

# Package ‘geomtextpath’

July 21, 2025

**Type** Package

**Title** Curved Text in 'ggplot2'

**Version** 0.2.0

**Description** A 'ggplot2' extension that allows text to follow curved paths.  
Curved text makes it easier to directly label paths or neatly annotate in polar co-ordinates.

**License** MIT + file LICENSE

**LazyData** true

**URL** <https://allancameron.github.io/geomtextpath/>

**BugReports** <https://github.com/AllanCameron/geomtextpath/issues>

**Encoding** UTF-8

**Depends** ggplot2 (>= 3.5.2), R (>= 3.6.0)

**Imports** grid, scales, systemfonts, rlang, textshaping (>= 0.4.0),  
vctrs

**RoxygenNote** 7.3.2

**Suggests** testthat (>= 3.0.0), covr, knitr, rmarkdown, ragg, roxygen2,  
sf, xml2, markdown (>= 1.3)

**Config/testthat/edition** 3

**VignetteBuilder** knitr

**Collate** 'borrowed\_gridtext.R' 'coord\_curvedpolar.R' 'data.R'  
'text\_params.R' 'geom\_textpath.R' 'geom\_labelpath.R'  
'geom\_textsegment.R' 'geom\_textabline.R' 'geom\_textcontour.R'  
'geom\_textcurve.R' 'geom\_textdensity.R' 'utils.R'  
'geom\_textdensity2d.R' 'geom\_texthline.R' 'geom\_textsf.R'  
'geom\_textsmooth.R' 'geom\_textvline.R' 'geomtextpath-package.R'  
'grob\_labelpath.R' 'grob\_textpath.R' 'guide\_axis\_textpath.R'  
'onload.R' 'path\_handling.R' 'scales.R' 'sf\_helpers.R'  
'smoothing.R' 'text\_helpers.R' 'text\_placement.R'  
'trig\_helpers.R'

**NeedsCompilation** no

**Author** Allan Cameron [aut, cre],  
Teun van den Brand [aut] (ORCID:  
    <https://orcid.org/0000-0002-9335-7468>)  
**Maintainer** Allan Cameron <Allan.Cameron@nhs.scot>  
**Repository** CRAN  
**Date/Publication** 2025-07-21 12:10:02 UTC

Contents

coord_curvedpolar . . . . .	2
GeomTextpath . . . . .	4
geom_textabline . . . . .	4
geom_textcontour . . . . .	9
geom_textcurve . . . . .	14
geom_textdensity . . . . .	18
geom_textdensity2d . . . . .	22
geom_textpath . . . . .	26
geom_textsegment . . . . .	32
geom_textsf . . . . .	36
geom_textsmooth . . . . .	39
guide_axis_textpath . . . . .	43
scale_hjust_discrete . . . . .	44
sibling_layers . . . . .	46
textpathGrob . . . . .	47
waterways . . . . .	49
<b>Index</b>	<b>51</b>

---

coord_curvedpolar	<i>Polar coordinates with curved text on x axis</i>
-------------------	---

---

Description

Polar co-ordinates in ‘ggplot2’ help to create a range of circular plots, which can be used to present data in a visually appealing, user-friendly way. However, the standard ‘coord\_polar’ uses a ‘textGrob’ to render the labels on the circumferential (theta) axis, meaning that labels do not rotate or curve in line with the axis. ‘coord\_curvedpolar’ aims to be identical to ‘coord\_polar’, except that the text on the theta axis follows the curve of the plot, correcting automatically for resizing to preserve letter spacing and size.

Usage

```
coord_curvedpolar(  
  theta = "x",  
  start = 0,  
  direction = 1,
```

```

    clip = "on",
    halign = c("center")
  )

```

### Arguments

theta	variable to map angle to ('x' or 'y')
start	Offset of starting point from 12 o'clock in radians. Offset is applied clockwise or anticlockwise depending on value of 'direction'.
direction	1, clockwise; -1, anticlockwise
clip	Should drawing be clipped to the extent of the plot panel? A setting of "on" (the default) means yes, and a setting of "off" means no. For details, please see [ <code>coord_cartesian()</code> ].
halign	A <code>character(1)</code> describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".

### Value

A 'Coord' ggproto object that can be added to a plot.

### Examples

```

# A pie chart = stacked bar chart + polar coordinates
pie <- ggplot(mtcars, aes(x = factor(1), fill = factor(cyl))) +
  geom_bar(width = 1)
pie + coord_curvedpolar(theta = "y")

# Demonstrating curved category labels
p <- ggplot(data.frame(x = paste("Category label", 1:5), y = runif(5)),
  aes(x, y, fill = x)) +
  geom_col() +
  theme_bw() +
  theme(panel.border = element_blank(),
    legend.position = "none",
    axis.text.x = element_text(size = 10, vjust = 0.5))

# Standard bar chart in Cartesian Co-ordinates
p

# Standard coord_polar axis labels
p + coord_polar()

# Curved polar co-ordinate labels
p + coord_curvedpolar()

```

---

GeomTextpath	<i>The Geom object for a textpath</i>
--------------	---------------------------------------

---

### Description

This is the ggproto class that creates the textpath layer. It is not intended to be used directly by the end user.

---

geom_textabline	<i>Labelled reference lines: horizontal, vertical, and diagonal</i>
-----------------	---

---

### Description

These geoms add labelled reference lines to a plot, either horizontal, vertical, or diagonal (specified by slope and intercept). These are useful for annotating plots. They are the labelled equivalent of the geom\_vline, geom\_hline and geom\_abline from ggplot2.

### Usage

```
geom_textabline(
  mapping = NULL,
  data = NULL,
  slope,
  intercept,
  ...,
  na.rm = FALSE,
  show.legend = NA
)

geom_labelabline(
  mapping = NULL,
  data = NULL,
  slope,
  intercept,
  ...,
  straight = NULL,
  label.r = unit(0.15, "lines"),
  label.padding = unit(0.25, "lines"),
  na.rm = FALSE,
  show.legend = NA
)

geom_textthline(
  mapping = NULL,
  data = NULL,
```

```
  yintercept,  
  stat = "identity",  
  position = "identity",  
  ...,  
  arrow = NULL,  
  lineend = "butt",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE  
)  
  
geom_labelhline(  
  mapping = NULL,  
  data = NULL,  
  yintercept,  
  stat = "identity",  
  position = "identity",  
  ...,  
  arrow = NULL,  
  lineend = "butt",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  straight = NULL,  
  label.r = unit(0.15, "lines"),  
  label.padding = unit(0.25, "lines")  
)  
  
geom_textvline(  
  mapping = NULL,  
  data = NULL,  
  xintercept,  
  stat = "identity",  
  position = "identity",  
  ...,  
  arrow = NULL,  
  lineend = "butt",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE  
)  
  
geom_labelvline(  
  mapping = NULL,  
  data = NULL,  
  xintercept,  
  stat = "identity",  
  position = "identity",
```

```

...,
arrow = NULL,
lineend = "butt",
na.rm = FALSE,
show.legend = NA,
inherit.aes = TRUE,
straight = NULL,
label.r = unit(0.15, "lines"),
label.padding = unit(0.25, "lines")
)

```

## Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <a href="#">ggplot()</a>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <a href="#">fortify()</a> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code>, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).</p>
slope	The slope of the abline
intercept	the point on the y axis at which the abline crosses it.
...	<p>Other arguments passed on to <a href="#">layer</a>. These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code>. These can also be the following text-path parameters:</p> <p><code>text_only</code> A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (<code>FALSE</code>, the default). If <code>TRUE</code>, any parameters or aesthetics relating to the drawing of the path will be ignored.</p> <p><code>gap</code> A <code>logical(1)</code> which if <code>TRUE</code>, breaks the path into two sections with a gap on either side of the label. If <code>FALSE</code>, the path is plotted as a whole. Alternatively, if <code>NA</code>, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is <code>FALSE</code> and for the text variant is <code>NA</code>.</p> <p><code>upright</code> A <code>logical(1)</code> which if <code>TRUE</code> (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If <code>FALSE</code>, the path decides the orientation of text.</p> <p><code>halign</code> A <code>character(1)</code> describing how multi-line text should be justified. Can either be <code>"center"</code> (default), <code>"left"</code> or <code>"right"</code>.</p> <p><code>offset</code> A <a href="#">unit</a> object of length 1 to determine the offset of the text from the path. If this is <code>NULL</code> (default), the <code>vjust</code> parameter decides the offset. If not <code>NULL</code>, the <code>offset</code> argument overrules the <code>vjust</code> setting.</p>

	<p><code>parse</code> A <code>logical(1)</code> which if <code>TRUE</code>, will coerce the labels into expressions, allowing for <code>plotmath</code> syntax to be used.</p> <p><code>straight</code> A <code>logical(1)</code> which if <code>TRUE</code>, keeps the letters of a label on a straight baseline and if <code>FALSE</code> (default), lets individual letters follow the curve. This might be helpful for noisy paths.</p> <p><code>padding</code> A <code>unit</code> object of length 1 to determine the padding between the text and the path when the <code>gap</code> parameter trims the path.</p> <p><code>text_smoothing</code> a <code>numeric(1)</code> value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.</p> <p><code>rich</code> A <code>logical(1)</code> whether to interpret the text as html/markdown formatted rich text. Default: <code>FALSE</code>. See also the rich text section of the details in <a href="#">geom_textpath()</a>.</p> <p><code>remove_long</code> if <code>TRUE</code>, labels that are longer than their associated path will be removed.</p>
<code>na.rm</code>	If <code>FALSE</code> , the default, missing values are removed with a warning. If <code>TRUE</code> , missing values are silently removed.
<code>show.legend</code>	logical. Should this layer be included in the legends? <code>NA</code> , the default, includes if any aesthetics are mapped. <code>FALSE</code> never includes, and <code>TRUE</code> always includes. It can also be a named logical vector to finely select the aesthetics to display.
<code>straight</code>	A <code>logical(1)</code> which if <code>TRUE</code> , keeps the letters of a label on a straight baseline and if <code>FALSE</code> (default), lets individual letters follow the curve. This might be helpful for noisy paths.
<code>label.r</code>	Radius of rounded corners. Defaults to 0.15 lines.
<code>label.padding</code>	Amount of padding around label. Defaults to 0.25 lines.
<code>yintercept</code>	The value at which the line should intercept the y axis
<code>stat</code>	The statistical transformation to use on the data for this layer, either as a ggproto <code>Geom</code> subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")
<code>position</code>	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
<code>arrow</code>	Arrow specification, as created by <a href="#">grid::arrow()</a> .
<code>lineend</code>	Line end style (round, butt, square).
<code>inherit.aes</code>	If <code>FALSE</code> , overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <a href="#">borders()</a> .
<code>xintercept</code>	The value at which the line should intercept the y axis

## Details

Although reference lines are straight, and therefore don't lend themselves to curved text, these `geom` layers are included in this package because they make labelling reference lines easier, allow automatic line breaking if desired, and will translate nicely into polar co-ordinates.

