parameters that control the position of the marginal points. If these are
            set, data, mapping and show.legend are overridden.
sides      A string that controls which sides of the plot the rugs appear on. It can be set to
            a string containing any combination of "trbl", for top, right, bottom, and left.
point.shift numeric value expressed innpc units for the shift of the rug points inwards from
            the edge of the plotting area.
na.rm       If FALSE (the default), removes missing values with a warning. If TRUE silently
            removes missing values.
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.
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 plot layer instance.

See Also

Other Geometries for marginal annotations in ggplots: geom_x_margin_arrow(), geom_x_margin_grob()

Examples

p <- ggplot(mtcars, aes(wt, mpg)) +
  geom_point()
p
p + geom_x_margin_point(xintercept = 3.5)
p + geom_y_margin_point(yintercept = c(18, 28, 15))
p + geom_x_margin_point(data = data.frame(x = c(2.5, 4.5)),
  mapping = aes(xintercept = x))
ggplot(p + geom_x_margin_point(data = data.frame(x = c(2.5, 4.5)),
                        mapping = aes(xintercept = x),
                        sides = "tb"))

---

**ggplot**: Create a new ggplot plot from time series data

**Description**

`ggplot()` initializes a ggplot object. It can be used to declare the input spectral object for a graphic and to optionally specify the set of plot aesthetics intended to be common throughout all subsequent layers unless specifically overridden.

**Usage**

```r
## S3 method for class 'ts'
ggplot(
  data,
  mapping = NULL,
  ..., 
  time.resolution = "day",
  as.numeric = TRUE,
  environment = parent.frame()
)

## S3 method for class 'xts'
ggplot(
  data,
  mapping = NULL,
  ..., 
  time.resolution = "day",
  as.numeric = TRUE,
  environment = parent.frame()
)
```

**Arguments**

- `data`: Default spectrum dataset to use for plot. If not a spectrum, the methods used will be those defined in package ggplot2. See [ggplot](#). If not specified, must be supplied in each layer added to the plot.
- `mapping`: Default list of aesthetic mappings to use for plot. If not specified, in the case of spectral objects, a default mapping will be used.
- `...`: Other arguments passed on to methods. Not currently used.
- `time.resolution`: character The time unit to which the returned time values will be rounded.
as.numeric logical If TRUE convert time to numeric, expressed as fractional calendar years.

environment If an variable defined in the aesthetic mapping is not found in the data, ggplot will look for it in this environment. It defaults to using the environment in which ggplot() is called.

Details

ggplot() is typically used to construct a plot incrementally, using the + operator to add layers to the existing ggplot object. This is advantageous in that the code is explicit about which layers are added and the order in which they are added. For complex graphics with multiple layers, initialization with ggplot is recommended.

There are three common ways to invoke ggplot:

- `ggplot(ts, aes(x, y, <other aesthetics>))`
- `ggplot(ts)`

The first method is recommended if all layers use the same data and the same set of aesthetics, although this method can also be used to add a layer using data from another data frame. See the first example below. The second method specifies the default spectrum object to use for the plot, and the units to be used for y in the plot, but no aesthetics are defined up front. This is useful when one data frame is used predominantly as layers are added, but the aesthetics may vary from one layer to another. The third method specifies the default spectrum object to use for the plot, but no aesthetics are defined up front. This is useful when one spectrum is used predominantly as layers are added, but the aesthetics may vary from one layer to another.

Value

A "ggplot" object.

Note

Current implementation does not merge default mapping with user supplied mapping. If user supplies a mapping, it is used as is. To add to the default mapping, aes() can be used by itself to compose the ggplot.

Examples

```
ggplot(lynx) + geom_line()
```
Description

position_dodgenudge() combines into one function the action of position_dodge and position_nudge and position_dodge2nudge() combines into one function the action of position_dodge2 and position_nudge. They are useful when labelling plots such as grouped bars, columns, etc. and when adding dodged to text labels linked to observations plotted without dodge. It can replace other position functions as it is backwards compatible. Like all other position functions in ‘ggpp’ and ‘ggrepel’ it preserves the initial position to allow drawing of segments or arrow linking the original position to the displaced one.

Usage

position_dodgenudge(
  width = 1,
  preserve = c("total", "single"),
  x = 0,
  y = 0,
  direction = c("none", "split", "split.x", "split.y", "center"),
  kept.origin = c("dodged", "original", "none")
)

position_dodge_keep(width = 1, preserve = c("total", "single"))

position_dodge2_keep(width = 1, preserve = c("total", "single"))

position_dodge2nudge(
  width = 1,
  preserve = c("total", "single"),
  padding = 0.1,
  reverse = FALSE,
  x = 0,
  y = 0,
  direction = c("none", "split", "split.x", "split.y", "center"),
  kept.origin = c("dodged", "original", "none")
)

Arguments

width  Dodging width, when different to the width of the individual elements. This is useful when you want to align narrow geoms with wider geoms. See the examples.

preserve  Should dodging preserve the total width of all elements at a position, or the width of a single element?
position_dodgenudge

x, y  
Amount of vertical and horizontal distance to move. A numeric vector of length 1, or of the same length as rows there are in ‘data’.

direction  
One of "none", "split", "split.x" or "split.y". A value of "none" replicates the behavior of position_nudge. At the moment "split" changes the sign of the nudge at zero, which is suitable for column plots with negative slices.

kept.origin  
One of "original" or "none".

padding  
Padding between elements at the same position. Elements are shrunk by this proportion to allow space between them. Defaults to 0.1.

reverse  
If TRUE, will reverse the default stacking order. This is useful if you’re rotating both the plot and legend.

Details

The applied dodge is identical to that by position_dodge or position_dodge2 while nudging is similar to that by position_nudge.

There are two posible uses for these functions. First they can be used to label dodged bars or boxplots. In this case, it is mandatory to use the same argument to width when passing position_dodge() to geom_col() and position_dodgenudge() to geom_text() or geom_label() or their repulsive equivalents. Otherwise the arrows or segments will fail to connect to the labels. In other words jittering is computed twice. Jitter should be identical with the same arguments as position_dodgenudge() as this last function simply call the same code from package ‘ggplot2’.

The second use is to dodge labels to be connected to elements that have not been jittered. The return of original positions instead of the dodged ones is achieved by passing origin = "original" instead of the default of origin = "dodged".

Value

A "Position" object.

Author(s)

Michał Krassowski, edited by Pedro J. Aphalo.

Source


See Also

position_nudge, position_nudge_repel.

Other position adjustments: position_jitternudge(), position_nudge_center(), position_nudge_line(), position_nudge_to(), position_stacknudge()
position_jitternudge

Examples

def <- data.frame(x1 = c(1, 2, 1, 3, -1),
                  x2 = c("a", "a", "b", "b", "b"),
                  grp = c("some long name", "other name", "some name",
                           "another name", "some long name"))

# Add labels to a horizontal column plot (stacked by default)
ggplot(data = df, aes(x1, x2, group = grp)) +
  geom_col(aes(fill = grp), width = 0.8,
            position = position_dodge()) +
  geom_vline(xintercept = 0) +
  geom_text(aes(label = grp),
            position = position_dodgenudge(x = 0.09, direction = "split", width = 0.8),
            angle = 90, size = 3) +
  theme(legend.position = "none")

ggplot(data = df, aes(x2, x1, group = grp)) +
  geom_col(aes(fill = grp), width = 0.75,
            position = position_dodge(width = 0.75)) +
  geom_vline(xintercept = 0) +
  geom_text(aes(label = grp),
            position = position_dodgenudge(y = 0.1,
                                            direction = "split",
                                            width = 0.75),
            size = 3) +
  theme(legend.position = "none")

position_jitternudge  Combined positions jitter and nudge

Description

position_jitternudge() combines into one function the action of position_jitter and position_nudge. It is useful when labels to jittered plots and when adding jitter to text labels linked to points plotted without jitter. It can replace other position functions as it is backwards compatible. Like all other position functions in ‘ggpp’ and ‘ggrepel’ it preserves the initial position to allow drawing of segments or arrow linking the original position to the displaced one.

Usage

position_jitternudge(
  width = NULL,
  height = NULL,
  seed = NA,
  x = 0,
  y = 0,
  direction = c("as.is", "alternate", "split"),
)
position_jitternudge

nudge.from = c("original", "original.x", "original.y", "jittered", "jittered.y", "jittered.x"),
kept.origin = c("jittered", "original", "none")
)

position_jitter_keep(width = NULL, height = NULL, seed = NA)

Arguments

width, height Amount of vertical and horizontal jitter. The jitter is added in both positive and negative directions, so the total spread is twice the value specified here. If omitted, defaults to 40 resolution of the data: this means the jitter values will occupy 80 implied bins. Categorical data is aligned on the integers, so a width or height of 0.5 will spread the data so it's not possible to see the distinction between the categories.

seed A random seed to make the jitter reproducible. Useful if you need to apply the same jitter twice, e.g., for a point and a corresponding label. The random seed is reset after jittering. If NA (the default value), the seed is initialised with a random value; this makes sure that two subsequent calls start with a different seed. Use NULL to use the current random seed and also avoid resetting (the behaviour of ggplot 2.2.1 and earlier).

x, y Amount of vertical and horizontal distance to move. A numeric vector of length 1, or of the same length as rows there are in data,

direction One of "as.is", code"alternate", "split", "split.x" or "split.y". A value of "none" replicates the behavior of position_nudge. "split" changes the sign of the nudge depending on the direction of the random jitter applied to each individual observation, which is suitable for nudging labels outward of the jittered data.

nudge.from One of "original", "jittered", "original.y" (or "jittered.x"), "original.x" (or "jittered.y"). A value of "original" applies the nudge before jittering the observations, while "jittered" applies the nudging after jittering.

kept.origin One of "original", "jittered" or "none".

Details

Jitter with position_jitternudge() is identical to that with position_jitter while nudging is enhanced compared to position_nudge by taking into use cases specific to the combination of jitter and nudge.

There are two possible uses for this function. First it can be used to label jittered points in a plot. In this case, it is mandatory to use the same arguments to width, height and seed when passing position_jitter() to geom_point() and position_jitternudge() to geom_text() or to geom_label() or their repulsive equivalents. Otherwise the arrows or segments will fail to connect to the labels. In other words jittering is computed twice. Jitter should be identical with the same arguments as position_jitternudge() as this last function calls the same code imported from package 'ggplot2'.

The second use is to jitter labels to be connected to points that have not been jittered. The return of original positions instead of the jittered ones is achieved by passing origin = "original" to override the default origin = "jittered".
Value

A "Position" object. The layer function within it returns a data frame, with the jittered + nudged values in columns x and y and by default the jittered values with no nudging as x_orig and y_orig. With nudge.from = "original" the original values with no jitter and no nudge applied are returned as x_orig and y_orig.

Note

When direction = "split" is used together with no jitter, the split to left and right, or up and down is done at random.

Author(s)

Michał Krassowski, edited by Pedro J. Aphalo.

Source


See Also

position_jitter, position_nudge, position_nudge_repel.

