

# Package ‘ggrepel’

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**Version** 0.9.8

**Title** Automatically Position Non-Overlapping Text Labels with  
'ggplot2'

**Description** Provides text and label geoms for 'ggplot2' that help to avoid overlapping text labels. Labels repel away from each other and away from the data points.

**Depends** R (>= 4.1.0), ggplot2 (>= 3.5.2)

**Imports** grid, Rcpp, rlang (>= 1.1.6), S7, scales (>= 1.4.0), withr (>= 3.0.2)

**Suggests** knitr, rmarkdown, testthat, svglite, vdiff, gridExtra, ggpp, patchwork, devtools, prettydoc, ggbeeswarm, dplyr, magrittr, readr, stringr, marquee, rsvg, sf

**VignetteBuilder** knitr

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**URL** <https://ggrepel.slowkow.com/>, <https://github.com/slowkow/ggrepel>

**BugReports** <https://github.com/slowkow/ggrepel/issues>

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## Contents

element_text_repel . . . . .	2
geom_label_repel . . . . .	5
position_nudge_repel . . . . .	10

<b>Index</b>	<b>12</b>
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element_text_repel	<i>Repulsive text element</i>
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## Description

This text element is a replacement for `element_text` that repulses labels.

## Usage

```
element_text_repel(  
  family = NULL,  
  face = NULL,  
  colour = NULL,  
  size = NULL,  
  hjust = NULL,  
  vjust = NULL,  
  angle = NULL,  
  lineheight = NULL,  
  color = NULL,  
  margin = NULL,
```

```

    box.padding = NULL,
    force = NULL,
    force_pull = NULL,
    max.time = NULL,
    max.iter = NULL,
    max.overlaps = NULL,
    min.segment.length = NULL,
    segment.colour = NULL,
    segment.linetype = NULL,
    segment.size = NULL,
    segment.curvature = NULL,
    segment.angle = NULL,
    segment.ncp = NULL,
    segment.shape = NULL,
    segment.square = NULL,
    segment.squareShape = NULL,
    segment.infllect = NULL,
    arrow = NULL,
    seed = NA,
    position = c("bottom", "top", "left", "right"),
    inherit.blank = FALSE
  )

```

## Arguments

family	The typeface to use. The validity of this value will depend on the graphics device being used for rendering the plot. See <a href="#">the systemfonts vignette</a> for guidance on the best way to access fonts installed on your computer. The values "sans", "serif", and "mono" should always be valid and will select the default typeface for the respective styles. However, what is considered default is dependant on the graphics device and the operating system.
face	Font face ("plain", "italic", "bold", "bold.italic")
colour, color	Line/border colour. Color is an alias for colour. <code>alpha()</code> can be used to set the transparency of the colour.
size	Font size in points.
hjust	Horizontal justification (in $[0, 1]$ )
vjust	Vertical justification (in $[0, 1]$ )
angle	Angle (in $[0, 360]$ )
lineheight	Line height
margin	Margins around the text. See <a href="#">margin()</a> for more details. When creating a theme, the margins should be placed on the side of the text facing towards the center of the plot.
box.padding	Amount of padding around bounding box, as unit or number. Defaults to 0.25. (Default unit is lines, but other units can be specified by passing <code>unit(x, "units")</code> ).
force	Force of repulsion between overlapping text labels. Defaults to 1.