These geoms act slightly differently from other geoms. You can supply the parameters in two ways: either as arguments to the layer function, or via aesthetics. If you use arguments, e.g. `geom_textabline(label = "my label", intercept = 0, slope = 1)`, then behind the scenes the geom makes a new data frame containing just the data you've supplied. That means that the lines will be the same in all facets; if you want them to vary across facets, construct the data frame yourself and use aesthetics.

Unlike most other geoms, these geoms do not inherit aesthetics from the plot default, because they do not understand x and y aesthetics which are commonly set in the plot. They also do not affect the x and y scales.

## Value

A Layer ggproto object that can be added to a plot.

## Aesthetics

The `geom_textabline()`, `geom_textthline()` and `geom_textvline()` understand the following aesthetics (required aesthetics are in bold):

- **label**
- **slope** (`geom_textabline()` and `geom_labelabline()`)
- **intercept** (`geom_textabline()` and `geom_labelabline()`)
- **yintercept** (`geom_textthline()` and `geom_labelhline()`)
- **xintercept** (`geom_textvline()` and `geom_labelvline()`)
- **alpha**
- **angle**
- **colour**
- **family**
- **fontface**
- **group**
- **hjust**
- **vjust**
- **linecolour**
- **lineheight**
- **linetype**
- **linewidth**
- **size**
- **spacing**
- **textcolour**

In addition to aforementioned aesthetics, `geom_labelabline()`, `geom_labelhline()` and `geom_labelvline()` also understand:

- **boxcolour**



- boxlinetype
- boxlinewidth
- fill

The spacing aesthetic allows fine control of spacing of text, which is called 'tracking' in typography. The default is 0 and units are measured in 1/1000 em. Numbers greater than zero increase the spacing, whereas negative numbers decrease the spacing.

### See Also

Other [geom layers](#) that place text on paths.

### Examples

```
ggplot(mtcars, aes(mpg, disp)) +
  geom_point() +
  geom_texthline(yintercept = 200, label = "displacement threshold",
                 hjust = 0.8, color = "red4") +
  geom_textvline(xintercept = 20, label = "consumption threshold", hjust = 0.8,
                 linetype = 2, vjust = 1.3, color = "blue4") +
  geom_textabline(slope = 15, intercept = -100, label = "partition line",
                 color = "green4", hjust = 0.6, vjust = -0.2)
```

---

geom_textcontour	<i>Produce labelled contour lines in ggplot2</i>
------------------	--

---

### Description

Contour lines are available already in **ggplot2**, but the native [geom\\_contour](#) does not allow the lines to be labelled with the level of each contour. `geom_textcontour` adds this ability.

### Usage

```
geom_textcontour(
  mapping = NULL,
  data = NULL,
  stat = "textcontour",
  position = "identity",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  lineend = "butt",
  linejoin = "round",
  linemitre = 10,
  bins = NULL,
  binwidth = NULL,
  breaks = NULL,
  ...
)
```

```

)

geom_labelcontour(
  mapping = NULL,
  data = NULL,
  stat = "textcontour",
  position = "identity",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  ...,
  lineend = "butt",
  linejoin = "round",
  linemitre = 10,
  bins = NULL,
  binwidth = NULL,
  breaks = NULL,
  label.padding = unit(0.25, "lines"),
  label.r = unit(0.15, "lines"),
  arrow = NULL
)

stat_textcontour(
  mapping = NULL,
  data = NULL,
  geom = "textcontour",
  position = "identity",
  ...,
  bins = NULL,
  binwidth = NULL,
  breaks = NULL,
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE
)

```

## Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <a href="#">ggplot()</a>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <a href="#">fortify()</a> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return</p>

	value must be a <code>data.frame</code> , and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code> ).
<code>stat</code>	The statistical transformation to use on the data for this layer, either as a ggproto <code>Geom</code> subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")
<code>position</code>	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
<code>na.rm</code>	If FALSE, the default, missing values are removed with a warning. If TRUE, missing values are silently removed.
<code>show.legend</code>	logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.
<code>inherit.aes</code>	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. <code>borders()</code> .
<code>lineend</code>	Line end style (round, butt, square).
<code>linejoin</code>	Line join style (round, mitre, bevel).
<code>linemitre</code>	Line mitre limit (number greater than 1).
<code>bins</code>	Number of contour bins. Overridden by <code>breaks</code> .
<code>binwidth</code>	The width of the contour bins. Overridden by <code>bins</code> .
<code>breaks</code>	One of: <ul style="list-style-type: none"> <li>• Numeric vector to set the contour breaks</li> <li>• A function that takes the range of the data and <code>binwidth</code> as input and returns breaks as output. A function can be created from a formula (e.g. <code>~ fullseq(.x, .y)</code>).</li> </ul> Overrides <code>binwidth</code> and <code>bins</code> . By default, this is a vector of length ten with <code>pretty()</code> breaks.
<code>...</code>	Other arguments passed on to <code>layer</code> . These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code> . These can also be the following text-path parameters: <p><code>text_only</code> A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (FALSE, the default). If TRUE, any parameters or aesthetics relating to the drawing of the path will be ignored.</p> <p><code>gap</code> A <code>logical(1)</code> which if TRUE, breaks the path into two sections with a gap on either side of the label. If FALSE, the path is plotted as a whole. Alternatively, if NA, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is FALSE and for the text variant is NA.</p> <p><code>upright</code> A <code>logical(1)</code> which if TRUE (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If FALSE, the path decides the orientation of text.</p> <p><code>halign</code> A <code>character(1)</code> describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".</p>

offset	A <a href="#">unit</a> object of length 1 to determine the offset of the text from the path. If this is NULL (default), the vjust parameter decides the offset. If not NULL, the offset argument overrules the vjust setting.
parse	A logical(1) which if TRUE, will coerce the labels into expressions, allowing for plotmath syntax to be used.
straight	A logical(1) which if TRUE, keeps the letters of a label on a straight baseline and if FALSE (default), lets individual letters follow the curve. This might be helpful for noisy paths.
padding	A <a href="#">unit</a> object of length 1 to determine the padding between the text and the path when the gap parameter trims the path.
text_smoothing	a numeric(1) value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.
rich	A logical(1) whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <a href="#">geom_textpath()</a> .
remove_long	if TRUE, labels that are longer than their associated path will be removed.
label.padding	Amount of padding around label. Defaults to 0.25 lines.
label.r	Radius of rounded corners. Defaults to 0.15 lines.
arrow	Arrow specification, as created by <a href="#">grid::arrow()</a> .
geom	The geometric object to use display the data

### Value

A Layer ggproto object that can be added to a plot.

### Aesthetics

geom\_textcontour() understands the following aesthetics (required aesthetics are in bold):

- x
- y
- alpha
- angle
- colour
- family
- fontface
- group
- hjust
- linecolour
- lineheight
- linetype

- linewidth
- size
- spacing
- textcolour
- vjust

In addition to aforementioned aesthetics, `geom_labelcontour()` also understands:

- boxcolour
- boxlinetype
- boxlinewidth
- fill

The spacing aesthetic allows fine control of spacing of text, which is called 'tracking' in typography. The default is 0 and units are measured in 1/1000 em. Numbers greater than zero increase the spacing, whereas negative numbers decrease the spacing.

Learn more about setting these aesthetics in `vignette("ggplot2-specs")`.

### Computed variables

The variable 'level' is a numeric or a factor depending on whether lines or bands are calculated.

**'level'** Height of contour. This is a numeric vector that represents bin boundaries.

### See Also

Other [geom layers](#) that place text on paths.

### Examples

```
df <- expand.grid(x = seq(nrow(volcano)), y = seq(ncol(volcano)))
df$z <- as.vector(volcano)

ggplot(df, aes(x, y, z = z)) +
  geom_contour_filled(bins = 6, alpha = 0.6) +
  geom_textcontour(bins = 6, size = 2.5, padding = unit(0.05, "in")) +
  scale_fill_manual(values = terrain.colors(11)) +
  theme_classic() +
  theme(legend.position = "none")
```

---

geom_textcurve	<i>Text on a curve</i>
----------------	------------------------

---

## Description

geom\_textcurve() and geom\_labelcurve() draw text on curved lines. See the underlying [grid::curveGrob\(\)](#) for the parameters that control the curve.