Other position adjustments: position_dodgenudge(), position_nudge_center(), position_nudge_line(), position_nudge_to(), position_stacknudge()

Examples

jitter <- position_jitter(width = 0.2, height = 2, seed = 123)

jitter_nudge <- position_jitternudge(width = 0.2, height = 2,
  seed = 123, x = 0.1,
  direction = "split",
  nudge.from = "jittered")

ggplot(mpg[1:20,],
  aes(cyl, hwy, label = drv)) +
  geom_point(position = jitter) +
  geom_text_s(position = jitter_nudge)

jitter_nudge <- position_jitternudge(width = 0.2, height = 2,
  seed = 123, x = 0.1,
  direction = "split",
  nudge.from = "jittered")

ggplot(mpg[1:20,],
  aes(cyl, hwy, label = drv)) +
  geom_point(position = jitter) +
  geom_text_s(position = jitter_nudge)

jitter_nudge <- position_jitternudge(width = 0.2, height = 2,
  seed = 123, x = 0.35,
  direction = "split",
  nudge.from = "original.x")

ggplot(mpg[1:20,],
  aes(cyl, hwy, label = drv)) +
  geom_point(position = jitter) +
  geom_text_s(position = jitter_nudge)

jitter <- position_jitter(width = 0, height = 2, seed = 123)

jitter_nudge <- position_jitternudge(width = 0, height = 2,
position_nudge_center

Nudge labels away from a central point

Description

position_nudge_center() is generally useful for adjusting the position of labels or text, both on a discrete or continuous scale. In contrast to position_nudge, position_nudge_center() returns in data both the original coordinates and the nudged coordinates.

Usage

```r
position_nudge_center(
  x = 0,
  y = 0,
  center_x = NULL,
  center_y = NULL,
  direction = NULL,
  obey_grouping = NULL,
  kept.origin = c("original", "none")
)
```
position_nudge_centre(
  x = 0,
  y = 0,
  center_x = NULL,
  center_y = NULL,
  direction = NULL,
  obey_grouping = NULL,
  kept.origin = c("original", "none")
)

position_nudge_keep(x = 0, y = 0)

Arguments

x, y  
Amount of vertical and horizontal distance to move. A numeric vector of length 1, or of the same length as rows there are in data.

center_x, center_y  
The coordinates of the virtual origin out from which nudging radiates or splits in opposite directions. A numeric vector of length 1 or of the same length as rows there are in data, or a function returning either of these vectors computed from the variables in data mapped to x or y, respectively.

direction  
One of "none", "radial", or "split". A value of "none" replicates the behavior of position_nudge. Which of these three values is the default depends on the values passed to the other parameters.

obey_grouping  
A logical flag indicating whether to obey or not groupings of the observations. By default, grouping is obeyed when both of the variables mapped to x and y are continuous numeric and ignored otherwise.

kept.origin  
One of "original" or "none".

Details

This position function is backwards compatible with position_nudge but extends it by adding support for nudging that varies across the plotting region, either in opposite directions or radially from a virtual emphcenter point.

The wrapper position_nudge_keep() with exactly the same signature and behaviour as position_nudge provides an easier to remember name when the desire is only to have access to both the original and nudged coordinates.

Positive values as arguments to x and y are added to the original position along either axis. If no arguments are passed to center_x, center_y or direction, the nudging is applied as is, as is the case if direction = "none". If non-NULL arguments are passed to both center_x and center_y, direction = "radial" is assumed. In this case, if x and/or y positive nudging is applied radially outwards from the center, while if negative, inwards towards the center. When a non-NULL argument is passed only to one of center_x or center_y, direction = "split" is assumed. In this case when the initial location of the point is to the left of center_x, -x is used instead of x for nudging, and when the initial location of the point is to the below of center_y, -y is used instead of y for nudging. If non-NULL arguments are passed to both center_x and center_y, and direction is passed "split" as argument, then the split as described above is applied to both to x and y coordinates.
Value

A "Position" object.

Note

Some situations are handled as special cases. When `direction = "split"` or `direction = "radial"`, observations at exactly the _center_ are nudged using x and y unchanged. When `direction = "split"`, and both `center_x` and `center_y` have been supplied, segments are drawn at eight different possible angles. When segments are exactly horizontal or vertical they would be shorter than when drawn at the other four angles, in which case x or y are adjusted to ensure these segments are of the same lengths as those at other angles.

This position is most useful when labeling points forming a cloud or grouped along vertical or horizontal lines or "divides".

See Also

[ggplot2::position_nudge()], [ggrepel::position_nudge_repel()].

Other position adjustments: position_dodgenudge(), position_jitternudge(), position_nudge_line(), position_nudge_to(), position_stacknudge()

Examples

df <- data.frame(
  x = c(1,3,2,5,4,2.5),
  y = c("abc","cd","d","c","bcd","a")
)

# Plain nudging, same as with ggplot2::position_nudge()

ggplot(df, aes(x, y, label = y)) +
  geom_point() +
  geom_text_s(hjust = "left", vjust = "bottom",
               position = position_nudge(x = 0.2, y = 0.2))

ggplot(df, aes(x, y, label = y)) +
  geom_point() +
  geom_text_s(add.segments = FALSE,
               position = position_nudge_center(x = 0.2, y = 0.2))

# "split" nudging

ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_s(aes(label = y),
              add.segments = FALSE,
              position = position_nudge_center(x = 0.2, y = 0.2,
                                              direction = "split"))
ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = 0.4,
                                                direction = "split"))

ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(y = 0.2,
                                                direction = "split"))

ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = 0.2,
                                                y = 0.3,
                                                center_y = 2,
                                                center_x = 1.5,
                                                direction = "split"))

ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = 0.06,
                                                y = 0.08,
                                                center_y = 2))

ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = 0.1,
                                                center_x = 2.51))

ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = 0.06,
                                                y = 0.08,
                                                center_x = median,
                                                center_y = median,
                                                direction = "split"))

# "Radial" nudging

ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = 0.1,
                                                y = 0.2,
                                                direction = "radial"))

 ggplot(df, aes(x, y)) +
df <- data.frame(
  x = -10:10,
  z = (-10:10)^2,
  y = letters[1:21],
  group = rep(c("a", "b"), rep(c(11, 10)))
)

ggplot(df, aes(x, z)) +
  geom_point() +
  geom_line() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = -0.1,
                                                y = -0.1,
                                                direction = "radial"))

above_max <- function(x) {1.2 * max(x)}

ggplot(df, aes(x, z)) +
  geom_point() +
  geom_line() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = -0.9,
                                                y = -2.7,
                                                center_x = mean,
                                                center_y = max))

ggplot(df, aes(x, z)) +
  geom_point() +
  geom_line() +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = 0.9,
                                                y = 2.7,
                                                center_x = mean,
                                                center_y = max))

ggplot(df, aes(x, z, color = group)) +
  geom_point() +
  geom_line(color = "black", linetype = "dotted") +
  geom_text_s(aes(label = y),
              position = position_nudge_center(x = -1.2,
                                                y = -3,
                                                center_x = mean,
                                                center_y = above_max))

ggplot(df, aes(x, z, color = group)) +
  geom_point() +
  geom_line(color = "black", linetype = "dotted") +
position_nudge_line

**Description**

position_nudge_line() is generally useful for adjusting the starting position of labels or text to be repelled while preserving the original position as the start of the segments. The difference compared to position_nudge_center is that the nudging is away from a line or curve fitted to the data points or supplied as coefficients. While position_nudge_center() is most useful for "round-shaped", vertically- or horizontally elongated clouds of points, position_nudge_line() is most suitable when observations follow a linear or curvilinear relationship between x and y values. In contrast to position_nudge, position_nudge_line() returns in 'data' both the original coordinates and the nudged coordinates.

**Usage**

```r
position_nudge_line(
  x = NA_real_,
  y = NA_real_,
  xy_relative = c(0.03, 0.03),
  abline = NULL,
  method = NULL,
  formula = y ~ x,
  direction = c("automatic", "none", "split"),
  line_nudge = 1,
  kept.origin = c("original", "none")
)
```

**Arguments**

- **x, y** Amount of vertical and horizontal distance to move. A numeric vector of length 1, or of the same length as rows there are in data.
- **xy_relative** Nudge relative to x and y data expanse, ignored unless x and y are both NAs.
- **abline** a vector of length two giving the intercept and slope.
- **method** One of "spline", "lm" or "auto".
- **formula** A model formula for lm when method = "lm". Ignored otherwise.
- **direction** One of "automatic", "none", or "split".
line_nudge  A positive multiplier $\geq 1$, increasing nudging away from the curve or line compared to nudging from points.
kept.origin One of "original" or "none".

Details
The default amount of nudging is 3 $x$ and $y$ axes, which in most cases is good. In most cases it is best to apply nudging along a direction perpendicular to the line or curve, if this is the aim, passing an argument to only one of $x$, $y$ or $xy$ _relative_ will be enough. When direction = "split" nudging is away from an implicit line or curve on either side with positive nudging. The line or curve can be smooth spline or linear regression fitted on-the-fly to the data points, or a straight line defined by its coefficients passed to abline. The fitting is well defined only if the observations fall roughly on a curve or straight line that is monotonic in $y$. By means of line_nudge one can increment nudging away from the line or curve compared to away from the points, which is useful for example to keep labels outside of a confidence band. Direction defaults to "split" when line_nudge $> 1$, and otherwise to "none".

Value
A "Position" object.

Note
For method = "lm" only model formulas corresponding to polynomials with no missing terms are supported. If using _poly_ in the model formula, _raw = TRUE_ is required.

In practice, $x$ and $y$ should have the same sign for nudging to work correctly.
This position is most useful when labeling points conforming a cloud along an arbitrary curve or line.

See Also
position_nudge, position_nudge_repel.
Other position adjustments: position_dodgenudge(), position_jitternudge(), position_nudge_center(), position_nudge_to(), position_stacknudge()

Examples

```r
set.seed(16532)
df <- data.frame(
  x = -10:10,
  y = (-10:10)^2,
  yy = (-10:10)^2 + rnorm(21, 0, 4),
  yyy = (-10:10) + rnorm(21, 0, 4),
  l = letters[1:21]
)

# Setting the nudging distance
```
position_nudge_line

```r
ggplot(df, aes(x, y, label = l)) +
  geom_line(linetype = "dotted") +
  geom_point() +
  geom_text(position = position_nudge_line())

ggplot(df, aes(x, y, label = l)) +
  geom_line(linetype = "dotted") +
  geom_point() +
  geom_text_s(position = position_nudge_line())

ggplot(df, aes(x, y, label = l)) +
  geom_line(linetype = "dotted") +
  geom_point() +
  geom_text(position = position_nudge_line(xy_relative = -0.03))

ggplot(df, aes(x, y, label = l)) +
  geom_line(linetype = "dotted") +
  geom_point() +
  geom_text(position = position_nudge_line(x = 0.6, y = 3.2))

ggplot(df, aes(x, y, label = l)) +
  geom_line(linetype = "dotted") +
  geom_point() +
  geom_text(position = position_nudge_line(x = -0.6, y = -4))

# Other curves, using defaults

ggplot(df, aes(x, -y, label = l)) +
  geom_line(linetype = "dotted") +
  geom_point() +
  geom_text(position = position_nudge_line())

ggplot(subset(df, x >= 0), aes(y, sqrt(y), label = l)) +
  geom_line(linetype = "dotted") +
  geom_point() +
  geom_text(position = position_nudge_line())

# Points scattered near a curve or line, we use 'direction = "split"'

ggplot(df, aes(x)) +
  geom_line(aes(y = y), linetype = "dotted") +
  geom_point(aes(y = yy)) +
  geom_text(aes(y = yy, label = l),
            position = position_nudge_line(direction = "split"))

ggplot(subset(df, x >= 0), aes(y, yy)) +
  stat_smooth(method = "lm", formula = y ~ x) +
  geom_point() +
  geom_text(aes(label = l),
            position = position_nudge_line(direction = "split"))

# increasing the nudging for labels near the line
```

### position_nudge_to

Nudge labels to new positions

#### Description

position_nudge_to() is generally useful for adjusting the position of labels or text, both on a discrete or continuous scale. position_nudge_to() differs from position_nudge in that the coordinates of the new position are given directly, rather than as a displacement from the original location. It optionally sets an even distance among positions. As other position functions in this package, it preserves the original position to allow the text to be linked back to its original position with a segment or arrow.