<code>force_pull</code>	Force of attraction between a text label and its corresponding data point. Defaults to 1.
<code>max.time</code>	Maximum number of seconds to try to resolve overlaps. Defaults to 0.5.
<code>max.iter</code>	Maximum number of iterations to try to resolve overlaps. Defaults to 10000.
<code>max.overlaps</code>	Exclude text labels when they overlap too many other things. For each text label, we count how many other text labels or other data points it overlaps, and exclude the text label if it has too many overlaps. Defaults to 10.
<code>min.segment.length</code>	Skip drawing segments shorter than this, as unit or number. Defaults to 0.5. (Default unit is lines, but other units can be specified by passing <code>unit(x, "units")</code> ).
<code>segment.colour</code> , <code>segment.linetype</code> , <code>segment.size</code>	Graphical parameters for the line connecting the text to points of origin.
<code>segment.curvature</code> , <code>segment.angle</code> , <code>segment.ncp</code> , <code>segment.shape</code> , <code>segment.square</code> , <code>segment.squareShape</code> , <code>segment.inflect</code>	Settings for curving the connecting line. See <a href="#">curveGrob</a> for descriptions of these parameters.
<code>arrow</code>	Arrow specification, as created by <code>grid::arrow()</code>
<code>seed</code>	Random seed passed to <code>set.seed</code> . Defaults to NA, which means that <code>set.seed</code> will not be called.
<code>position</code>	One of "top", "right", "bottom", "left" setting where the text labels should be relative to points of origin.
<code>inherit.blank</code>	Should this element inherit the existence of an <code>element_blank</code> among its parents? If TRUE the existence of a blank element among its parents will cause this element to be blank as well. If FALSE any blank parent element will be ignored when calculating final element state.

## Value

An object of class `<element_text_repel>`.

## Examples

```
# A plot with a crowded y-axis
p <- ggplot(mtcars, aes(mpg, rownames(mtcars))) +
  geom_col() +
  coord_cartesian(ylim = c(-32, 64)) +
  theme(axis.text.y = element_text_repel())

# By default there isn't enough space to draw distinctive lines
p

# The available space can be increased by setting the margin
p + theme(axis.text.y.left = element_text_repel(margin = margin(r = 20)))

# For secondary axis positions at the top and right, the `position` argument
# should be set accordingly
p + scale_y_discrete(position = "right") +
  theme(axis.text.y.right = element_text_repel(
```

```

    margin = margin(l = 20),
    position = "right"
  ))

# Using segment settings and matching tick colour
p + theme(
  axis.text.y.left = element_text_repel(
    margin = margin(r = 20),
    segment.curvature = -0.1,
    segment.inflect = TRUE,
    segment.colour = "red"
  ),
  axis.ticks.y.left = element_line(colour = "red")
)

```

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geom\_label\_repel      *Repulsive textual annotations.*

---

## Description

geom\_text\_repel adds text directly to the plot. geom\_label\_repel draws a rectangle underneath the text, making it easier to read. The text labels repel away from each other and away from the data points.

## Usage

```

geom_label_repel(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  parse = FALSE,
  ...,
  box.padding = 0.25,
  label.padding = 0.25,
  point.padding = 1e-06,
  label.r = 0.15,
  label.size = 0.25,
  min.segment.length = 0.5,
  arrow = NULL,
  force = 1,
  force_pull = 1,
  max.time = 0.5,
  max.iter = 10000,
  max.overlaps = getOption("ggrepel.max.overlaps", default = 10),
  nudge_x = 0,
  nudge_y = 0,
  xlim = c(NA, NA),

```

```
  ylim = c(NA, NA),
  na.rm = FALSE,
  show.legend = NA,
  direction = c("both", "y", "x"),
  seed = NA,
  verbose = getOption("verbose", default = FALSE),
  inherit.aes = TRUE
)

geom_marquee_repel(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...,
  box.padding = 0.25,
  point.padding = 1e-06,
  min.segment.length = 0.5,
  arrow = NULL,
  force = 1,
  force_pull = 1,
  max.time = 0.5,
  max.iter = 10000,
  max.overlaps = getOption("ggrepel.max.overlaps", default = 10),
  nudge_x = 0,
  nudge_y = 0,
  xlim = c(NA, NA),
  ylim = c(NA, NA),
  na.rm = FALSE,
  show.legend = NA,
  direction = c("both", "y", "x"),
  seed = NA,
  verbose = getOption("verbose", default = FALSE),
  inherit.aes = TRUE
)

geom_text_repel(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  parse = FALSE,
  ...,
  box.padding = 0.25,
  point.padding = 1e-06,
  min.segment.length = 0.5,
  arrow = NULL,
  force = 1,
```

```

force_pull = 1,
max.time = 0.5,
max.iter = 10000,
max.overlaps = getOption("ggrepel.max.overlaps", default = 10),
nudge_x = 0,
nudge_y = 0,
xlim = c(NA, NA),
ylim = c(NA, NA),
na.rm = FALSE,
show.legend = NA,
direction = c("both", "y", "x"),
seed = NA,
verbose = getOption("verbose", default = FALSE),
inherit.aes = TRUE
)