## Usage

```
geom_textcurve(  
  mapping = NULL,  
  data = NULL,  
  stat = "identity",  
  position = "identity",  
  ...,  
  curvature = 0.5,  
  angle = 90,  
  ncp = 5,  
  arrow = NULL,  
  lineend = "butt",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE  
)  
  
geom_labelcurve(  
  mapping = NULL,  
  data = NULL,  
  stat = "identity",  
  position = "identity",  
  ...,  
  curvature = 0.5,  
  angle = 90,  
  ncp = 5,  
  arrow = NULL,  
  lineend = "butt",  
  label.r = unit(0.15, "lines"),  
  label.padding = unit(0.25, "lines"),  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE  
)
```

## Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and inherit.aes = TRUE (the default), it is combined with the default mapping at the top level of
---------	---

	the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <code>ggplot()</code>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <code>fortify()</code> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code>, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).</p>
stat	The statistical transformation to use on the data for this layer, either as a <code>ggproto</code> <code>Geom</code> subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")
position	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
...	<p>Other arguments passed on to <code>layer</code>. These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code>. These can also be the following text-path parameters:</p> <p><code>text_only</code> A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (<code>FALSE</code>, the default). If <code>TRUE</code>, any parameters or aesthetics relating to the drawing of the path will be ignored.</p> <p><code>gap</code> A <code>logical(1)</code> which if <code>TRUE</code>, breaks the path into two sections with a gap on either side of the label. If <code>FALSE</code>, the path is plotted as a whole. Alternatively, if <code>NA</code>, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is <code>FALSE</code> and for the text variant is <code>NA</code>.</p> <p><code>upright</code> A <code>logical(1)</code> which if <code>TRUE</code> (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If <code>FALSE</code>, the path decides the orientation of text.</p> <p><code>halign</code> A <code>character(1)</code> describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".</p> <p><code>offset</code> A <code>unit</code> object of length 1 to determine the offset of the text from the path. If this is <code>NULL</code> (default), the <code>vjust</code> parameter decides the offset. If not <code>NULL</code>, the <code>offset</code> argument overrules the <code>vjust</code> setting.</p> <p><code>parse</code> A <code>logical(1)</code> which if <code>TRUE</code>, will coerce the labels into expressions, allowing for <code>plotmath</code> syntax to be used.</p> <p><code>straight</code> A <code>logical(1)</code> which if <code>TRUE</code>, keeps the letters of a label on a straight baseline and if <code>FALSE</code> (default), lets individual letters follow the curve. This might be helpful for noisy paths.</p> <p><code>padding</code> A <code>unit</code> object of length 1 to determine the padding between the text and the path when the <code>gap</code> parameter trims the path.</p> <p><code>rich</code> A <code>logical(1)</code> whether to interpret the text as <code>html/markdown</code> formatted rich text. Default: <code>FALSE</code>. See also the rich text section of the details in <code>geom_textpath()</code>.</p>

	remove_long if TRUE, labels that are longer than their associated path will be removed.
curvature	A numeric value giving the amount of curvature. Negative values produce left-hand curves, positive values produce right-hand curves, and zero produces a straight line.
angle	A numeric value between 0 and 180, giving an amount to skew the control points of the curve. Values less than 90 skew the curve towards the start point and values greater than 90 skew the curve towards the end point.
ncp	The number of control points used to draw the curve. More control points creates a smoother curve.
arrow	Arrow specification, as created by <code>grid::arrow()</code> .
lineend	Line end style (round, butt, square).
na.rm	If FALSE, the default, missing values are removed with a warning. If TRUE, missing values are silently removed.
show.legend	logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.
inherit.aes	If FALSE, overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <code>borders()</code> .
label.r	Radius of rounded corners. Defaults to 0.15 lines.
label.padding	Amount of padding around label. Defaults to 0.25 lines.

## Value

A Layer ggproto object that can be added to a plot.

## Aesthetics

`geom_textcurve()` understands the following aesthetics (required aesthetics are in bold):

- x
- xend
- y
- yend
- label
- alpha
- angle
- colour
- family
- fontface
- group
- hjust



- linecolour
- lineheight
- linetype
- linewidth
- size
- spacing
- textcolour
- vjust

In addition to aforementioned aesthetics, `geom_labelcurve()` also understands:

- boxcolour
- boxlinetype
- boxlinewidth
- fill

The spacing aesthetic allows fine control of spacing of text, which is called 'tracking' in typography. The default is 0 and units are measured in 1/1000 em. Numbers greater than zero increase the spacing, whereas negative numbers decrease the spacing.

Learn more about setting these aesthetics in `vignette("ggplot2-specs")`.

## Examples

```
t <- seq(0, 2 * pi, length.out = 4)[-1]

df <- data.frame(
  x = cos(t),
  y = sin(t),
  xend = cos(t + 1.8),
  yend = sin(t + 1.8)
)

ggplot(df, aes(x, y, xend = xend, yend = yend)) +
  geom_textcurve(
    label = c(
      "A chicken lays an egg",
      "A chick becomes a chicken",
      "An egg hatches into a chick"
    ),
    curvature = 0.5, vjust = 2,
    arrow = arrow(ends = "first")
  ) +
  coord_equal(xlim = c(-1.1, 1.1), ylim = c(-1.1, 1.1))
```

---

`geom_textdensity`*Produce smoothly labelled density plots in **ggplot2***

---

## Description

Line plots of smoothed kernel density estimates are available in **ggplot2** via [geom\\_density](#). This `geom` layer simply adds a text label to each curve that follow the contour of the density line when used as a drop-in replacement for [geom\\_density](#)

## Usage

```
geom_textdensity(  
  mapping = NULL,  
  data = NULL,  
  stat = "density",  
  position = "identity",  
  ...,  
  bw = "nrd0",  
  adjust = 1,  
  kernel = "gaussian",  
  n = 512,  
  lineend = "butt",  
  linejoin = "round",  
  linemitre = 10,  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE  
)  
  
geom_labeldensity(  
  mapping = NULL,  
  data = NULL,  
  stat = "density",  
  position = "identity",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...,  
  lineend = "butt",  
  linejoin = "round",  
  linemitre = 10,  
  bw = "nrd0",  
  adjust = 1,  
  kernel = "gaussian",  
  n = 512,  
  label.padding = unit(0.25, "lines"),  
  label.r = unit(0.15, "lines"),
```

```

    arrow = NULL
  )

```

## Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <a href="#">ggplot()</a>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <a href="#">fortify()</a> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code>, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).</p>
stat	The statistical transformation to use on the data for this layer, either as a <code>ggproto</code> Geom subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")
position	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
...	<p>Other arguments passed on to <a href="#">layer</a>. These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code>. These can also be the following text-path parameters:</p> <p><code>text_only</code> A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (<code>FALSE</code>, the default). If <code>TRUE</code>, any parameters or aesthetics relating to the drawing of the path will be ignored.</p> <p><code>gap</code> A <code>logical(1)</code> which if <code>TRUE</code>, breaks the path into two sections with a gap on either side of the label. If <code>FALSE</code>, the path is plotted as a whole. Alternatively, if <code>NA</code>, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is <code>FALSE</code> and for the text variant is <code>NA</code>.</p> <p><code>upright</code> A <code>logical(1)</code> which if <code>TRUE</code> (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If <code>FALSE</code>, the path decides the orientation of text.</p> <p><code>halign</code> A <code>character(1)</code> describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".</p> <p><code>offset</code> A <code>unit</code> object of length 1 to determine the offset of the text from the path. If this is <code>NULL</code> (default), the <code>vjust</code> parameter decides the offset. If not <code>NULL</code>, the <code>offset</code> argument overrules the <code>vjust</code> setting.</p> <p><code>parse</code> A <code>logical(1)</code> which if <code>TRUE</code>, will coerce the labels into expressions, allowing for <code>plotmath</code> syntax to be used.</p> <p><code>straight</code> A <code>logical(1)</code> which if <code>TRUE</code>, keeps the letters of a label on a straight baseline and if <code>FALSE</code> (default), lets individual letters follow the curve. This might be helpful for noisy paths.</p>

	padding	A <a href="#">unit</a> object of length 1 to determine the padding between the text and the path when the gap parameter trims the path.
	text_smoothing	a numeric(1) value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.
	rich	A logical(1) whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <a href="#">geom_textpath()</a> .
	remove_long	if TRUE, labels that are longer than their associated path will be removed.
bw		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 <a href="#">stats::bw.nrd()</a> . Note that automatic calculation of the bandwidth does not take weights into account.
adjust		A multiplicate bandwidth adjustment. This makes it possible to adjust the bandwidth while still using the a bandwidth estimator. For example, adjust = 1/2 means use half of the default bandwidth.
kernel		Kernel. See list of available kernels in <a href="#">density()</a> .
n		number of equally spaced points at which the density is to be estimated, should be a power of two, see <a href="#">density()</a> for details
lineend		Line end style (round, butt, square).
linejoin		Line join style (round, mitre, bevel).
linemitre		Line mitre limit (number greater than 1).
na.rm		If FALSE, the default, missing values are removed with a warning. If TRUE, missing values are silently removed.
show.legend		logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.
inherit.aes		If FALSE, overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <a href="#">borders()</a> .
label.padding		Amount of padding around label. Defaults to 0.25 lines.
label.r		Radius of rounded corners. Defaults to 0.15 lines.
arrow		Arrow specification, as created by <a href="#">grid::arrow()</a> .

## Value

A Layer ggproto object that can be added to a plot.

## Aesthetics

geom\_textdensity() understands the following aesthetics (required aesthetics are in bold):

- x
- label

- alpha
- angle
- colour
- family
- fontface
- group
- hjust
- linecolour
- lineheight
- linetype
- linewidth
- size
- spacing
- textcolour
- vjust

In addition to aforementioned aesthetics, `geom_labeldensity()` also understands:

- boxcolour
- boxlinetype
- boxlinewidth
- fill

The spacing aesthetic allows fine control of spacing of text, which is called 'tracking' in typography. The default is 0 and units are measured in 1/1000 em. Numbers greater than zero increase the spacing, whereas negative numbers decrease the spacing.