#### Usage

```r
position_nudge_to(
  x = NULL,
  y = NULL,
  x.action = c("none", "spread"),
  y.action = c("none", "spread"),
  kept.origin = c("original", "none")
)
```
Arguments

x, y  Coordinates of the destination position. A vector of mode numeric, that is extended if needed, to the same length as rows there are in data. The values are applied in the order of the observations in data. The default, NULL, leaves the original coordinates unchanged.

x.action, y.action  character string, one of "none", or "spread". With "spread" evenly distributing the positions within the range of argument x or y, if non-null, or the range the variable mapped to x or y, otherwise.

kept.origin  One of "original" or "none".

Details

The nudged x or y replace the original ones in data, while the original coordinates are returned in x_orig and y_orig. Values supported are those of mode numeric, thus including dates and times.

Value

A "Position" object.

Note

Irrespective of the action, the ordering of rows in data is preserved.

See Also

position_nudge, position_nudge_repel.

Other position adjustments: position_dodgenudge(), position_jitternudge(), position_nudge_center(), position_nudge_line(), position_stacknudge()

Examples

df <- data.frame(
  x = c(1,3,2.5,4,2.5),
  y = c(2,1,2.5,1.8,2.8,1.5),
  label = c("abc","cd","d","c","bcd","a")
)

ggplot(df, aes(x, y, label = label)) +
  geom_point() +
  geom_text(position = position_nudge_to(y = 3))

ggplot(df, aes(x, y, label = label)) +
  geom_point() +
  geom_text_s(position = position_nudge_to(y = 3))

ggplot(df, aes(x, y, label = label)) +
  geom_point() +
  geom_text_s(position =
              position_nudge_to(y = 3, x.action = "spread"))
position_stacknudge

```r
ggplot(df, aes(x, y, label = label)) + geom_point() + geom_text_s(position =
  position_nudge_to(y = 3, x = c(2,4), x.action = "spread"),
  hjust = "center")
```

**position_stacknudge**  Combined positions stack and nudge

**Description**

`position_stacknudge()` is useful when labelling plots such as stacked bars, stacked columns, stacked lines, etc. In contrast to `position_nudge`, `position_stacknudge()` returns in data both the original coordinates and the nudged coordinates.

**Usage**

```r
position_stacknudge(
  vjust = 1,
  reverse = FALSE,
  x = 0,
  y = 0,
  direction = c("none", "split", "split.x", "split.y"),
  kept.origin = c("stacked", "original", "none")
)
```

```r
position_fillnudge(
  vjust = 1,
  reverse = FALSE,
  x = 0,
  y = 0,
  direction = c("none", "split", "split.x", "split.y"),
  kept.origin = c("stacked", "original", "none")
)
```

```r
position_stack_keep(vjust = 1, reverse = FALSE)
```

```r
position_fill_keep(vjust = 1, reverse = FALSE)
```

**Arguments**

- `vjust`  Vertical adjustment for geoms that have a position (like points or lines), not a dimension (like bars or areas). Set to 0 to align with the bottom, 0.5 for the middle, and 1 (the default) for the top.
- `reverse`  If TRUE, will reverse the default stacking order. This is useful if you’re rotating both the plot and legend.
position_stacknudge

\[x, y\] Amount of vertical and horizontal distance to move. A numeric vector of length 1, or of the same length as rows there are in \(data\).

direction One of "none", "split", "split.x" or "split.y". A value of "none" replicates the behavior of \texttt{position\_nudge}. At the moment "split" changes the sign of the nudge at zero, which is suitable for column plots with negative slices.

kept.origin One of "original", "stacked" or "none".

Details

This position function is backwards compatible with \texttt{position\_nudge} but extends it by adding support for stacking and for geometries that make use of the original position to draw connecting segments or arrows.

The wrapper \texttt{position\_nudge\_keep()} with exactly the same signature and behaviour as \texttt{position\_nudge} provides an easier to remember name when the desire is only to have access to both the original and nudged coordinates.

Value

A "Position" object.

Author(s)

Michał Krassowski, edited by Pedro J. Aphalo.

Source

\url{https://github.com/slowkow/ggrepel/issues/161}.

See Also

\texttt{position\_nudge}, \texttt{position\_stack}, \texttt{position\_nudge\_repel}.

Other position adjustments: \texttt{position\_dodgenudge()}, \texttt{position\_jitternudge()}, \texttt{position\_nudge\_center()}, \texttt{position\_nudge\_line()}, \texttt{position\_nudge\_to()}.

Examples

```r
df <- data.frame(x1 = c("a", "a", "b", "b", "b"),
                 x2 = c(1, 2, 1, 3, -1),
                 grp = c("some long name", "other name", "some name",
                         "another name", "some long name"))

# Add labels to a horizontal column plot (stacked by default)
ggplot(data = df, aes(x1, x2, group = grp)) +
geom_col(aes(fill = grp), width=0.5) +
geom_vline(xintercept = 0) +
geom_text(aes(label = grp),
          position = position_stacknudge(vjust = 0.5, y = 0.3)) +
theme(legend.position = "none")
```
# Add labels to a vertical column plot (stacked by default)
ggplot(data = df, aes(x2, x1, group = grp)) +
  geom_col(aes(fill = grp), width=0.5) +
  geom_vline(xintercept = 0) +
  geom_text(
    aes(label = grp),
    position = position_stacknudge(vjust = 0.5, x = -0.3),
    angle = 90) +
  theme(legend.position = "none")

# Add labels to a vertical column plot (stacked by default)
ggplot(data = subset(df, x1 >= 0), aes(x1, x2, group = grp)) +
  geom_col(aes(fill = grp), width=0.5, position = position_fill()) +
  geom_vline(xintercept = 0) +
  geom_text(
    aes(label = grp),
    position = position_fillnudge(vjust = 0.5, x = -0.3),
    angle = 90) +
  theme(legend.position = "none")

# Add label at a fixed distance from the top of each column slice
ggplot(data = df, aes(x1, x2, group = grp)) +
  geom_col(aes(fill = grp), width=0.5) +
  geom_vline(xintercept = 0) +
  geom_text(
    aes(label = grp),
    position = position_stacknudge(vjust = 1, y = -0.2)) +
  theme(legend.position = "none")

# Use geom_text_s(), geom_text_repel() or geom_label_repel() to link
# label to labelled segment or object with an arrow

scale_continuous_npc

Position scales for continuous data (npcx & npcy)

Description

scale_npcx_continuous() and scalenpcy_continuous() are scales for continuous npcx and npcy aesthetics expressed in "npc" units. There are no variants. Obviously limits are always the full range of "npc" units and transformations meaningless. These scales are used by the newly defined aesthetics npcx and npcy.
Usage

scale_npcx_continuous(...)  
scale_npcy_continuous(...)

Arguments

... Other arguments passed on to continuous_scale()

Value

A "Scale" object.

stat_apply_group  Apply a function to x or y values

Description

stat_summary_xy() and stat_centroid() are similar to ggplot2::stat_summary() but summarize both x and y values in the same plot layer. Differently to stat_summary() no grouping based on data values is done; the grouping respected is that already present based on mappings to aesthetics. This makes it possible to highlight the actual location of the centroid with geom_point(), geom_text(), and similar geometries. Instead, if we use geom_rug() they are only a convenience avoiding the need to add two separate layers and flipping one of them using orientation = "y".

Usage

stat_apply_group(
  mapping = NULL,
  data = NULL,
  geom = "line",
  .fun.x = NULL,
  .fun.x.args = list(),
  .fun.y = NULL,
  .fun.y.args = list(),
  position = "identity",
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = TRUE,
  ...
)

stat_summary_xy(
  mapping = NULL,
  data = NULL,
  geom = "point",
  .fun.x = NULL,
Arguments

- **mapping**: The aesthetic mapping, usually constructed with `aes`. Only needs to be set at the layer level if you are overriding the plot defaults.
- **data**: A layer specific dataset - only needed if you want to override the plot defaults.
- **geom**: The geometric object to use display the data
- **.fun.x, .fun.y, .fun**: function to be applied or the name of the function to be applied as a character string.
- **.fun.x.args, .fun.y.args, .fun.args**: additional arguments to be passed to the function as a named list.
- **position**: The position adjustment to use for overlapping points on this layer
- **na.rm**: a logical value indicating whether NA values should be stripped before the computation proceeds.
- **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.
- **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`.
- **...**: other arguments passed on to `layer`. This can include aesthetics whose values you want to set, not map. See `layer` for more details.
Details

`stat_apply_group` applies functions to data. When possible it is preferable to use transformations through scales or summary functions such as `ggplot2::stat_summary()`, `stat_summary_xy()` or `stat_centroid()`. There are some computations that are not scale transformations but are not usual summaries either, as the number of data values does not decrease all the way to one row per group. A typical case for a summary is the computation of quantiles. For transformations are cumulative ones, e.g., using `cumsum()`, `runmed()` and similar functions. Obviously, it is always possible to apply such functions to the data before plotting and passing them to a single layer function. However, it can be useful to apply such functions on-the-fly to ensure that grouping is consistent between computations and aesthetics. One particularity of these statistics is that they can apply simultaneously different functions to x values and to y values when needed. In contrast to these statistics, `geom_smooth` applies a function that takes both x and y values as arguments.

These four statistics are similar. They differ on whether they return a single or multiple rows of data per group.

Value

A data frame with the same variables as the data input, with either a single or multiple rows, with the values of x and y variables replaced by the values returned by the applied functions, or possibly filled with NA if no function was supplied or available by default. If the applied function returns a named vector, the names are copied into columns `x.names` and/or `y.names`. If the summary function applied returns a one row data frame, it will be column bound keeping the column names, but overwriting columns x and/or y with y from the summary data frame. In the names returned by `.fun.x` the letter "y" is replaced by "x". These allows the use of the same functions as in `ggplot2::stat_summary()`.

- `x` x-value as returned by `.fun.x`, with names removed
- `y` y-value as returned by `.fun.y`, with names removed
- `x.names` if the x-value returned by `.fun.x` is named, these names
- `y.names` if the y-value returned by `.fun.y` is named, these names
- `xmin, xmax` values returned by `.fun.x` under these names, if present
- `ymin, ymax` values returned by `.fun.y` under these names, if present
- `<other>` additional values as returned by `.fun.y` under other names

Note

The applied function(s) must accept as first argument a vector that matches the variables mapped to x or y aesthetics. For `stat_summary_xy()` and `stat_centroid()` the function(s) to be applied is(are) expected to return a vector of length 1 or a data frame with only one row, as `mean_se()`, `mean_cl_normal()`, `mean_cl_boot()`, `mean_sdl()` and `median_hilow()` from 'ggplot2' do.