```

### Arguments

mapping	Set of aesthetic mappings created by <code>aes</code> or <code>aes_</code> . If specified and <code>inherit.aes = TRUE</code> (the default), is combined with the default mapping at the top level of the plot. You only need to supply mapping if there isn't a mapping defined for the plot.
data	A data frame. If specified, overrides the default data frame defined at the top level of the plot.
stat	The statistical transformation to use on the data for this layer, as a string.
position	Position adjustment, either as a string, or the result of a call to a position adjustment function.
parse	If TRUE, the labels will be parsed into expressions and displayed as described in <code>?plotmath</code>
...	other arguments passed on to <code>layer</code> . There are three types of arguments you can use here: <ul style="list-style-type: none"> <li>• Aesthetics: to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code>.</li> <li>• Other arguments to the layer, for example you override the default stat associated with the layer.</li> <li>• Other arguments passed on to the stat.</li> </ul>
box.padding	Amount of padding around bounding box, as unit or number. Defaults to 0.25. (Default unit is lines, but other units can be specified by passing <code>unit(x, "units")</code> ).
label.padding	Amount of padding around label, as unit or number. Defaults to 0.25. (Default unit is lines, but other units can be specified by passing <code>unit(x, "units")</code> ).
point.padding	Amount of padding around labeled point, as unit or number. Defaults to 0. (Default unit is lines, but other units can be specified by passing <code>unit(x, "units")</code> ).
label.r	Radius of rounded corners, as unit or number. Defaults to 0.15. (Default unit is lines, but other units can be specified by passing <code>unit(x, "units")</code> ).
label.size	Size of label border, in mm.

<code>min.segment.length</code>	Skip drawing segments shorter than this, as unit or number. Defaults to 0.5. (Default unit is lines, but other units can be specified by passing <code>unit(x, "units")</code> ).
<code>arrow</code>	specification for arrow heads, as created by <a href="#">arrow</a>
<code>force</code>	Force of repulsion between overlapping text labels. Defaults to 1.
<code>force_pull</code>	Force of attraction between a text label and its corresponding data point. Defaults to 1.
<code>max.time</code>	Maximum number of seconds to try to resolve overlaps. Defaults to 0.5.
<code>max.iter</code>	Maximum number of iterations to try to resolve overlaps. Defaults to 10000.
<code>max.overlaps</code>	Exclude text labels when they overlap too many other things. For each text label, we count how many other text labels or other data points it overlaps, and exclude the text label if it has too many overlaps. Defaults to 10.
<code>nudge_x, nudge_y</code>	Horizontal and vertical adjustments to nudge the starting position of each text label. The units for <code>nudge_x</code> and <code>nudge_y</code> are the same as for the data units on the x-axis and y-axis.
<code>xlim, ylim</code>	Limits for the x and y axes. Text labels will be constrained to these limits. By default, text labels are constrained to the entire plot area.
<code>na.rm</code>	If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.
<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.
<code>direction</code>	"both", "x", or "y" – direction in which to adjust position of labels
<code>seed</code>	Random seed passed to <a href="#">set.seed</a> . Defaults to NA, which means that <code>set.seed</code> will not be called.
<code>verbose</code>	If TRUE, some diagnostics of the repel algorithm are printed
<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. <a href="#">borders</a> .

## Details

These geoms are based on [geom\\_text](#) and [geom\\_label](#). See the documentation for those functions for more details. Differences from those functions are noted here.

Text labels have height and width, but they are physical units, not data units. The amount of space they occupy on that plot is not constant in data units: when you resize a plot, labels stay the same size, but the size of the axes changes. The text labels are repositioned after resizing a plot.

## geom\_label\_repel

Currently `geom_label_repel` does not support the `rot` argument and is considerably slower than `geom_text_repel`. The `fill` aesthetic controls the background colour of the label.