Learn more about setting these aesthetics in `vignette("ggplot2-specs")`.

### See Also

Other [geom layers](#) that place text on paths.

### Examples

```
ggplot(iris, aes(Sepal.Length, label = Species, color = Species)) +  
  geom_textdensity()
```

---

geom_textdensity2d	<i>Produce labelled contour lines of 2D density in <b>ggplot2</b></i>
--------------------	---

---

## Description

Contour lines representing 2D density are available already in **ggplot2**, but the native [geom\\_density\\_2d](#) does not allow the lines to be labelled with the level of each contour. `geom_textdensity2d` adds this ability.

## Usage

```
geom_textdensity2d(  
  mapping = NULL,  
  data = NULL,  
  stat = "density_2d",  
  position = "identity",  
  ...,  
  contour_var = "density",  
  n = 100,  
  h = NULL,  
  adjust = c(1, 1),  
  lineend = "butt",  
  linejoin = "round",  
  linemitre = 10,  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE  
)  
  
geom_labeldensity2d(  
  mapping = NULL,  
  data = NULL,  
  stat = "density_2d",  
  position = "identity",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...,  
  contour_var = "density",  
  n = 100,  
  h = NULL,  
  adjust = c(1, 1),  
  lineend = "butt",  
  linejoin = "round",  
  linemitre = 10,  
  label.padding = unit(0.25, "lines"),  
  label.r = unit(0.15, "lines"),
```

```

    arrow = NULL
  )

```

## Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <a href="#">ggplot()</a>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <a href="#">fortify()</a> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code>, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).</p>
stat	The statistical transformation to use on the data for this layer, either as a <code>ggproto</code> Geom subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")
position	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
...	<p>Other arguments passed on to <a href="#">layer</a>. These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code>. These can also be the following text-path parameters:</p> <p><code>text_only</code> A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (<code>FALSE</code>, the default). If <code>TRUE</code>, any parameters or aesthetics relating to the drawing of the path will be ignored.</p> <p><code>gap</code> A <code>logical(1)</code> which if <code>TRUE</code>, breaks the path into two sections with a gap on either side of the label. If <code>FALSE</code>, the path is plotted as a whole. Alternatively, if <code>NA</code>, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is <code>FALSE</code> and for the text variant is <code>NA</code>.</p> <p><code>upright</code> A <code>logical(1)</code> which if <code>TRUE</code> (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If <code>FALSE</code>, the path decides the orientation of text.</p> <p><code>halign</code> A <code>character(1)</code> describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".</p> <p><code>offset</code> A <code>unit</code> object of length 1 to determine the offset of the text from the path. If this is <code>NULL</code> (default), the <code>vjust</code> parameter decides the offset. If not <code>NULL</code>, the <code>offset</code> argument overrules the <code>vjust</code> setting.</p> <p><code>parse</code> A <code>logical(1)</code> which if <code>TRUE</code>, will coerce the labels into expressions, allowing for <code>plotmath</code> syntax to be used.</p> <p><code>straight</code> A <code>logical(1)</code> which if <code>TRUE</code>, keeps the letters of a label on a straight baseline and if <code>FALSE</code> (default), lets individual letters follow the curve. This might be helpful for noisy paths.</p>

	padding	A <a href="#">unit</a> object of length 1 to determine the padding between the text and the path when the gap parameter trims the path.
	text_smoothing	a numeric(1) value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.
	rich	A logical(1) whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <a href="#">geom_textpath()</a> .
	remove_long	if TRUE, labels that are longer than their associated path will be removed.
contour_var		Character string identifying the variable to contour by. Can be one of "density", "ndensity", or "count". See the section on computed variables for details.
n		Number of grid points in each direction.
h		Bandwidth (vector of length two). If NULL, estimated using <a href="#">MASS::bandwidth.nrd()</a> .
adjust		A multiplicative bandwidth adjustment to be used if 'h' is 'NULL'. This makes it possible to adjust the bandwidth while still using the a bandwidth estimator. For example, adjust = 1/2 means use half of the default bandwidth.
lineend		Line end style (round, butt, square).
linejoin		Line join style (round, mitre, bevel).
linemitre		Line mitre limit (number greater than 1).
na.rm		If FALSE, the default, missing values are removed with a warning. If TRUE, missing values are silently removed.
show.legend		logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.
inherit.aes		If FALSE, overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <a href="#">borders()</a> .
label.padding		Amount of padding around label. Defaults to 0.25 lines.
label.r		Radius of rounded corners. Defaults to 0.15 lines.
arrow		Arrow specification, as created by <a href="#">grid::arrow()</a> .

## Value

A Layer ggproto object that can be added to a plot.

## Aesthetics

`geom_textdensity2d()` understands the following aesthetics (required aesthetics are in bold):

- x
- y
- alpha
- angle



- colour
- family
- fontface
- group
- hjust
- linecolour
- lineheight
- linetype
- linewidth
- size
- spacing
- textcolour
- vjust

In addition to aforementioned aesthetics, `geom_labeldensity2d()` also understands:

- boxcolour
- boxlinetype
- boxlinewidth
- fill

The spacing aesthetic allows fine control of spacing of text, which is called 'tracking' in typography. The default is 0 and units are measured in 1/1000 em. Numbers greater than zero increase the spacing, whereas negative numbers decrease the spacing.

Learn more about setting these aesthetics in `vignette("ggplot2-specs")`.

## See Also

Other [geom layers](#) that place text on paths.

## Examples

```
set.seed(1)

df <- data.frame(x = rnorm(100), y = rnorm(100))

ggplot(df, aes(x, y)) +
  geom_textdensity2d() +
  theme_classic()
```

## Description

The existing text-based geom layers in **ggplot2** ([geom\\_text\(\)](#) and [geom\\_label\(\)](#)) are ideal for the majority of plots, since typically textual annotations are short, straight and in line with the axes of the plot. However, there are some occasions when it is useful to have text follow a curved path. This may be to create or recreate a specific visual effect, or it may be to label a circular / polar plot in a more "natural" way.

## Usage

```
geom_textpath(  
  mapping = NULL,  
  data = NULL,  
  stat = "identity",  
  position = "identity",  
  na.rm = FALSE,  
  show.legend = NA,  
  inherit.aes = TRUE,  
  ...,  
  lineend = "butt",  
  linejoin = "round",  
  linemitre = 10,  
  text_only = FALSE,  
  gap = NA,  
  upright = TRUE,  
  halign = "center",  
  offset = NULL,  
  parse = FALSE,  
  straight = FALSE,  
  padding = unit(0.05, "inch"),  
  text_smoothing = 0,  
  rich = FALSE,  
  arrow = NULL,  
  remove_long = FALSE  
)
```

```
geom_textline(  
  mapping = NULL,  
  data = NULL,  
  stat = "identity",  
  position = "identity",  
  na.rm = FALSE,  
  orientation = NA,  
  show.legend = NA,
```

```
    inherit.aes = TRUE,
    ...,
    lineend = "butt",
    linejoin = "round",
    linemitre = 10,
    arrow = NULL
)

geom_labelpath(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  ...,
  lineend = "butt",
  linejoin = "round",
  linemitre = 10,
  text_only = FALSE,
  gap = FALSE,
  upright = TRUE,
  halign = "center",
  offset = NULL,
  parse = FALSE,
  straight = FALSE,
  padding = unit(0.05, "inch"),
  text_smoothing = 0,
  rich = FALSE,
  label.padding = unit(0.25, "lines"),
  label.r = unit(0.15, "lines"),
  arrow = NULL,
  remove_long = FALSE
)

geom_labelline(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  ...,
  lineend = "butt",
  linejoin = "round",
  linemitre = 10,
```

```

text_only = FALSE,
gap = FALSE,
upright = TRUE,
halign = "center",
offset = NULL,
parse = FALSE,
straight = FALSE,
padding = unit(0.05, "inch"),
label.padding = unit(0.25, "lines"),
label.r = unit(0.15, "lines"),
arrow = NULL,
remove_long = TRUE
)

```

## Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <a href="#">ggplot()</a>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <a href="#">fortify()</a> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code>, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).</p>
stat	The statistical transformation to use on the data for this layer, either as a <code>ggproto</code> Geom subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")
position	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
na.rm	If <code>FALSE</code> , the default, missing values are removed with a warning. If <code>TRUE</code> , missing values are silently removed.
show.legend	logical. Should this layer be included in the legends? <code>NA</code> , the default, includes if any aesthetics are mapped. <code>FALSE</code> never includes, and <code>TRUE</code> always includes. It can also be a named logical vector to finely select the aesthetics to display.
inherit.aes	If <code>FALSE</code> , overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <a href="#">borders()</a> .
...	Other arguments passed on to <a href="#">layer()</a> . These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code> . They may also be parameters to the paired geom/stat.
lineend	Line end style (round, butt, square).

linejoin	Line join style (round, mitre, bevel).
linemitre	Line mitre limit (number greater than 1).
text_only	A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (FALSE, the default). If TRUE, any parameters or aesthetics relating to the drawing of the path will be ignored.
gap	A <code>logical(1)</code> which if TRUE, breaks the path into two sections with a gap on either side of the label. If FALSE, the path is plotted as a whole. Alternatively, if NA, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is FALSE and for the text variant is NA.
upright	A <code>logical(1)</code> which if TRUE (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If FALSE, the path decides the orientation of text.
halign	A <code>character(1)</code> describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".
offset	A <code>unit</code> object of length 1 to determine the offset of the text from the path. If this is NULL (default), the <code>vjust</code> parameter decides the offset. If not NULL, the offset argument overrules the <code>vjust</code> setting.
parse	A <code>logical(1)</code> which if TRUE, will coerce the labels into expressions, allowing for plotmath syntax to be used.
straight	A <code>logical(1)</code> which if TRUE, keeps the letters of a label on a straight baseline and if FALSE (default), lets individual letters follow the curve. This might be helpful for noisy paths.
padding	A <code>unit</code> object of length 1 to determine the padding between the text and the path when the gap parameter trims the path.
text_smoothing	a <code>numeric(1)</code> value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.
rich	A <code>logical(1)</code> whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <a href="#">geom_textpath()</a> .
arrow	Arrow specification, as created by <code>grid::arrow()</code> .
remove_long	if TRUE, labels that are longer than their associated path will be removed.
orientation	The orientation of the layer. The default (NA) automatically determines the orientation from the aesthetic mapping. In the rare event that this fails it can be given explicitly by setting orientation to either "x" or "y". See the Orientation section for more detail.
label.padding	Amount of padding around label. Defaults to 0.25 lines.
label.r	Radius of rounded corners. Defaults to 0.15 lines.