For `stat_apply_group` the vectors returned by the the functions applied to x and y must be of exactly the same length. When only one of `.fun.x` or `.fun.y` are passed a function as argument, the other variable in the returned data is filled with NA. If other values are desired, they can be set by means of a user-defined function.
References

Answers to question "R ggplot on-the-fly calculation by grouping variable" at https://stackoverflow.com/questions/51412522.

Examples

```r
set.seed(123456)
my.df <- data.frame(X = rep(1:20,2),
  Y = runif(40),
  category = rep(c("A","B"), each = 20))
# make sure rows are ordered for X as we will use functions that rely on this
my.df <- my.df[order(my.df["X"])]

# Centroid
ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_centroid(shape = "cross", size = 6) +
  geom_point()

ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_centroid(geom = "rug", linewidth = 1.5, .fun = median) +
  geom_point()

ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_centroid(geom = "text", aes(label = category)) +
  geom_point()

ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_summary_xy(geom = "pointrange",
  .fun.x = mean, .fun.y = mean_se) +
  geom_point()

# quantiles
my.probs <- c(0.25, 0.5, 0.75)
ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  geom_point() +
  stat_apply_group(geom = "rug", .fun.y = quantile, .fun.x = quantile) +
  stat_apply_group(geom = "text", hjust = "right", color = "darkred",
  .fun.y = quantile, .fun.x = function(x) {rep(22, 5)}, # set x to 22
  mapping = aes(label = after_stat(y.names))) +
  expand_limits(x = 21)
```

```r
my.probs <- c(0.25, 0.5, 0.75)
ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  geom_point() +
  stat_apply_group(geom = "hline",
  aes(yintercept = after_stat(y)),
```
stat_dens1d_filter

.fun.y = quantile,
.fun.y.args = list(probs = my.probs))

# cumulative summaries
ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_apply_group(.fun.x = function(x) {x},
  .fun.y = cummax)

ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_apply_group(.fun.x = cumsum, .fun.y = cumsum)

# diff returns a shorter vector by 1 for each group
ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_apply_group(.fun.x = function(x) {x[-1L]},
  .fun.y = diff, na.rm = TRUE)

# Running summaries
ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  geom_point() +
  stat_apply_group(.fun.x = function(x) {x},
  .fun.y = runmed, .fun.y.args = list(k = 5))

# Rescaling per group
ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_apply_group(.fun.x = function(x) {x},
  .fun.y = function(x) {(x - min(x)) / (max(x) - min(x)))

# inspecting the returned data
if (requireNamespace("gginnards", quietly = TRUE)) {
  library(gginnards)

ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_centroid(.fun = mean_se, geom = "debug")

ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_summary_xy(.fun.y = mean_se, geom = "debug")

ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  stat_apply_group(.fun.y = cumsum, geom = "debug")

ggplot(my.df, aes(x = X, y = Y, colour = category)) +
  geom_point() +
  stat_apply_group(geom = "debug",
    .fun.x = quantile,
    .fun.x.args = list(probs = my.probs),
    .fun.y = quantile,
    .fun.y.args = list(probs = my.probs))
}

stat_dens1d_filter  
Filter observations by local 1D density

Description

stat_dens1d_filter Filters-out/filters-in observations in regions of a plot panel with high density of observations, based on the values mapped to one of x and y aesthetics. stat_dens1d_filter_g does the same filtering by group instead of by panel. This second stat is useful for highlighting observations, while the first one tends to be most useful when the aim is to prevent clashes among text labels. By default the data are handled all together, but it is also possible to control labeling separately in each tail.

Usage

stat_dens1d_filter(
    mapping = NULL,
    data = NULL,
    geom = "point",
    position = "identity",
    ...,
    keep.fraction = 0.1,
    keep.number = Inf,
    keep.sparse = TRUE,
    keep.these = FALSE,
    exclude.these = FALSE,
    these.target = "label",
    pool.along = c("x", "none"),
    xintercept = 0,
    invert.selection = FALSE,
    bw = "SJ",
    kernel = "gaussian",
    adjust = 1,
    n = 512,
    return.density = FALSE,
    orientation = c("x", "y"),
    na.rm = TRUE,
    show.legend = FALSE,
    inherit.aes = TRUE
)

stat_dens1d_filter_g(
    mapping = NULL,
    data = NULL,
    geom = "point",
    position = "identity",
    keep.fraction = 0.1,
    keep.number = Inf,
    keep.sparse = TRUE,
    ...
keep.these = FALSE,
exclude.these = FALSE,
these.target = "label",
pool.along = c("x", "none"),
xintercept = 0,
invert.selection = FALSE,
na.rm = TRUE,
show.legend = FALSE,
inherit.aes = TRUE,
bw = "SJ",
adjust = 1,
kernel = "gaussian",
n = 512,
return.density = FALSE,
orientation = c("x", "y"),
...
)

Arguments

mapping The aesthetic mapping, usually constructed with 

aes or 
aes_. Only needs to be

set at the layer level if you are overriding the plot defaults.
data A layer specific dataset - only needed if you want to override the plot defaults.
geom The geometric object to use display the data.
position The position adjustment to use for overlapping points on this layer

... other arguments passed on to layer. This can include aesthetics whose values

you want to set, not map. See layer for more details.
keep.fraction numeric vector of length 1 or 2 [0..1]. The fraction of the observations (or rows)
in data to be retained.
keep.number integer vector of length 1 or 2. Set the maximum number of observations to
retain, effective only if obeying keep.fraction would result in a larger number.
keep.sparse logical If TRUE, the default, observations from the more sparse regions are re-
tained, if FALSE those from the densest regions.
keep.these, exclude.these character vector, integer vector, logical vector or function that takes one or more
variables in data selected by these.target. Negative integers behave as in
R’s extraction methods. The rows from data indicated by keep.these and
exclude.these are kept or excluded irrespective of the local density.
these.target character, numeric or logical selecting one or more column(s) of data. If TRUE
the whole data object is passed.
pool.along character, one of "none" or "x", indicating if selection should be done pooling
the observations along the x aesthetic, or separately on either side of xintercept.
xintercept numeric The split point for the data filtering. If NA the data are not split.
invert.selection logical If TRUE, the complement of the selected rows are returned.
bw numeric or character The smoothing bandwidth to be used. If numeric, the standard deviation of the smoothing kernel. If character, a rule to choose the bandwidth, as listed in bw.nrd.

kernel character See density for details.

adjust numeric A multiplicative bandwidth adjustment. This makes it possible to adjust the bandwidth while still using the a bandwidth estimator through an argument passed to bw. The larger the value passed to adjust the stronger the smoothing, hence decreasing sensitivity to local changes in density.

n numeric Number of equally spaced points at which the density is to be estimated for applying the cut point. See density for details.

return.density logical vector of length 1. If TRUE add columns "density" and "keep.obs" to the returned data frame.

orientation character The aesthetic along which density is computed. Given explicitly by setting orientation to either "x" or "y".

na.rm a logical value indicating whether NA values should be stripped before the computation proceeds.

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.

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.

Details

The 1D density of observations of x or y is computed with function density and used to select observations, passing to the geom a subset of the rows in its data input. The default is to select observations in sparse regions of the plot, but the selection can be inverted so that only observations in the densest regions are returned. Specific observations can be protected from being deselected and "kept" by passing a suitable argument to keep.these. Logical and integer vectors work as indexes to rows in data, while a values in a character vector are compared to the character values mapped to the label aesthetic. A function passed as argument to keep.these will receive as argument the values in the variable mapped to label and should return a character, logical or numeric vector as described above. If no variable has been mapped to label, row names are used in its place.

How many rows are retained in addition to those in keep.these is controlled with arguments passed to keep.number and keep.fraction. keep.number sets the maximum number of observations selected, whenever keep.fraction results in fewer observations selected, it is obeyed. If 'xintercept' is a finite value within the x range of the data and pool.along is passed "none" the data as are split into two groups and keep.number and keep.fraction are applied separately to each tail with density still computed jointly from all observations. If the length of keep.number and keep.fraction is one, this value is used for both tails, if their length is two, the first value is use for the left tail and the second value for the right tail.

Computation of density and of the default bandwidth require at least two observations with different values. If data do not fulfill this condition, they are kept only if keep.fraction = 1. This is correct behavior for a single observation, but can be surprising in the case of multiple observations.

Parameters keep.these and exclude.these make it possible to force inclusion or exclusion of observations after the density is computed. In case of conflict, exclude.these overrides keep.these.
Value

A plot layer instance. Using as output data a subset of the rows in input data retained based on a 1D filtering criterion.

Note

Which points are kept and which not depends on how dense and flexible is the density curve estimate. This depends on the values passed as arguments to parameters n, bw and kernel. It is also important to be aware that both geom_text() and geom_text_repel() can avoid over plotting by discarding labels at the plot rendering stage, i.e., what is plotted may differ from what is returned by this statistic.

See Also

density used internally.

Other statistics returning a subset of data: stat_dens1d_labels(), stat_dens2d_filter(), stat_dens2d_labels()

Examples

```r
random_string <-
  function(len = 6) {
    paste(sample(letters, len, replace = TRUE), collapse = "")
  }

# Make random data.
set.seed(1001)
d <- tibble::tibble(
  x = rnorm(100),
  y = rnorm(100),
  group = rep(c("A", "B"), c(50, 50)),
  lab = replicate(100, { random_string() })
)
d$xg <- d$x
d$xg[51:100] <- d$xg[51:100] + 1

# highlight the 1/10 of observations in sparsest regions of the plot
ggplot(data = d, aes(x, y)) +
  geom_point() +
  geom_rug(sides = "b") +
  stat_dens1d_filter(colour = "red") +
  stat_dens1d_filter(geom = "rug", colour = "red", sides = "b")

# highlight the 1/4 of observations in densest regions of the plot
ggplot(data = d, aes(x, y)) +
  geom_point() +
  geom_rug(sides = "b") +
  stat_dens1d_filter(colour = "blue", keep.fraction = 1/4, keep.sparse = FALSE) +
  stat_dens1d_filter(geom = "rug", colour = "blue", keep.fraction = 1/4, keep.sparse = FALSE),
```

stat_dens1d_filter

sides = "b")

# switching axes
ggplot(data = d, aes(x, y)) +
  geom_point() +
  geom_rug(sides = "l") +
  stat_dens1d_filter(colour = "red", orientation = "y") +
  stat_dens1d_filter(geom = "rug", colour = "red", orientation = "y",
                     sides = "l")

# highlight 1/10 plus 1/10 observations in high and low density regions
ggplot(data = d, aes(x, y)) +
  geom_point() +
  geom_rug(sides = "b") +
  stat_dens1d_filter(colour = "red") +
  stat_dens1d_filter(geom = "rug", colour = "red", sides = "b") +
  stat_dens1d_filter(colour = "blue", keep.sparse = FALSE) +
  stat_dens1d_filter(geom = "rug",
                     colour = "blue", keep.sparse = FALSE, sides = "b")

# selecting the 1/10 observations in sparsest regions and their complement
ggplot(data = d, aes(x, y)) +
  stat_dens1d_filter(colour = "red") +
  stat_dens1d_filter(geom = "rug", colour = "red", sides = "b") +
  stat_dens1d_filter(colour = "blue", invert.selection = TRUE) +
  stat_dens1d_filter(geom = "rug",
                     colour = "blue", invert.selection = TRUE, sides = "b")

# density filtering done jointly across groups
ggplot(data = d, aes(xg, y, colour = group)) +
  geom_point() +
  geom_rug(sides = "b", colour = "black") +
  stat_dens1d_filter_g(shape = 1, size = 3, keep.fraction = 1/4, adjust = 2)

# density filtering done independently for each group
ggplot(data = d, aes(xg, y, colour = group)) +
  geom_point() +
  geom_rug(sides = "b") +
  stat_dens1d_filter_g(shape = 1, size = 3, keep.fraction = 1/4, adjust = 2)

# density filtering done jointly across groups by overriding grouping
ggplot(data = d, aes(xg, y, colour = group)) +
  geom_point() +
  geom_rug(sides = "b") +
  stat_dens1d_filter_g(colour = "black",
                       shape = 1, size = 3, keep.fraction = 1/4, adjust = 2)

# label observations
ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  geom_point() +
  stat_dens1d_filter(geom = "text", hjust = "outward")

# looking under the hood with gginnards::geom_debug()
gginnards.installed <- requireNamespace("ggrepel", quietly = TRUE)
if (gginnards.installed) {
  library(gginnards)
  ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  stat_dens1d_filter(geom = "debug")
  ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  stat_dens1d_filter(geom = "debug", return.density = TRUE)
}

stat_dens1d_labels

Replace labels in data based on 1D density

Description

stat_dens1d_labels() Sets values mapped to the label aesthetic to "" or a user provided character string based on the local density in regions of a plot panel. Its main use is together with repulsive geoms from package ggrepel to restrict labeling to the low density tails of a distribution. By default the data are handled all together, but it is also possible to control labeling separately in each tail.