## Details

### Limitations:

There are limitations inherent in the plotting of text elements in **ggplot2** due to the way that the underlying **grid** graphics handles text. A text string is dealt with as a zero-width object, and

therefore the rotation and spacing of the letters making up the string can only be dealt with by treating each letter separately.

It is important to realise that the letters are only rotated, and do not undergo any change in shape. Thus, for example, large text appearing on convex curves will not be deformed so that individual letters are narrower at the bottom and wider at the top. Doing so would require reinterpreting the letters as polygons.

Another issue is that we may wish to use a short curved label on a much longer path. Spacing the letters equally along the path would mean there is too much space between the letters for the label to remain legible. A single text string is therefore kept "together" according to the point size of the text in `geom_textpath()`. This then leaves the problem of where on the path the text should be placed. This can be dealt with by the aesthetic mapping `hjust`, which allows the user to place the labels at the desired position along the path, including separate positions for each label.

A final point to note is that a path is usually a group-based geom (i.e. a path typically comprises x, y points from two columns over several rows of a data frame), whereas text labels can come from single rows in a data frame. This means that if we have a data frame with an x column, a y column and a grouping variable column, there can only be a single label for the group. Typically, this will be the grouping variable itself (see the examples, particularly those using the built-in `iris` data set.)

### Rich text:

The rich text option (`rich = TRUE`) relies heavily on rich-text parsers copied from the `{gridtext}` package. We thank Claus O. Wilke for developing `{gridtext}` and allowing us to re-use his code under the MIT licence. Currently, the supported HTML tags are `<p>`, `<span>`, `<b>`, `<strong>`, `<i>`, `<em>`, `<sub>`, `<sup>` and `<br>`.

### Value

A Layer ggproto object that can be added to a plot.

### Aesthetics

`geom_textpath()` understands the following aesthetics (required aesthetics are in bold):

- x
- y
- label
- alpha
- angle
- colour
- family
- fontface
- group
- hjust
- linecolour
- lineheight

- linetype
- linewidth
- size
- spacing
- textcolour
- vjust

In addition to aforementioned aesthetics, `geom_labelpath()` also understands:

- boxcolour
- boxlinetype
- boxlinewidth
- fill

The spacing aesthetic allows fine control of spacing of text, which is called 'tracking' in typography. The default is 0 and units are measured in 1/1000 em. Numbers greater than zero increase the spacing, whereas negative numbers decrease the spacing.

Learn more about setting these aesthetics in `vignette("ggplot2-specs")`.

## See Also

Other [geom layers](#) that place text on paths.

## Examples

```
# Plot text along an arbitrary path
t <- seq(-1, 5, length.out = 1000) * pi
spiral <- data.frame(
  x = rev(sin(t) * 1000:1),
  y = rev(cos(t) * 1000:1),
  s = seq(1, 10, length.out = 100),
  text = paste(
    "Like a circle in a spiral, like a wheel within a wheel,",
    "never ending or beginning on an ever spinning reel"
  )
)

ggplot(spiral, aes(x, y, label = text)) +
  geom_textpath(size = 7, vjust = 2, linewidth = 0) +
  coord_equal(xlim = c(-1500, 1500), ylim = c(-1500, 1500))

# Use geom_textline as a drop-in for geom_line

df <- data.frame(x = rep(1:100, 3),
  y = sin(c(seq(0, pi, len = 100),
    seq(pi, 2*pi, len = 100),
    rep(0, 100))),
  label = rep(c("y is increasing",
    "y is falling",
```

```

      "y is flat"), each = 100))

ggplot(df, aes(x, y, label = label, color = label)) +
  geom_textline(size = 6) + theme(legend.position = "none")

# Rich text labels can contain a subset of HTML tags
label <- paste0(
  "Indometacin (",
  "C<sub>19</sub>H<sub>16</sub>",
  "<span style='color:limegreen'>Cl</span>",
  "<span style='color:blue'>N</span>",
  "<span style='color:red'>O</span><sub>4</sub>",
  ") concentration"
)

# These are interpreted when `rich = TRUE`
ggplot(Indometh, aes(time, conc)) +
  geom_point() +
  geom_labelpath(
    label = label,
    stat = "smooth", formula = y ~ x, method = "loess",
    vjust = -3, size = 8, rich = TRUE
  ) +
  scale_x_log10()

```

---

geom_textsegment	<i>Add text to line segments</i>
------------------	----------------------------------

---

## Description

geom\_textsegment draws a line between two points defined by (x, y) and (xend, yend) and places a text label on that line. It is the text-placement equivalent of [geom\\_segment\(\)](#).

## Usage

```

geom_textsegment(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...,
  arrow = NULL,
  lineend = "butt",
  linejoin = "round",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  straight = NULL
)

```



```
geom_labelsegment(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...,
  arrow = NULL,
  lineend = "butt",
  linejoin = "round",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  straight = NULL,
  label.r = unit(0.15, "lines"),
  label.padding = unit(0.25, "lines")
)
```

## Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <a href="#">ggplot()</a>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <a href="#">fortify()</a> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code>, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(., 10)</code>).</p>
stat	The statistical transformation to use on the data for this layer, either as a <code>ggproto</code> <code>Geom</code> subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")
position	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
...	<p>Other arguments passed on to <a href="#">layer</a>. These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code>. These can also be the following text-path parameters:</p> <p><code>text_only</code> A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (<code>FALSE</code>, the default). If <code>TRUE</code>, any parameters or aesthetics relating to the drawing of the path will be ignored.</p> <p><code>gap</code> A <code>logical(1)</code> which if <code>TRUE</code>, breaks the path into two sections with a gap on either side of the label. If <code>FALSE</code>, the path is plotted as a whole. Alternatively, if <code>NA</code>, the path will be broken if the string has a <code>vjust</code> between</p>

	0 and 1, and not otherwise. The default for the label variant is FALSE and for the text variant is NA.
upright	A logical(1) which if TRUE (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If FALSE, the path decides the orientation of text.
halign	A character(1) describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".
offset	A <a href="#">unit</a> object of length 1 to determine the offset of the text from the path. If this is NULL (default), the vjust parameter decides the offset. If not NULL, the offset argument overrules the vjust setting.
parse	A logical(1) which if TRUE, will coerce the labels into expressions, allowing for plotmath syntax to be used.
padding	A <a href="#">unit</a> object of length 1 to determine the padding between the text and the path when the gap parameter trims the path.
text_smoothing	a numeric(1) value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.
rich	A logical(1) whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <a href="#">geom_textpath()</a> .
remove_long	if TRUE, labels that are longer than their associated path will be removed.
arrow	Arrow specification, as created by <a href="#">grid::arrow()</a> .
lineend	Line end style (round, butt, square).
linejoin	Line join style (round, mitre, bevel).
na.rm	If FALSE, the default, missing values are removed with a warning. If TRUE, missing values are silently removed.
show.legend	logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes. It can also be a named logical vector to finely select the aesthetics to display.
inherit.aes	If FALSE, overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <a href="#">borders()</a> .
straight	A logical(1) which if TRUE, keeps the letters of a label on a straight baseline and if FALSE (default), lets individual letters follow the curve. This might be helpful for noisy paths.
label.r	Radius of rounded corners. Defaults to 0.15 lines.
label.padding	Amount of padding around label. Defaults to 0.25 lines.

## Value

A Layer ggproto object that can be added to a plot.

**Aesthetics**

`geom_textsegment()` understands the following aesthetics (required aesthetics are in bold):

- x
- y
- xend
- yend
- label
- alpha
- angle
- colour
- family
- fontface
- group
- hjust
- linecolour
- lineheight
- linetype
- linewidth
- size
- spacing
- textcolour
- vjust

In addition to aforementioned aesthetics, `geom_labelsegment()` also understands:

- boxcolour
- boxlinetype
- boxlinewidth
- fill

The spacing aesthetic allows fine control of spacing of text, which is called 'tracking' in typography. The default is 0 and units are measured in 1/1000 em. Numbers greater than zero increase the spacing, whereas negative numbers decrease the spacing.

Learn more about setting these aesthetics in `vignette("ggplot2-specs")`.

**See Also**

Other [geom layers](#) that place text on paths.

## Examples

```
# The convenience here is that the position and angle
# are in sync automatically with the data
sleep2 <- reshape(sleep, direction = "wide",
                  idvar = "ID", timevar = "group")

ggplot(sleep2, aes(x = "Drug 1", y = extra.1)) +
  geom_textsegment(
    aes(xend = "Drug 2", yend = extra.2,
        label = paste0("Patient #", ID))
  )

# As an annotation
ggplot(mapping = aes(x, y)) +
  geom_col(
    data = data.frame(x = c(1, 2), y = c(1, 10))
  ) +
  annotate(
    "textsegment",
    x = 1, xend = 2, y = 1, yend = 10,
    label = "10x increase", arrow = arrow()
  )
```

---

geom\_textsf

*Visualise sf objects with labels*

---

## Description

This set of geom, stat, and coord are used to visualise simple feature (sf) objects. For simple plots, you will only need geom\_sf() as it uses stat\_sf() and adds coord\_sf() for you. geom\_textsf() is an unusual geom because it will draw different geometric objects depending on what simple features are present in the data: you can get points, lines, or polygons.

## Usage

```
geom_textsf(
  mapping = aes(),
  data = NULL,
  stat = "sf",
  position = "identity",
  ...,
  remove_long = TRUE,
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE
)

geom_labelsf(
```

```

mapping = aes(),
data = NULL,
stat = "sf",
position = "identity",
...,
remove_long = TRUE,
na.rm = FALSE,
show.legend = NA,
inherit.aes = TRUE
)

```

## Arguments

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <a href="#">ggplot()</a>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <a href="#">fortify()</a> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code>, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).</p>
stat	The statistical transformation to use on the data for this layer, either as a ggproto Geom subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")
position	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
...	<p>Arguments passed on to <a href="#">geom_textpath</a>, <a href="#">geom_labelpath</a></p> <p><code>text_only</code> A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (<code>FALSE</code>, the default). If <code>TRUE</code>, any parameters or aesthetics relating to the drawing of the path will be ignored.</p> <p><code>gap</code> A <code>logical(1)</code> which if <code>TRUE</code>, breaks the path into two sections with a gap on either side of the label. If <code>FALSE</code>, the path is plotted as a whole. Alternatively, if <code>NA</code>, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is <code>FALSE</code> and for the text variant is <code>NA</code>.</p> <p><code>upright</code> A <code>logical(1)</code> which if <code>TRUE</code> (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If <code>FALSE</code>, the path decides the orientation of text.</p> <p><code>halign</code> A <code>character(1)</code> describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".</p>

	<p><b>offset</b> A <a href="#">unit</a> object of length 1 to determine the offset of the text from the path. If this is NULL (default), the <code>vjust</code> parameter decides the offset. If not NULL, the <code>offset</code> argument overrules the <code>vjust</code> setting.</p> <p><b>parse</b> A <code>logical(1)</code> which if TRUE, will coerce the labels into expressions, allowing for <code>plotmath</code> syntax to be used.</p> <p><b>straight</b> A <code>logical(1)</code> which if TRUE, keeps the letters of a label on a straight baseline and if FALSE (default), lets individual letters follow the curve. This might be helpful for noisy paths.</p> <p><b>padding</b> A <a href="#">unit</a> object of length 1 to determine the padding between the text and the path when the <code>gap</code> parameter trims the path.</p> <p><b>text_smoothing</b> a <code>numeric(1)</code> value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.</p> <p><b>rich</b> A <code>logical(1)</code> whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <a href="#">geom_textpath()</a>.</p> <p><b>label.padding</b> Amount of padding around label. Defaults to 0.25 lines.</p> <p><b>label.r</b> Radius of rounded corners. Defaults to 0.15 lines.</p>
<b>remove_long</b>	if TRUE, labels that are longer than their associated path will be removed.
<b>na.rm</b>	If FALSE, the default, missing values are removed with a warning. If TRUE, missing values are silently removed.
<b>show.legend</b>	<p>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.</p> <p>You can also set this to one of "polygon", "line", and "point" to override the default legend.</p>
<b>inherit.aes</b>	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. <a href="#">borders()</a> .

## Value

A Layer ggproto object that can be added to a plot.

## Geometry aesthetic

`geom_textsf()` uses a unique aesthetic: `geometry`, giving an column of class `sfc` containing simple features data. There are three ways to supply the `geometry` aesthetic:

- Do nothing: by default `geom_textsf()` assumes it is stored in the `geometry` column.
- Explicitly pass an `sf` object to the `data` argument. This will use the primary `geometry` column, no matter what it's called.
- Supply your own using `aes(geometry = my_column)`

Unlike other aesthetics, `geometry` will never be inherited from the plot.

## CRS

`coord_sf()` ensures that all layers use a common CRS. You can either specify it using the `crs` param, or `coord_sf()` will take it from the first layer that defines a CRS.

## Combining sf layers and regular geoms

Most regular geoms, such as `geom_point()`, `geom_path()`, `geom_text()`, `geom_polygon()` etc. will work fine with `coord_sf()`. However when using these geoms, two problems arise. First, what CRS should be used for the x and y coordinates used by these non-sf geoms? The CRS applied to non-sf geoms is set by the `default_crs` parameter, and it defaults to `NULL`, which means positions for non-sf geoms are interpreted as projected coordinates in the coordinate system set by the `crs` parameter. This setting allows you complete control over where exactly items are placed on the plot canvas, but it may require some understanding of how projections work and how to generate data in projected coordinates. As an alternative, you can set `default_crs = sf::st_crs(4326)`, the World Geodetic System 1984 (WGS84). This means that x and y positions are interpreted as longitude and latitude, respectively. You can also specify any other valid CRS as the default CRS for non-sf geoms.

The second problem that arises for non-sf geoms is how straight lines should be interpreted in projected space when `default_crs` is not set to `NULL`. The approach `coord_sf()` takes is to break straight lines into small pieces (i.e., segmentize them) and then transform the pieces into projected coordinates. For the default setting where x and y are interpreted as longitude and latitude, this approach means that horizontal lines follow the parallels and vertical lines follow the meridians. If you need a different approach to handling straight lines, then you should manually segmentize and project coordinates and generate the plot in projected coordinates.

## See Also

`stat_sf_coordinates()`. Other [geom layers](#) that place text on paths.

## Examples

```
ggplot(waterways) +
  geom_textsf(label = "Forth and Clyde Canal",
             hjust = 0.62, vjust = -0.3, fill = "#E4E0A3") +
  lims(x = c(-4.2, -3.9), y = c(55.9, 56))
```

---

geom\_textsmooth

*Labelled conditional means in ggplot2*

---

## Description

Smoothed conditional means are available in **ggplot2** via [geom\\_smooth](#). This geom layer simply adds a text label to each curve that follow the contour of this line when used as a drop-in replacement for [geom\\_smooth](#)

**Usage**

```
geom_textsmooth(
  mapping = NULL,
  data = NULL,
  stat = "smooth",
  position = "identity",
  ...,
  method = NULL,
  formula = NULL,
  na.rm = FALSE,
  orientation = NA,
  show.legend = NA,
  inherit.aes = TRUE
)

geom_labelsmooth(
  mapping = NULL,
  data = NULL,
  stat = "smooth",
  position = "identity",
  method = NULL,
  formula = NULL,
  na.rm = FALSE,
  orientation = NA,
  show.legend = NA,
  inherit.aes = TRUE,
  ...
)
```

**Arguments**

mapping	Set of aesthetic mappings created by <a href="#">aes()</a> . If specified and <code>inherit.aes = TRUE</code> (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	<p>The data to be displayed in this layer. There are three options:</p> <p>If <code>NULL</code>, the default, the data is inherited from the plot data as specified in the call to <a href="#">ggplot()</a>.</p> <p>A <code>data.frame</code>, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <a href="#">fortify()</a> for which variables will be created.</p> <p>A function will be called with a single argument, the plot data. The return value must be a <code>data.frame</code>, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).</p>
stat	The statistical transformation to use on the data for this layer, either as a ggproto Geom subclass or as a string naming the stat stripped of the <code>stat_</code> prefix (e.g. "count" rather than "stat_count")



position	Position adjustment, either as a string naming the adjustment (e.g. "jitter" to use <code>position_jitter</code> ), or the result of a call to a position adjustment function. Use the latter if you need to change the settings of the adjustment.
...	Other arguments passed on to <code>layer</code> . These are often aesthetics, used to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code> . These can also be the following text-path parameters:
	<p><code>text_only</code> A <code>logical(1)</code> indicating whether the path part should be plotted along with the text (FALSE, the default). If TRUE, any parameters or aesthetics relating to the drawing of the path will be ignored.</p> <p><code>gap</code> A <code>logical(1)</code> which if TRUE, breaks the path into two sections with a gap on either side of the label. If FALSE, the path is plotted as a whole. Alternatively, if NA, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is FALSE and for the text variant is NA.</p> <p><code>upright</code> A <code>logical(1)</code> which if TRUE (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If FALSE, the path decides the orientation of text.</p> <p><code>halign</code> A <code>character(1)</code> describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".</p> <p><code>offset</code> A <code>unit</code> object of length 1 to determine the offset of the text from the path. If this is NULL (default), the <code>vjust</code> parameter decides the offset. If not NULL, the <code>offset</code> argument overrules the <code>vjust</code> setting.</p> <p><code>parse</code> A <code>logical(1)</code> which if TRUE, will coerce the labels into expressions, allowing for plotmath syntax to be used.</p> <p><code>straight</code> A <code>logical(1)</code> which if TRUE, keeps the letters of a label on a straight baseline and if FALSE (default), lets individual letters follow the curve. This might be helpful for noisy paths.</p> <p><code>padding</code> A <code>unit</code> object of length 1 to determine the padding between the text and the path when the <code>gap</code> parameter trims the path.</p> <p><code>text_smoothing</code> a <code>numeric(1)</code> value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.</p> <p><code>rich</code> A <code>logical(1)</code> whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <code>geom_textpath()</code>.</p> <p><code>remove_long</code> if TRUE, labels that are longer than their associated path will be removed.</p>
method	<p>Smoothing method (function) to use, accepts either NULL or a character vector, e.g. "lm", "glm", "gam", "loess" or a function, e.g. <code>MASS::rlm</code> or <code>mgcv::gam</code>, <code>stats::lm</code>, or <code>stats::loess</code>. "auto" is also accepted for backwards compatibility. It is equivalent to NULL.</p> <p>For <code>method = NULL</code> the smoothing method is chosen based on the size of the largest group (across all panels). <code>stats::loess()</code> is used for less than 1,000 observations; otherwise <code>mgcv::gam()</code> is used with <code>formula = y ~ s(x, bs = "cs")</code> with <code>method = "REML"</code>. Somewhat anecdotally, loess gives a better appearance, but is <math>O(N^2)</math> in memory, so does not work for larger datasets.</p>