If there is no mapping to label in data, the mapping is set to rownames(data), with a message.

Usage

stat_dens1d_labels(
  mapping = NULL,
  data = NULL,
  geom = "text",
  position = "identity",
  ...,
  keep.fraction = 0.1,
  keep.number = Inf,
  keep.sparse = TRUE,
  keep.these = FALSE,
  exclude.these = FALSE,
  these.target = "label",
  pool.along = c("x", "none"),
  xintercept = 0,
  invert.selection = FALSE,
  bw = "SJ",
  kernel = "gaussian",
  adjust = 1,
  n = 512,
  orientation = c("x", "y"),
  label.fill = "",
)
\begin{verbatim}
stat_dens1d_labels

  return.density = FALSE,
  na.rm = TRUE,
  show.legend = FALSE,
  inherit.aes = TRUE
)

Arguments

mapping  The aesthetic mapping, usually constructed with \texttt{aes} or \texttt{aes_}. Only needs to be set at the layer level if you are overriding the plot defaults.
data     A layer specific dataset - only needed if you want to override the plot defaults.
geom      The geometric object to use display the data.
position  The position adjustment to use for overlapping points on this layer
          ... other arguments passed on to \texttt{layer}. This can include aesthetics whose values
          you want to set, not map. See \texttt{layer} for more details.
keep.fraction  numeric vector of length 1 or 2 \([0..1]\). The fraction of the observations (or rows)
                in \texttt{data} to be retained.
keep.number   integer vector of length 1 or 2. Set the maximum number of observations to
                retain, effective only if obeying \texttt{keep.fraction} would result in a larger number.
keep.sparse   logical If \texttt{TRUE}, the default, observations from the more sparse regions are re-
                tained, if \texttt{FALSE} those from the densest regions.
keep.these, exclude.these
                character vector, integer vector, logical vector or function that takes one or more
                variables in \texttt{data} selected by \texttt{these.target}. Negative integers behave as in
                R’s extraction methods. The rows from \texttt{data} indicated by \texttt{keep.these} and
                \texttt{exclude.these} are kept or excluded irrespective of the local density.
these.target  character, numeric or logical selecting one or more column(s) of \texttt{data}. If \texttt{TRUE}
                the whole \texttt{data} object is passed.
pool.along    character, one of "none" or "x", indicating if selection should be done pooling
                the observations along the \texttt{x} aesthetic, or separately on either side of \texttt{xintercept}.
xintercept    numeric The split point for the data filtering.
invert.selection  logical If \texttt{TRUE}, the complement of the selected rows are returned.
bw            numeric or character The smoothing bandwidth to be used. If numeric, the
                standard deviation of the smoothing kernel. If character, a rule to choose the
                bandwidth, as listed in \texttt{bw.nrd}.
kernel       character See \texttt{density} for details.
adjust       numeric A multiplicative bandwidth adjustment. This makes it possible to adjust
                the bandwidth while still using the a bandwidth estimator through an argument
                passed to \texttt{bw}. The larger the value passed to \texttt{adjust} the stronger the smoothing,
                hence decreasing sensitivity to local changes in density.
n             numeric Number of equally spaced points at which the density is to be estimated
                for applying the cut point. See \texttt{density} for details.
\end{verbatim}
orientation character The aesthetic along which density is computed. Given explicitly by
setting orientation to either "x" or "y".

label.fill character vector of length 1 or a function.

return.density logical vector of length 1. If TRUE add columns "density" and "keep.obs" to
the returned data frame.

na.rm a logical value indicating whether NA values should be stripped before the com-
putation proceeds.

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.

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.

Details

stat_dens1d_labels() is designed to work together with geometries from package 'ggrepel'. To
avoid text labels being plotted over unlabelled points the corresponding rows in data need to be
retained but labels replaced with the empty character string, "". Function stat_dens1d_filter
cannot be used with the repulsive geoms from 'ggrepel' because it drops the observations.

stat_dens1d_labels() can be useful also in other situations, as the substitution character string
can be set by the user by passing an argument to label.fill. If this argument is NULL the unse-
lected rows are filtered out.

The local density of observations along x or y is computed with function density and used to select
observations, passing to the geom all the rows in its data input but with with the text of labels
replaced in those "not kept". The default is to select observations in sparse regions of the plot, but
the selection can be inverted so that only observations in the densest regions are returned. Specific
observations can be protected from having the label replaced by passing a suitable argument to
keep.these. Logical and integer vectors function as indexes to rows in data, while a character
vector is compared to values in the variable mapped to the label aesthetic. A function passed as
argument to keep.these will receive as argument the values in the variable mapped to label and
should return a character, logical or numeric vector as described above.

How many labels are retained intact in addition to those in keep.these is controlled with arguments
passed to keep.number and keep.fraction. keep.number sets the maximum number of observa-
tions selected, whenever keep.fraction results in fewer observations selected, it is obeyed. If
xintercept is a finite value within the x range of the data and pool.along is passed "none" the
data are split into two groups and keep.number and keep.fraction are applied separately to each
tail with density still computed jointly from all observations. If the length of keep.number and
keep.fraction is one, half this value is used each tail, if their length is two, the first value is use
for the left tail and the second value for the right tail (or if using orientation = "y" the lower and
upper tails, respectively).

Computation of density and of the default bandwidth require at least two observations with different
values. If data do not fulfill this condition, they are kept only if keep.fraction = 1. This is correct
behavior for a single observation, but can be surprising in the case of multiple observations.

Parameters keep.these and exclude.these make it possible to force inclusion or exclusion of
labels after the density is computed. In case of conflict, exclude.these overrides keep.these.
stat_dens1d_labels

Value

A plot layer instance. Using as output data the input data after value substitution based on a 1D the filtering criterion.

Note

Which points are kept and which not depends on how dense and flexible is the density curve estimate. This depends on the values passed as arguments to parameters n, bw and kernel. It is also important to be aware that both geom_text() and geom_text_repel() can avoid overplotting by discarding labels at the plot rendering stage, i.e., what is plotted may differ from what is returned by this statistic.

See Also

density used internally.

Other statistics returning a subset of data: stat_dens1d_filter(), stat_dens2d_filter(), stat_dens2d_labels()

Examples

```r
random_string <-
function(len = 6) {
    paste(sample(letters, len, replace = TRUE), collapse = "")
}

# Make random data.
set.seed(1005)
d <- tibble::tibble(
x = rnorm(100),
y = rnorm(100),
group = rep(c("A", "B"), c(50, 50)),
lab = replicate(100, { random_string() })
)

# using defaults
ggplot(data = d, aes(x, y, label = lab)) +
  geom_point() +
  stat_dens1d_labels()

ggrepel.installed <- requireNamespace("ggrepel", quietly = TRUE)
if (ggrepel.installed) {
    library(ggrepel)

    # using defaults
ggplot(data = d, aes(x, y, label = lab)) +
      geom_point() +
      stat_dens1d_labels(geom = "text_repel")

    # if no mapping to label is found, it is set row names
    ggrepel.installed <- requireNamespace("ggrepel", quietly = TRUE)
    if (ggrepel.installed) {
        library(ggrepel)

        # using defaults
ggplot(data = d, aes(x, y)) +
          geom_point() +
          geom_text_repel()
    }
}
```
stat_dens1d_labels(geom = "text_repel")

ggplot(data = d, aes(x, y)) +
gem_point() +
stat_dens1d_labels(geom = "text_repel", pool.along = "none")

ggplot(data = d, aes(x, y)) +
gem_point() +
stat_dens1d_labels(geom = "text_repel",
    keep.number = c(0, 10), pool.along = "none")

ggplot(data = d, aes(x, y)) +
gem_point() +
stat_dens1d_labels(geom = "text_repel",
    keep.fraction = c(0, 0.2), pool.along = "none")

# using defaults, along y-axis

ggplot(data = d, aes(x, y, label = lab)) +
gem_point() +
stat_dens1d_labels(orientation = "y", geom = "text_repel")

# example labelling with coordinates

ggplot(data = d, aes(x, y, label = sprintf("x = %.2f
y = %.2f", x, y))) +
gem_point() +
stat_dens1d_filter(colour = "red") +
stat_dens1d_labels(geom = "text_repel", colour = "red", size = 3)

ggplot(data = d, aes(x, y, label = lab, colour = group)) +
gem_point() +
stat_dens1d_labels(geom = "text_repel")

ggplot(data = d, aes(x, y, label = lab, colour = group)) +
gem_point() +
stat_dens1d_labels(geom = "text_repel", label.fill = NA)

# we keep labels starting with "a" across the whole plot, but all in sparse
# regions. To achieve this we pass as argument to label.fill a function
# instead of a character string.

label.fun <- function(x) {ifelse(grepl("^a", x), x, "")

ggplot(data = d, aes(x, y, label = lab, colour = group)) +
gem_point() +
stat_dens1d_labels(geom = "text_repel", label.fill = label.fun)

# Using geom_debug() we can see that all 100 rows in code(d) are
# returned. But only those labelled in the previous example still contain
# the original labels.

gginnards.installed <- requireNamespace("gginnards", quietly = TRUE)
if (gginnards.installed) {
    library(gginnards)

    gplot(data = d, aes(x, y, label = lab)) +
}
```r
stat_dens2d_filter

stat_dens2d_filter

Filter observations by local 2D density

Description

stat_dens2d_filter Filters-out/filters-in observations in regions of a plot panel with high density of observations, based on the values mapped to both x and y aesthetics. stat_dens2d_filter_g does the filtering by group instead of by panel. This second stat is useful for highlighting observations, while the first one tends to be most useful when the aim is to prevent clashes among text labels. If there is no mapping to label in data, the mapping is silently set to rownames(data).

Usage

stat_dens2d_filter(
  mapping = NULL,
  data = NULL,
  geom = "point",
  position = "identity",
  ...,
  keep.fraction = 0.1,
  keep.number = Inf,
  keep.sparse = TRUE,
  keep.these = FALSE,
  exclude.these = FALSE,
  these.target = "label",
  pool.along = c("xy", "x", "y", "none"),
  xintercept = 0,
  yintercept = 0,
...)
```
invert.selection = FALSE,
na.rm = TRUE,
show.legend = FALSE,
inherit.aes = TRUE,
h = NULL,
n = NULL,
return.density = FALSE
)

stat_dens2d_filter_g(
  mapping = NULL,
  data = NULL,
  geom = "point",
  position = "identity",
  ...,
  keep.fraction = 0.1,
  keep.number = Inf,
  keep.sparse = TRUE,
  keep.these = FALSE,
  exclude.these = FALSE,
  these.target = "label",
  pool.along = c("xy", "x", "y", "none"),
  xintercept = 0,
  yintercept = 0,
  invert.selection = FALSE,
  na.rm = TRUE,
  show.legend = FALSE,
  inherit.aes = TRUE,
  h = NULL,
  n = NULL,
  return.density = FALSE
)

Arguments

mapping       The aesthetic mapping, usually constructed with aes or aes_. Only needs to be
              set at the layer level if you are overriding the plot defaults.
data           A layer specific dataset - only needed if you want to override the plot defaults.
geom           The geometric object to use display the data.
position       The position adjustment to use for overlapping points on this layer
...             other arguments passed on to layer. This can include aesthetics whose values
              you want to set, not map. See layer for more details.
keep.fraction  numeric [0..1]. The fraction of the observations (or rows) in data to be retained.
keep.number    integer Set the maximum number of observations to retain, effective only if
              obeying keep.fraction would result in a larger number.
keep.sparse    logical If TRUE, the default, observations from the more sparse regions are re-
              tained, if FALSE those from the densest regions.
keep.these, exclude.these
character vector, integer vector, logical vector or function that takes one or more variables in data selected by these.target. Negative integers behave as in R’s extraction methods. The rows from data indicated by keep.these and exclude.these are kept or excluded irrespective of the local density.

these.target character, numeric or logical selecting one or more column(s) of data. If TRUE the whole data object is passed.
pool.along character, one of "none", "x", "y", or "xy" indicating if selection should be done pooling the observations along the x, y, both axes or none based on quadrants given by xintercept and yintercept.
xintercept, yintercept numeric The center point of the quadrants.
invert.selection logical If TRUE, the complement of the selected rows are returned.
na.rm a logical value indicating whether NA values should be stripped before the computation proceeds.
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.
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.
h vector of bandwidths for x and y directions. Defaults to normal reference bandwidth (see bandwidth.nrd). A scalar value will be taken to apply to both directions.
n Number of grid points in each direction. Can be scalar or a length-2 integer vector
return.density logical vector of length 1. If TRUE add columns "density" and "keep.obs" to the returned data frame.

Details

The local density of observations in 2D (x and y) is computed with function kde2d and used to select observations, passing to the geom a subset of the rows in its data input. The default is to select observations in sparse regions of the plot, but the selection can be inverted so that only observations in the densest regions are returned. Specific observations can be protected from being deselected and "kept" by passing a suitable argument to keep.these. Logical and integer vectors work as indexes to rows in data, while a character vector values are compared to the character values mapped to the label aesthetic. A function passed as argument to keep.these will receive as argument the values in the variable mapped to label and should return a character, logical or numeric vector as described above. If no variable has been mapped to label, row names are used in its place.

How many rows are retained in addition to those in keep.these is controlled with arguments passed to keep.number and keep.fraction. keep.number sets the maximum number of observations selected, whenever keep.fraction results in fewer observations selected, it is obeyed.
Computation of density and of the default bandwidth require at least two observations with different values. If data do not fulfill this condition, they are kept only if keep.fraction = 1. This is correct behavior for a single observation, but can be surprising in the case of multiple observations.

Parameters keep.these and exclude.these make it possible to force inclusion or exclusion of observations after the density is computed. In case of conflict, exclude.these overrides keep.these.

Value

A plot layer instance. Using as output data a subset of the rows in input data retained based on a 2D-density-based filtering criterion.

Note

Which points are kept and which not depends on how dense a grid is used and how flexible the density surface estimate is. This depends on the values passed as arguments to parameters n, bw and kernel. It is also important to be aware that both geom_text() and geom_text_repel() can avoid overplotting by discarding labels at the plot rendering stage, i.e., what is plotted may differ from what is returned by this statistic.

See Also

stat_dens2d_labels and kde2d used internally. Parameters n, h in these statistics correspond to the parameters with the same name in this imported function. Limits are set to the limits of the plot scales.

Other statistics returning a subset of data: stat_dens1d_filter(), stat_dens1d_labels(), stat_dens2d_labels()

Examples

```r
random_string <-
  function(len = 6) {
    paste(sample(letters, len, replace = TRUE), collapse = "")
  }

  # Make random data.
set.seed(1001)
d <- tibble::tibble(
  x = rnorm(100),
  y = rnorm(100),
  group = rep(c("A", "B"), c(50, 50)),
  lab = replicate(100, random_string())
)

  # filter (and here highlight) 1/10 observations in sparsest regions
 ggplot(data = d, aes(x, y)) +
   geom_point() +
   stat_dens2d_filter(colour = "red")

  # filter observations not in the sparsest regions
 ggplot(data = d, aes(x, y)) +
   geom_point() +
```
stat_dens2d_filter

stat_dens2d_filter(colour = "blue", invert.selection = TRUE)

# filter observations in dense regions of the plot
ggplot(data = d, aes(x, y)) +
  geom_point() +
  stat_dens2d_filter(colour = "blue", keep.sparse = FALSE)

# filter 1/2 the observations
ggplot(data = d, aes(x, y)) +
  geom_point() +
  stat_dens2d_filter(colour = "red", keep.fraction = 0.5)

# filter 1/2 the observations but cap their number to maximum 12 observations
ggplot(data = d, aes(x, y)) +
  geom_point() +
  stat_dens2d_filter(colour = "red",
                     keep.fraction = 0.5,
                     keep.number = 12)

# density filtering done jointly across groups
ggplot(data = d, aes(x, y, colour = group)) +
  geom_point() +
  stat_dens2d_filter(shape = 1, size = 3, keep.fraction = 1/4)

# density filtering done independently for each group
ggplot(data = d, aes(x, y, colour = group)) +
  geom_point() +
  stat_dens2d_filter_g(shape = 1, size = 3, keep.fraction = 1/4)

# density filtering done jointly across groups by overriding grouping
ggplot(data = d, aes(x, y, colour = group)) +
  geom_point() +
  stat_dens2d_filter_g(colour = "black",
                       shape = 1, size = 3, keep.fraction = 1/4)

# label observations
ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  geom_point() +
  stat_dens2d_filter(geom = "text")

ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  geom_point() +
  stat_dens2d_filter(geom = "text",
                     keep.these = function(x) (grepl("^u", x)))

ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  geom_point() +
  stat_dens2d_filter(geom = "text",
                     keep.these = function(x) (grepl("^u", x)))

ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  geom_point() +
  stat_dens2d_filter(geom = "text",
                     keep.these = function(x) (grepl("^u", x)))
# looking under the hood with gginnards::geom_debug()
gginnards.installed <- requireNamespace("ggrepel", quietly = TRUE)
if (gginnards.installed) {
  library(gginnards)

  ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  stat_dens2d_filter(geom = "debug")

  ggplot(data = d, aes(x, y, label = lab, colour = group)) +
  geom_point() +
  stat_dens2d_filter(geom = "debug", return.density = TRUE)
}

---

**stat_dens2d_labels**

*Replace labels in data based on 2D density*

**Description**

`stat_dens2d_labels()` Sets values mapped to the `label` aesthetic to "" or a user provided character string based on the local density in regions of a plot panel. Its main use is together with repulsive geoms from package `ggrepel`. If there is no mapping to `label` in data, the mapping is set to `rownames(data)`, with a message.

**Usage**

```r
stat_dens2d_labels(
  mapping = NULL,
  data = NULL,
  geom = "text",
  position = "identity",
  ..., 
  keep.fraction = 0.1,
  keep.number = Inf,
  keep.sparse = TRUE,
  keep.these = FALSE,
  exclude.these = FALSE,
  these.target = "label",
  pool.along = c("xy", "x", "y", "none"),
  xintercept = 0,
  yintercept = 0,
  invert.selection = FALSE,
  h = NULL,
  n = NULL,
  label.fill = "",
  return.density = FALSE,
)```

Arguments

mapping

The aesthetic mapping, usually constructed with `aes` or `aes_`. Only needs to be set at the layer level if you are overriding the plot defaults.

data

A layer specific dataset - only needed if you want to override the plot defaults.

geom

The geometric object to use display the data.

position

The position adjustment to use for overlapping points on this layer

... other arguments passed on to `layer`. This can include aesthetics whose values you want to set, not map. See `layer` for more details.

keep.fraction

numeric [0..1]. The fraction of the observations (or rows) in `data` to be retained.

keep.number

integer Set the maximum number of observations to retain, effective only if obeying `keep.fraction` would result in a larger number.

keep.sparse

logical If TRUE, the default, observations from the more sparse regions are retained, if FALSE those from the densest regions.

keep.these, exclude.these

character vector, integer vector, logical vector or function that takes one or more variables in `data` selected by `these.target`. Negative integers behave as in R’s extraction methods. The rows from `data` indicated by `keep.these` and `exclude.these` are kept or excluded irrespective of the local density.

these.target

character, numeric or logical selecting one or more column(s) of `data`. If TRUE the whole `data` object is passed.

pool.along

character, one of "none" or "x", indicating if selection should be done pooling the observations along the x aesthetic, or separately on either side of `xintercept`.

xintercept, yintercept

numeric The split points for the data filtering.

invert.selection

logical If TRUE, the complement of the selected rows are returned.

h

vector of bandwidths for x and y directions. Defaults to normal reference bandwidth (see `bandwidth.nrd`). A scalar value will be taken to apply to both directions.

n

Number of grid points in each direction. Can be scalar or a length-2 integer vector.

label.fill

character vector of length 1, a function or NULL.

return.density

logical vector of length 1. If TRUE add columns "density" and "keep.obs" to the returned data frame.

na.rm

a logical value indicating whether NA values should be stripped before the computation proceeds.

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.
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.

Details

stat_dens2d_labels() is designed to work together with geometries from package 'ggrepel'. To avoid text labels being plotted over unlabelled points all the rows in data need to be retained but labels replaced with the empty character string, "". Function stat_dens2d_filter cannot be used with the repulsive geoms from 'ggrepel' because it drops observations.

stat_dens2d_labels() can be useful also in other situations, as the substitution character string can be set by the user by passing an argument to label.fill. If this argument is NULL the unselected rows are filtered out identically as by stat_dens2d_filter.

The local density of observations in 2D (x and y) is computed with function kde2d and used to select observations, passing to the geom all the rows in its data input but with with the text of labels replaced in those “not kept”. The default is to select observations in sparse regions of the plot, but the selection can be inverted so that only observations in the densest regions are returned. Specific observations can be protected from having the label replaced by passing a suitable argument to keep.these. Logical and integer vectors function as indexes to rows in data, while a character vector is compared to values in the variable mapped to the label aesthetic. A function passed as argument to keep.these will receive as its first argument the values in the variable mapped to label and should return a character, logical or numeric vector as described above.

How many labels are retained intact in addition to those in keep.these is controlled with arguments passed to keep.number and keep.fraction. keep.number sets the maximum number of observations selected, whenever keep.fraction results in fewer observations selected, it is obeyed.

Computation of density and of the default bandwidth require at least two observations with different values. If data do not fulfill this condition, they are kept only if keep.fraction = 1. This is correct behavior for a single observation, but can be surprising in the case of multiple observations.

Parameters keep.these and exclude.these make it possible to force inclusion or exclusion of observations after the density is computed. In case of conflict, exclude.these overrides keep.these.

Value
A plot layer instance. Using as output data the input data after value substitution based on a 2D the filtering criterion.

Note
Which points are kept and which not depends on how dense a grid is used and how flexible the density surface estimate is. This depends on the values passed as arguments to parameters n, bw and kernel. It is also important to be aware that both geom_text() and geom_text_repel() can avoid overplotting by discarding labels at the plot rendering stage, i.e., what is plotted may differ from what is returned by this statistic.

See Also
stat_dens2d_filter and kde2d used internally. Parameters n, h in this statistic correspond to the parameters with the same name in this imported function. Limits are set to the limits of the plot.
scales.
Other statistics returning a subset of data: `stat_dens1d_filter()`, `stat_dens1d_labels()`, `stat_dens2d_filter()

Examples