	If you have fewer than 1,000 observations but want to use the same <code>gam()</code> model that <code>method = NULL</code> would use, then set <code>method = "gam"</code> , <code>formula = y ~ s(x, bs = "cs")</code> .
<code>formula</code>	Formula to use in smoothing function, eg. <code>y ~ x</code> , <code>y ~ poly(x, 2)</code> , <code>y ~ log(x)</code> . <code>NULL</code> by default, in which case <code>method = NULL</code> implies <code>formula = y ~ x</code> when there are fewer than 1,000 observations and <code>formula = y ~ s(x, bs = "cs")</code> otherwise.
<code>na.rm</code>	If <code>FALSE</code> , the default, missing values are removed with a warning. If <code>TRUE</code> , missing values are silently removed.
<code>orientation</code>	The orientation of the layer. The default ( <code>NA</code> ) automatically determines the orientation from the aesthetic mapping. In the rare event that this fails it can be given explicitly by setting <code>orientation</code> to either <code>"x"</code> or <code>"y"</code> . See the <i>Orientation</i> section for more detail.
<code>show.legend</code>	logical. Should this layer be included in the legends? <code>NA</code> , the default, includes if any aesthetics are mapped. <code>FALSE</code> never includes, and <code>TRUE</code> always includes. It can also be a named logical vector to finely select the aesthetics to display.
<code>inherit.aes</code>	If <code>FALSE</code> , overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. <code>borders()</code> .

## Value

A Layer ggproto object that can be added to a plot.

## Aesthetics

`geom_textdensity()` understands the following aesthetics (required aesthetics are in bold):

- **x**
- **label**
- **alpha**
- **angle**
- **colour**
- **family**
- **fontface**
- **group**
- **hjust**
- **linecolour**
- **lineheight**
- **linetype**
- **linewidth**
- **size**
- **spacing**
- **textcolour**

- `vjust`

In addition to aforementioned aesthetics, `geom_labeldensity()` also understands:

- `boxcolour`
- `boxlinetype`
- `boxlinewidth`
- `fill`

The `spacing` aesthetic allows fine control of spacing of text, which is called 'tracking' in typography. The default is 0 and units are measured in 1/1000 em. Numbers greater than zero increase the spacing, whereas negative numbers decrease the spacing.

Learn more about setting these aesthetics in `vignette("ggplot2-specs")`.

### See Also

Other [geom layers](#) that place text on paths.

### Examples

```
ggplot(iris, aes(x = Sepal.Length, y = Petal.Length)) +
  geom_point(alpha = 0.1) +
  geom_textsmooth(aes(label = Species, colour = Species),
    method = "loess", formula = y ~ x,
    size = 7, linetype = 3, fontface = 2, linewidth = 1) +
  scale_colour_manual(values = c("forestgreen", "deepskyblue4", "tomato4")) +
  theme_bw() +
  theme(legend.position = "none")
```

---

guide_axis_textpath	<i>Textpath axis</i>
---------------------	----------------------

---

### Description

This is a specialised guide used in `coord_radial()` to represent the theta position scale.

### Usage

```
guide_axis_textpath(
  title = waiver(),
  halign = "center",
  rich = FALSE,
  minor.ticks = FALSE,
  cap = "none",
  order = 0,
  position = waiver()
)
```

**Arguments**

<code>title</code>	A character string or expression indicating a title of guide. If NULL, the title is not shown. By default ( <a href="#">waiver()</a> ), the name of the scale object or the name specified in <a href="#">labs()</a> is used for the title.
<code>halign</code>	A character(1) describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".
<code>rich</code>	A logical(1) whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <a href="#">geom_textpath()</a> .
<code>minor.ticks</code>	Whether to draw the minor ticks (TRUE) or not draw minor ticks (FALSE, default).
<code>cap</code>	A character to cut the axis line back to the last breaks. Can be "none" (default) to draw the axis line along the whole panel, or "upper" and "lower" to draw the axis to the upper or lower break, or "both" to only draw the line in between the most extreme breaks. TRUE and FALSE are shorthand for "both" and "none" respectively.
<code>order</code>	A positive integer of length 1 that specifies the order of this guide among multiple guides. This controls in which order guides are merged if there are multiple guides for the same position. If 0 (default), the order is determined by a secret algorithm.
<code>position</code>	Where this guide should be drawn: one of top, bottom, left, or right.

**Value**

A Guide ggproto object that can be added to a plot through a scale or the `guides()` function.

**Examples**

```
ggplot(mpg, aes(class, displ)) +
  geom_boxplot(staplewidth = 0.5) +
  coord_radial() +
  guides(theta = "axis_textpath")
```

---

scale\_hjust\_discrete    *justification scales*

---

**Description**

Sometimes text labels on adjacent lines can clash if the lines are not well separated vertically. One option for controlling this is to use an `hjust` or `vjust` scale that will place each label on a different position on each path, either vertically (`vjust`) or horizontally (`hjust`).

**Usage**

```

scale_hjust_discrete(..., range = c(0, 1), guide = "none")

scale_hjust_manual(
  ...,
  values,
  breaks = waiver(),
  guide = "none",
  na.value = NA
)

scale_hjust_identity(..., guide = "none")

scale_vjust_discrete(..., guide = "none", range = c(-0.5, 1.5))

scale_vjust_manual(
  ...,
  values,
  breaks = waiver(),
  guide = "none",
  na.value = NA
)

scale_vjust_identity(..., guide = "none")

```

**Arguments**

...	Other arguments passed on to [continuous_scale()], [binned_scale], or [discrete_scale()] as appropriate, to control name, limits, breaks, labels and so forth.
range	Output range of hjust and vjust. Must lie between 0 and 1 for hjust.
guide	A function used to create a guide or its name. See [guides()] for more information.
values	a set of aesthetic values to map data values to. The values will be matched in order (usually alphabetical) with the limits of the scale, or with breaks if provided. If this is a named vector, then the values will be matched based on the names instead. Data values that don't match will be given na.value.
breaks	One of: - 'NULL' for no breaks - 'waiver()' for the default breaks computed by the [transformation object][scales::trans_new()] - A numeric vector of positions - A function that takes the limits as input and returns breaks as output (e.g., a function returned by [scales::extended_breaks()]). Also accepts rlang [lambda][rlang::as_function()] function notation.
na.value	Missing values will be replaced with this value.

**Details**

The simplest way to separate labels is by adding 'scale\_hjust\_discrete()' or 'scale\_vjust\_discrete()' to your plot, but you can get more control with 'scale\_hjust\_manual' and 'scale\_vjust\_manual'.

Value

A ‘Scale’ ggproto object that can be added to a plot.

Examples

```
ggplot(iris, aes(Sepal.Length, color = Species)) +
  geom_textdensity(aes(label = Species, hjust = Species), size = 6) +
  scale_hjust_discrete()
```

---

sibling_layers	<i>Sibling layers</i>
----------------	-----------------------

---

Description

The goal of **geomtextpath** is to label (curved) lines in a plot. The **ggplot2** package has various ways to construct lines. For several of the **ggplot2** line functions, there is a plain ‘text’ sibling and a ‘label’ sibling that includes a text box. Below is an overview of how function in **geomtextpath** relate to those in **ggplot2**.

Details

ggplot2 geom	Text equivalent	Label equivalent
geom_path()	geom_textpath()	geom_labelpath()
geom_line()	geom_textline()	geom_labelline()
geom_segment()	geom_textsegment()	geom_labelsegment()
geom_curve()	geom_textcurve	geom_labelcurve()
geom_abline()	geom_textabline()	geom_labelabline()
geom_hline()	geom_texthline()	geom_labelhline()
geom_vline()	geom_textvline()	geom_labelvline()
geom_density()	geom_textdensity()	geom_labeldensity()
geom_smooth()	geom_textsmooth()	geom_labelsmooth()
geom_contour()	geom_textcontour()	geom_labelcontour()
geom_density2d()	geom_textdensity2d()	geom_labeldensity2d()
geom_sf()	geom_textsf()	geom_labelsf()

---

textpathGrob	<i>Draw text on a path.</i>
--------------	-----------------------------

---

## Description

This function creates (curved) text on a path.

## Usage

```
textpathGrob(  
  label,  
  x = 0.5,  
  y = 0.5,  
  id = 1L,  
  just = "centre",  
  hjust = NULL,  
  vjust = NULL,  
  halign = "left",  
  angle = 0,  
  straight = FALSE,  
  rich = FALSE,  
  gp_text = gpar(),  
  gp_path = gpar(),  
  gp_box = gpar(),  
  gap = NA,  
  upright = TRUE,  
  text_smoothing = 0,  
  polar_params = NULL,  
  padding = unit(0.05, "inch"),  
  label.padding = unit(0.25, "lines"),  
  label.r = unit(0.15, "lines"),  
  remove_long = FALSE,  
  arrow = NULL,  
  default.units = "npc",  
  name = NULL,  
  vp = NULL,  
  as_label = FALSE  
)
```

## Arguments

label	A character vector.
x	A numeric vector.
y	A numeric vector.
id	A numeric vector used to separate locations in x and y into multiple lines. All locations with the same id belong to the same line.