```r
random_string <- function(len = 6) {
  paste(sample(letters, len, replace = TRUE), collapse = "")
}

# Make random data.
set.seed(1001)
d <- tibble::tibble(
x = rnorm(100),
y = rnorm(100),
group = rep(c("A", "B"), c(50, 50)),
lab = replicate(100, { random_string() })
)

# using defaults
ggplot(data = d, aes(x, y, label = lab)) +
  geom_point() +
  stat_dens2d_labels()

ggplot(data = d, aes(x, y, label = lab)) +
  geom_point() +
  stat_dens2d_labels(keep.these = "zoujdg")

ggplot(data = d, aes(x, y, label = lab)) +
  geom_point() +
  stat_dens2d_labels(keep.these = function(x) {grepl("^z", x)})

ggplot(data = d, aes(x, y, label = lab)) +
  geom_point() +
  stat_dens2d_labels(geom = "text_s",
  position = position_nudge_center(x = 0.1, y = 0.1,
  center_x = mean,
  center_y = mean),
  vjust = "outward_mean", hjust = "outward_mean") +
  expand_limits(x = c(-4, 4.5))

ggrepel.installed <- requireNamespace("ggrepel", quietly = TRUE)
if (ggrepel.installed) {
  library(ggrepel)
  ggrepelinst <- requireNamespace("ggrepel", quietly = TRUE)
  if (gggrepelinst) {
    library(ggrepel)
    ggrepelinst <- requireNamespace("ggrepel", quietly = TRUE)
    if (gggrepelinst) {
      library(ggrepel)
      ggplot(data = d, aes(x, y, label = lab, colour = group)) +
        geom_point() +
        stat_dens2d_labels(geom = "text_repel")
    }
  }
  library(ggrepel)
}
```

```
stat_fmt_tb

stat_fmt_tb selects, reorders and/or renames columns and or rows of a tibble nested in data. This

Description

stat_fmt_tb selects, reorders and/or renames columns and or rows of a tibble nested in data. This
stat is intended to be used to pre-process tibble objects mapped to the label aesthetic before adding them to a plot with geom_table.

Usage

```r
stat_fmt_tb(
  mapping = NULL,
  data = NULL,
  geom = "table",
  tb.vars = NULL,
  tb.rows = NULL,
  digits = 3,
  position = "identity",
  table.theme = NULL,
  table.rownames = FALSE,
  table.colnames = TRUE,
  table.hjust = 0.5,
  parse = FALSE,
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = TRUE,
  ...
)
```

Arguments

- **mapping**: The aesthetic mapping, usually constructed with `aes` or `aes_`. Only needs to be set at the layer level if you are overriding the plot defaults.
- **data**: A layer specific dataset - only needed if you want to override the plot defaults.
- **geom**: The geometric object to use display the data
- **tb.vars, tb.rows**: character or numeric vectors, optionally named, used to select and/or rename the columns or rows in the table returned.
- **digits**: integer indicating the number of significant digits to be retained in data.
- **position**: The position adjustment to use for overlapping points on this layer
- **table.theme**: NULL, list or function A 'gridExtra' ttheme definition, or a constructor for a ttheme or NULL for default.
- **table.rownames, table.colnames**: logical flag to enable or disabling printing of row names and column names.
- **table.hjust**: numeric Horizontal justification for the core and column headings of the table.
- **parse**: If TRUE, the labels will be parsed into expressions and displayed as described in ?plotmath.
- **na.rm**: a logical indicating whether NA values should be stripped before the computation proceeds.
- **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.
### stat_fmt_tb

**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`.

... other arguments passed on to `layer`. This can include aesthetics whose values you want to set, not map. See `layer` for more details.

### Value
A plot layer instance. Using as output data a copy of the input data in which the data frames mapped to `label` have been modified.

### Computed variables
The output of sequentially applying `slice` with `tb.rows` as argument and `select` with `tb.vars` to a list variable list mapped to `label` and containing a single tibble per row in data.

### See Also
See `geom_table` for details on how tables respond to mapped aesthetics and table themes. For details on predefined table themes see `ttheme_gtdefault`.

### Examples
```r
my.df <-
tibble::tibble(
  x = c(1, 2),
  y = c(0, 4),
  group = c("A", "B"),
  tbs = list(a = tibble::tibble(Xa = 1:6, Y = rep(c("x", "y"), 3)),
             b = tibble::tibble(Xb = 1:3, Y = "x"))
)

ggplot(my.df, aes(x, y, label = tbs)) +
  stat_fmt_tb() +
  expand_limits(x = c(0,3), y = c(-2, 6))

# Hide column names, display row names
ggplot(my.df, aes(x, y, label = tbs)) +
  stat_fmt_tb(table.colnames = FALSE,
             table.rownames = TRUE) +
  expand_limits(x = c(0,3), y = c(-2, 6))

# Use a theme for the table
ggplot(my.df, aes(x, y, label = tbs)) +
  stat_fmt_tb(table.theme = ttheme_gtlight) +
  expand_limits(x = c(0,3), y = c(-2, 6))

# Selection and renaming by column position
ggplot(my.df, aes(x, y, label = tbs)) +
  stat_fmt_tb(tb.vars = c(value = 1, group = 2),
              tb.rows = 1:3) +
```
expand_limits(x = c(0, 3), y = c(-2, 6))

# selection, reordering and renaming by column position
ggplot(my.df, aes(x, y, label = tbs)) +
  stat_fmt_tb(tb.vars = c(group = 2, value = 1),
              tb.rows = 1:3) +
  expand_limits(x = c(0, 3), y = c(-2, 6))

# selection and renaming, using partial matching to column name
ggplot(my.df, aes(x, y, label = tbs)) +
  stat_fmt_tb(tb.vars = c(value = "X", group = "Y"),
              tb.rows = 1:3) +
  expand_limits(x = c(0, 3), y = c(-2, 6))

stat_panel_counts

Number of observations in a plot panel

Description

stat_panel_counts() counts the number of observations in each panel. stat_group_counts() counts the number of observations in each group. By default they add one or more text labels to the top right corner of each panel. Grouping is ignored by stat_panel_counts(). If no grouping exists, the two statistics behave similarly.

Usage

stat_panel_counts(
  mapping = NULL,
  data = NULL,
  geom = "text_npc",
  position = "identity",
  label.x = "right",
  label.y = "top",
  na.rm = FALSE,
  show.legend = FALSE,
  inherit.aes = TRUE,
  ...
)

stat_group_counts(
  mapping = NULL,
  data = NULL,
  geom = "text_npc",
  position = "identity",
  label.x = "right",
  label.y = "top",
  hstep = 0,
  ...
stat_panel_counts

vstep = NULL,
na.rm = FALSE,
show.legend = FALSE,
inherit.aes = TRUE,
...
)

Arguments

mapping The aesthetic mapping, usually constructed with `aes` or `aes_`. Only needs to be set at the layer level if you are overriding the plot defaults.
data A layer specific dataset. Rarely used, as you will not want to override the plot defaults.
geom The geometric object to use display the data
position The position adjustment to use on this layer
label.x, label.y numeric Coordinates (in npc units) to be used for absolute positioning of the labels.
na.rm a logical indicating whether NA values should be stripped before the computation proceeds.
show.legend logical. Should this layer be included in the legends? NA, the default, includes it if any aesthetics are mapped. FALSE never includes, and TRUE always includes.
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 should not inherit behaviour from the default plot specification, e.g., `borders`.
... other arguments passed on to `layer`. This can include aesthetics whose values you want to set, not map. See `layer` for more details.
hstep, vstep numeric in npc units, the horizontal and vertical step used between labels for different groups.

Details

These statistics can be used to automatically count observations in each panel of a plot, and by default add these counts as text labels. These statistics, unlike `stat_quadrant_counts()` requires only one of x or y aesthetics and can be used together with statistics that have the same requirement, like `stat_density()`.

The default position of the label is in the top right corner. When using facets even with free limits for x and y axes, the location of the labels is consistent across panels. This is achieved by use of `geom = "text_npc"` or `geom = "label_npc"`. To pass the positions in native data units to `label.x` and `label.y`, pass also explicitly `geom = "text"`, `geom = "label"` or some other geometry that use the x and/or y aesthetics. A vector with the same length as the number of panels in the figure can be used if needed.

Value

A plot layer instance. Using as output data the counts of observations in each plot panel or per group in each plot panel.
Computed variables

Data frame with one or more rows, one for each group of observations for which counts are counted in data.

\texttt{x,npcx} x value of label position in data- or npc units, respectively

\texttt{y,npcy} y value of label position in data- or npc units, respectively

\texttt{count} number of observations as an integer

\texttt{count.label} number of observations as character

As shown in one example below \texttt{geom\_debug} can be used to print the computed values returned by any statistic. The output shown includes also values mapped to aesthetics, like \texttt{label} in the example. \texttt{x} and \texttt{y} are included in the output only if mapped.

See Also

Other Functions for quadrant and volcano plots: \texttt{geom\_quadrant\_lines()}, \texttt{stat\_quadrant\_counts()}

Examples

```r
# generate artificial data
set.seed(67821)
x <- 1:100
y <- rnorm(length(x), mean = 10)
group <- factor(rep(c("A", "B"), times = 50))
my.data <- data.frame(x, y, group)

ggplot(my.data, aes(x, y)) +
  geom_point() +
  stat_panel_counts()

ggplot(my.data, aes(x, y, colour = group)) +
  geom_point() +
  stat_panel_counts()

ggplot(my.data, aes(x, y, colour = group)) +
  geom_point() +
  stat_group_counts()

ggplot(my.data, aes(x, y, colour = group)) +
  geom_point() +
  stat_group_counts(label.x = "left", hstep = 0.06, vstep = 0)

# We use geom\_debug() to see the computed values

if (gginnards.installed)
  library(gginnards)

ggplot(my.data, aes(x, y)) +
  geom_point() +
  geom_debug()
```


```r
stat_panel_counts(geom = "debug")

ggplot(my.data, aes(x, y, colour = group)) +
  geom_point() +
  stat_group_counts(geom = "debug")
}

ggplot(my.data, aes(x, y)) +
  geom_point() +
  stat_panel_counts(aes(label = sprintf("%i observations", after_stat(count)))) +
  expand_limits(y = 12.7)

ggplot(my.data, aes(y)) +
  stat_panel_counts(label.x = "left") +
  stat_density()

ggplot(my.data, aes(y, colour = group)) +
  stat_group_counts(label.y = "top") +
  stat_density(aes(fill = group))
```

---

**stat_quadrant_counts**  
*Number of observations in quadrants*

**Description**

`stat_quadrant_counts()` counts the number of observations in each quadrant of a plot panel. By default it adds a text label to the far corner of each quadrant. It can also be used to obtain the total number of observations in each of two pairs of quadrants or in the whole panel. Grouping is ignored, so in every case a single count is computed for each quadrant in a plot panel.

**Usage**

```r
stat_quadrant_counts(  
  mapping = NULL,  
  data = NULL,  
  geom = "text_npc",  
  position = "identity",  
  quadrants = NULL,  
  pool.along = NULL,  
  xintercept = 0,  
  yintercept = 0,  
  label.x = NULL,  
  label.y = NULL,  
  na.rm = FALSE,  
  show.legend = FALSE,  
  inherit.aes = TRUE,  
  ...
)
```
Arguments

- **mapping**: The aesthetic mapping, usually constructed with `aes` or `aes_`. Only needs to be set at the layer level if you are overriding the plot defaults.
- **data**: A layer specific dataset - only needed if you want to override the plot defaults.
- **geom**: The geometric object to use display the data.
- **position**: The position adjustment to use on this layer.
- **quadrants**: integer vector indicating which quadrants are of interest, with a 0L indicating the whole plot.
- **pool.along**: character, one of "none", "x" or "y", indicating which quadrants to pool to calculate counts by pair of quadrants.
- **xintercept, yintercept**: numeric the coordinates of the origin of the quadrants.
- **label.x, label.y**: numeric Coordinates (in npc units) to be used for absolute positioning of the labels.
- **na.rm**: a logical indicating whether NA values should be stripped before the computation proceeds.
- **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.
- **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 should not inherit behaviour from the default plot specification, e.g., `borders`.
- **...**: other arguments passed on to `layer`. This can include aesthetics whose values you want to set, not map. See `layer` for more details.

Details

This statistic can be used to automatically count observations in each of the four quadrants of a plot, and by default add these counts as text labels. Values exactly equal to `xintercept` or `yintercept` are counted together with those larger than the intercepts. An argument value of zero, passed to formal parameter `quadrants` is interpreted as a request for the count of all observations in each plot panel.

The default origin of quadrants is at `xintercept = 0`, `yintercept = 0`. Also by default, counts are computed for all quadrants within the `x` and `y` scale limits, but ignoring any marginal scale expansion. The default positions of the labels is in the farthest corner or edge of each quadrant using npc coordinates. Consequently, when using facets even with free limits for `x` and `y` axes, the location of the labels is consistent across panels. This is achieved by use of `geom = "text_npc"` or `geom = "label_npc"`. To pass the positions in native data units, pass `geom = "text"` explicitly as argument.

Value

A plot layer instance. Using as output data the counts of observations per plot quadrant.
Computed variables

Data frame with one to four rows, one for each quadrant for which counts are counted in data.

- **quadrant** integer, one of 0:4
- **x** x value of label position in data units
- **y** y value of label position in data units
- **npcx** x value of label position in npc units
- **npcy** y value of label position in npc units
- **count** number of observations
- **count.label** number of observations as character

As shown in one example below `geom_debug` can be used to print the computed values returned by any statistic. The output shown includes also values mapped to aesthetics, like `label` in the example.

See Also

Other Functions for quadrant and volcano plots: `geom_quadrant_lines()`, `stat_panel_counts()`

Examples

```r
# generate artificial data
set.seed(4321)
x <- 1:100
y <- rnorm(length(x), mean = 10)
my.data <- data.frame(x, y)
ggplot(my.data, aes(x, y)) +
  geom_point() +
  stat_quadrant_counts()

# We use geom_debug() to see the computed values

gginnards.installed <- requireNamespace("gginnards", quietly = TRUE)
if (gginnards.installed) {
  library(gginnards)
  gggplot(my.data, aes(x, y)) +
    geom_point() +
    stat_quadrant_counts(geom = "debug")
}

ggplot(my.data, aes(x, y)) +
  geom_point() +
  stat_quadrant_counts(aes(label = sprintf("%i observations", after_stat(count)))) +
  expand_limits(y = 12.7)
```
try_data_frame

Convert an R object into a tibble

Description

This functions tries to convert any R object into a data.frame object. If x is already a data.frame, it is returned as is. If it is a list or a vector it is converted by means of as.data.frame(). If of any other type, a conversion into an object of class xts is attempted by means of try.xts() and if successful the xts object is converted into a data frame with a variable time containing times as POSIXct and the remaining data columns with the time series data. In this conversion row names are stripped.

Usage

```
try_data_frame(
x, 
  time.resolution = "month", 
  as.numeric = FALSE, 
  col.names = NULL 
)
```

```
try_tibble(x, time.resolution = "month", as.numeric = FALSE, col.names = NULL)
```
Arguments

x: An R object

time.resolution: character The time unit to which the returned time values will be rounded.

as.numeric: logical If TRUE convert time to numeric, expressed as fractional calendar years.

col.names: character vector

Value

A tibble::tibble object, derived from data.frame.

Warning!

The time zone was set to "UTC" by try.xts() in the test cases I used. Setting TZ to "UTC" can cause some trouble as several frequently used functions have as default the local or system TZ and will apply a conversion before printing or plotting time data, which in addition is affected by summer/winter time transitions. This should be taken into account as even for yearly data when conversion is to POSIXct a day (1st of January) will be set, but then shifted some hours if printed on a TZ different from "UTC". I recommend reading the documentation of package lubridate-package where the irregularities of time data and the difficulties they cause are very well described. In many cases when working with time series with yearly observations it is best to work with numeric values for years.

Note

This function can be used to easily convert time series data into a format that can be easily plotted with package ggplot2. try_tibble is another name for try_data_frame which tracks the separation and re-naming of data_frame into tibble::tibble in the imported packages.

Examples

class(lynx)
try_tibble(lynx)
try_tibble(lynx, as.numeric = TRUE)
try_tibble(lynx, "year")
class(austres)
try_tibble(austres)
try_tibble(austres, as.numeric = TRUE)
try_tibble(austres, "quarter")
class(cars)
try_tibble(cars)
Table themes

Description
Additional theme constructors for use with `geom_table`.

Usage

```r
ttheme_gtdefault(
  base_size = 10,
  base_colour = "black",
  base_family = "",
  parse = FALSE,
  padding = unit(c(0.8, 0.6), "char"),
  ...
)

ttheme_gtminimal(
  base_size = 10,
  base_colour = "black",
  base_family = "",
  parse = FALSE,
  padding = unit(c(0.5, 0.4), "char"),
  ...
)

ttheme_gtbw(
  base_size = 10,
  base_colour = "black",
  base_family = "",
  parse = FALSE,
  padding = unit(c(1, 0.6), "char"),
  ...
)

ttheme_gtplain(
  base_size = 10,
  base_colour = "black",
  base_family = "",
  parse = FALSE,
  padding = unit(c(0.8, 0.6), "char"),
  ...
)

ttheme_gtdark(
  base_size = 10,
```
base_colour = "grey90",
base_family = "",
parsing = FALSE,
padding = unit(c(0.8, 0.6), "char"),
...
)


ttheme_gtlight(
  base_size = 10,
  base_colour = "grey10",
  base_family = "",
  parsing = FALSE,
padding = unit(c(0.8, 0.6), "char"),
...
)


ttheme_gtsimple(
  base_size = 10,
  base_colour = "grey10",
  base_family = "",
  parsing = FALSE,
padding = unit(c(0.5, 0.4), "char"),
...
)


ttheme_gtstripes(
  base_size = 10,
  base_colour = "grey10",
  base_family = "",
  parsing = FALSE,
padding = unit(c(0.8, 0.6), "char"),
...
)

Arguments

- **base_size**: numeric, default font size.
- **base_colour**: default font colour.
- **base_family**: default font family.
- **parsing**: logical, default behaviour for parsing text as plotmath.
- **padding**: length-2 unit vector specifying the horizontal and vertical padding of text within each cell.
- ... further arguments to control the gtable.

Details

Depending on the theme, the base_colour, which is mapped to the colour aesthetic if present, is applied to only the text elements, or to the text elements and rules. The difference is exemplified...
Value

A list object that can be used as `ttheme` in the construction of tables with functions from package 'gridExtra'.

Note

These theme constructors are wrappers on `gridExtra::ttheme_default()` and `gridExtra::ttheme_minimal()`. They can also be used with `grid.table` if desired.

Examples

```r
library(dplyr)
library(tibble)

mtcars %>%
  group_by(cyl) %>%
  summarize(wt = mean(wt), mpg = mean(mpg)) %>%
  ungroup() %>%
  mutate(wt = sprintf("%.2f", wt),
         mpg = sprintf("%.1f", mpg)) -> tb

df <- tibble(x = 5.45, y = 34, tb = list(tb))

# Same as the default theme constructor
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtdefault) +
  theme_classic()

# Minimal theme constructor
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtminimal) +
  theme_classic()

# A theme with white background
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtbw) +
  theme_bw()

# Default colour of theme superceded by aesthetic constant
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtbw, colour = "darkblue") +
```
theme_bw()

# A theme with dark background
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtdark) +
  theme_dark()

# Default colour of theme superceded by aesthetic constant
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtdark, colour = "yellow") +
  theme_dark()

# A theme with light background
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtlight)

# Default colour of theme superceded by aesthetic constant
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtlight, colour = "darkred")

# Default colour of theme superceded by aesthetic constant
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtsimple)

# Default colour of theme superceded by aesthetic constant
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb),
             table.theme = ttheme_gtstripes) +
  theme_dark()

---

**ttheme_set**

Set default table theme

**Description**

Set R option to the theme to use as current default. This function is implemented differently but is used in the same way as ggplot2::theme_set() but affects the default table-theme instead of the plot theme.
**Usage**

```r
ttheme_set(table.theme = NULL)
```

**Arguments**

- `table.theme` NULL, list or function A `gridExtra` theme definition, or a constructor for a `theme` or NULL for default.

**Value**

A named list with the previous value of the option.

**Note**

The `theme` is set when a plot object is constructed, and consequently the option setting does not affect rendering of ready built plot objects.

**Examples**

```r
library(dplyr)
library(tibble)

mtcars `%>%`
  group_by(cyl) `%>%`
  summarize(wt = mean(wt), mpg = mean(mpg)) `%>%`
  ungroup() `%>%`
  mutate(wt = sprintf("%.2f", wt),
         mpg = sprintf("%.1f", mpg)) -> tb

df <- tibble(x = 5.45, y = 34, tb = list(tb))

# Same as the default theme constructor
ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb))

# set a new default
old_theme <- ttheme_set(ttheme_gtstripes)

ggplot(mtcars, aes(wt, mpg, colour = factor(cyl))) +
  geom_point() +
  geom_table(data = df, aes(x = x, y = y, label = tb))

# restore previous setting
ttheme_set(old_theme)
```
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