<code>just</code>	The justification of the text relative to its (x, y) location. If there are two values, the first value specifies horizontal justification and the second value specifies vertical justification. Possible string values are: "left", "right", "centre", "center", "bottom", and "top". For numeric values, 0 means left (bottom) alignment and 1 means right (top) alignment.
<code>hjust</code>	A numeric vector specifying horizontal justification. If specified, overrides the <code>just</code> setting.
<code>vjust</code>	A numeric vector specifying justification orthogonal to the direction of the text. Alternatively a <code>unit()</code> object to directly set the offset from the path.
<code>halign</code>	A character(1) describing how multi-line text should be justified. Can either be "center" (default), "left" or "right".
<code>angle</code>	a numeric vector either length 1 or the same length as <code>id</code> describing the angle in degrees at which text should be rotated.
<code>straight</code>	A logical(1) which if TRUE, keeps the letters of a label on a straight baseline and if FALSE (default), lets individual letters follow the curve. This might be helpful for noisy paths.
<code>rich</code>	A logical(1) whether to interpret the text as html/markdown formatted rich text. Default: FALSE. See also the rich text section of the details in <a href="#">geom_textpath()</a> .
<code>gp_text, gp_path</code>	An object of class "gpar", typically the output from a call from the <a href="#">gpar()</a> function. These are basically lists of graphical parameters for the text and path respectively.
<code>gp_box</code>	(Optional) an object of class "gpar", typically the output from a call to the <a href="#">gpar()</a> function. If this is an empty list, no text box will be drawn.
<code>gap</code>	A logical(1) which if TRUE, breaks the path into two sections with a gap on either side of the label. If FALSE, the path is plotted as a whole. Alternatively, if NA, the path will be broken if the string has a <code>vjust</code> between 0 and 1, and not otherwise. The default for the label variant is FALSE and for the text variant is NA.
<code>upright</code>	A logical(1) which if TRUE (default), inverts any text where the majority of letters would upside down along the path, to improve legibility. If FALSE, the path decides the orientation of text.
<code>text_smoothing</code>	a numeric(1) value between 0 and 100 that smooths the text without affecting the line portion of the geom. The default value of 0 means no smoothing is applied.
<code>polar_params</code>	a list consisting of an x, y, and r component that specifies the central point and radius of a circle around which single-point labels will be wrapped.
<code>padding</code>	A <code>unit</code> object of length 1 to determine the padding between the text and the path when the <code>gap</code> parameter trims the path.
<code>label.padding</code>	Amount of padding around label. Defaults to 0.25 lines.
<code>label.r</code>	Radius of rounded corners. Defaults to 0.15 lines.
<code>remove_long</code>	if TRUE, labels that are longer than their associated path will be removed.
<code>arrow</code>	Arrow specification, as created by <a href="#">arrow()</a> .



<code>default.units</code>	A string indicating the default units to use if x or y are only given as numeric vectors.
<code>name</code>	A character identifier.
<code>vp</code>	A Grid viewport object (or NULL).
<code>as_label</code>	a logical TRUE or FALSE indicating whether the text should be drawn inside a text box. If FALSE, the parameters <code>label.padding</code> , <code>label.r</code> and <code>gp_box</code> will be ignored.

### Value

An object of class `gTree`, containing grobs.

### Examples

```
require(grid)

t <- seq(0, 2 * pi, length.out = 100)
grob <- textpathGrob(
  label = c(
    "Why I am making trigonometry jokes? Cos I can!",
    "I was never any good at sine language."
  ),
  x = c(t, t) / (2 * pi),
  y = c(cos(t), sin(t)) * 0.25 + 0.5,
  id = rep(1:2, each = length(t)),
  vjust = rep(0.5, 2 * length(t)),
  gp_text = gpar(lineheight = c(1.2, 1.2), fontsize = c(10, 10)),
  gp_path = gpar(lty = c(1, 2))
)

grid.newpage(); grid.draw(grob)
```

---

waterways

*A simple features data frame of three Scottish waterways*

---

### Description

An ‘sf’ object showing the River Clyde, the River Forth, and the canal joining the two.

### Usage

```
waterways
```

### Format

A data frame with 4 rows and 3 variables

**name** name of geographic object

**type** type of geographic object

**geometry** sfc objects

**Details**

Contains Ordnance Survey data © Crown copyright and database right 2010-19

# Index

## \* datasets

- geom\_textabline, 4
- GeomTextpath, 4
- waterways, 49

aes(), 6, 10, 14, 19, 23, 28, 33, 37, 40

arrow(), 48

borders(), 7, 11, 16, 20, 24, 28, 34, 38, 42

coord\_curvedpolar, 2

density(), 20

fortify(), 6, 10, 15, 19, 23, 28, 33, 37, 40

geom layers, 9, 13, 21, 25, 31, 35, 39, 43

geom\_abline(), 46

geom\_contour, 9

geom\_contour(), 46

geom\_curve(), 46

geom\_density, 18

geom\_density(), 46

geom\_density2d(), 46

geom\_density\_2d, 22

geom\_hline(), 46

geom\_label(), 26

geom\_labelabline (geom\_textabline), 4

geom\_labelabline(), 46

geom\_labelcontour (geom\_textcontour), 9

geom\_labelcontour(), 46

geom\_labelcurve (geom\_textcurve), 14

geom\_labelcurve(), 46

geom\_labeldensity (geom\_textdensity), 18

geom\_labeldensity(), 46

geom\_labeldensity2d  
(geom\_textdensity2d), 22

geom\_labeldensity2d(), 46

geom\_labelhline (geom\_textabline), 4

geom\_labelhline(), 46

geom\_labelline (geom\_textpath), 26

geom\_labelline(), 46

geom\_labelpath, 37

geom\_labelpath (geom\_textpath), 26

geom\_labelpath(), 46

geom\_labelsegment (geom\_textsegment), 32

geom\_labelsegment(), 46

geom\_labelsf (geom\_textsf), 36

geom\_labelsf(), 46

geom\_labelsmooth (geom\_textsmooth), 39

geom\_labelsmooth(), 46

geom\_labelvline (geom\_textabline), 4

geom\_labelvline(), 46

geom\_line(), 46

geom\_path(), 39, 46

geom\_point(), 39

geom\_polygon(), 39

geom\_segment(), 32, 46

geom\_sf(), 46

geom\_smooth, 39

geom\_smooth(), 46

geom\_text(), 26, 39

geom\_textabline, 4

geom\_textabline(), 46

geom\_textcontour, 9

geom\_textcontour(), 46

geom\_textcurve, 14, 46

geom\_textdensity, 18

geom\_textdensity(), 46

geom\_textdensity2d, 22

geom\_textdensity2d(), 46

geom\_texthline (geom\_textabline), 4

geom\_texthline(), 46

geom\_textline (geom\_textpath), 26

geom\_textline(), 46

geom\_textpath, 26, 37

geom\_textpath(), 7, 12, 15, 20, 24, 29, 34, 38, 41, 44, 46, 48

geom\_textsegment, 32

geom\_textsegment(), 46

geom\_textsf, 36  
 geom\_textsf(), 46  
 geom\_textsmooth, 39  
 geom\_textsmooth(), 46  
 geom\_textvline (geom\_textabline), 4  
 geom\_textvline(), 46  
 geom\_vline(), 46  
 GeomLabelabline (GeomTextpath), 4  
 GeomLabelcontour (GeomTextpath), 4  
 GeomLabelcurve (GeomTextpath), 4  
 GeomLabeldensity (GeomTextpath), 4  
 GeomLabeldensity2d (GeomTextpath), 4  
 GeomLabelhline (GeomTextpath), 4  
 GeomLabelline (GeomTextpath), 4  
 GeomLabelpath (GeomTextpath), 4  
 GeomLabelsegment (GeomTextpath), 4  
 GeomLabelsfc (GeomTextpath), 4  
 GeomLabelvline (geom\_textabline), 4  
 GeomTextabline (GeomTextpath), 4  
 GeomTextcontour (GeomTextpath), 4  
 GeomTextcurve (GeomTextpath), 4  
 GeomTextdensity (GeomTextpath), 4  
 GeomTextdensity2d (GeomTextpath), 4  
 GeomTexthline (GeomTextpath), 4  
 GeomTextline (GeomTextpath), 4  
 GeomTextpath, 4  
 GeomTextsegment (GeomTextpath), 4  
 GeomTextsf (GeomTextpath), 4  
 GeomTextvline (geom\_textabline), 4  
 ggplot(), 6, 10, 15, 19, 23, 28, 33, 37, 40  
 gpar(), 48  
 grid::arrow(), 7, 12, 16, 20, 24, 29, 34  
 grid::curveGrob(), 14  
 guide\_axis\_textpath, 43  
 GuideAxisTextpath (GeomTextpath), 4  
  
 labs(), 44  
 layer, 6, 11, 15, 19, 23, 33, 41  
 layer(), 28  
  
 MASS::bandwidth.nrd(), 24  
 mgcv::gam(), 41  
  
 pretty(), 11  
  
 scale\_hjust\_discrete, 44  
 scale\_hjust\_identity  
     (scale\_hjust\_discrete), 44  
 scale\_hjust\_manual  
     (scale\_hjust\_discrete), 44  
  
 scale\_vjust\_discrete  
     (scale\_hjust\_discrete), 44  
 scale\_vjust\_identity  
     (scale\_hjust\_discrete), 44  
 scale\_vjust\_manual  
     (scale\_hjust\_discrete), 44  
 sibling\_layers, 46  
 stat\_sf\_coordinates(), 39  
 stat\_textcontour (geom\_textcontour), 9  
 stats::bw.nrd(), 20  
 stats::loess(), 41  
 StatTextcontour (GeomTextpath), 4  
  
 textpathGrob, 47  
  
 unit, 6, 7, 12, 15, 19, 20, 23, 24, 29, 34, 38,  
     41, 48  
 unit(), 48  
  
 waiver(), 44  
 waterways, 49