**Alignment with hjust or vjust**

The arguments `hjust` and `vjust` are supported, but they only control the initial positioning, so repulsive forces may disrupt alignment. Alignment with `hjust` will be preserved if labels only move up and down by using `direction="y"`. For `vjust`, use `direction="x"`.

**Examples**

```
p <- ggplot(mtcars,
  aes(wt, mpg, label = rownames(mtcars), colour = factor(cyl))) +
  geom_point()

# Avoid overlaps by repelling text labels
p + geom_text_repel()
# Labels with background
p + geom_label_repel()

## Not run:
p + geom_text_repel(family = "Times New Roman",
  box.padding = 0.5)

# Add aesthetic mappings
p + geom_text_repel(aes(alpha=wt, size=mpg))
p + geom_label_repel(aes(fill=factor(cyl)), colour="white", segment.colour="black")

# Draw all line segments
p + geom_text_repel(min.segment.length = 0)

# Omit short line segments (default behavior)
p + geom_text_repel(min.segment.length = 0.5)

# Omit all line segments
p + geom_text_repel(segment.colour = NA)

# Repel just the labels and totally ignore the data points
p + geom_text_repel(point.size = NA)

# Hide some of the labels, but repel from all data points
mtcars$label <- rownames(mtcars)
mtcars$label[1:15] <- ""
p + geom_text_repel(data = mtcars, aes(wt, mpg, label = label))

# Nudge the starting positions
p + geom_text_repel(nudge_x = ifelse(mtcars$cyl == 6, 1, 0),
  nudge_y = ifelse(mtcars$cyl == 6, 8, 0))

# Change the text size
p + geom_text_repel(aes(size = wt))
# Scale height of text, rather than sqrt(height)
p + geom_text_repel(aes(size = wt)) + scale_radius(range = c(3,6))

# You can display expressions by setting parse = TRUE. The
# details of the display are described in ?plotmath, but note that
```

```

# geom_text_repel uses strings, not expressions.
p + geom_text_repel(aes(label = paste(wt, "^(", cyl, ")"), sep = "")),
  parse = TRUE)

# Add a text annotation
p +
  geom_text_repel() +
  annotate(
    "text", label = "plot mpg vs. wt",
    x = 2, y = 15, size = 8, colour = "red"
  )

# Add arrows
p +
  geom_point(colour = "red") +
  geom_text_repel(
    arrow = arrow(length = unit(0.02, "npc")),
    box.padding = 1
  )

## End(Not run)

```

---

position\_nudge\_repel *Nudge labels a fixed distance from points*

---

### Description

position\_nudge\_repel is useful for adjusting the starting position of text labels before they are repelled from data points.

### Usage

```
position_nudge_repel(x = 0, y = 0)
```

### Arguments

**x, y** Amount of horizontal and vertical distance to move. Same units as the data on the x and y axes.

### Examples

```

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

ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_repel(aes(label = y))

```

```
ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_repel(
    aes(label = y),
    min.segment.length = 0,
    position = position_nudge_repel(x = 0.1, y = 0.15)
  )

# The values for x and y can be vectors
ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_repel(
    aes(label = y),
    min.segment.length = 0,
    position = position_nudge_repel(
      x = c(0.1, 0, -0.1, 0),
      y = c(0.1, 0.2, -0.1, -0.2)
    )
  )

# We can also use geom_text_repel() with arguments nudge_x, nudge_y
ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_repel(
    aes(label = y),
    min.segment.length = 0,
    nudge_x = 0.1,
    nudge_y = 0.15
  )

# The arguments nudge_x, nudge_y also accept vectors
ggplot(df, aes(x, y)) +
  geom_point() +
  geom_text_repel(
    aes(label = y),
    min.segment.length = 0,
    nudge_x = c(0.1, 0, -0.1, 0),
    nudge_y = c(0.1, 0.2, -0.1, -0.2)
  )
```

# Index

## \* position adjustments

position\_nudge\_repel, 10

aes, 7

aes\_, 7

arrow, 8

borders, 8

curveGrob, 4

element\_text, 2

element\_text\_repel, 2

geom\_label, 8

geom\_label\_repel, 5

geom\_marquee\_repel (geom\_label\_repel), 5

geom\_text, 8

geom\_text\_repel (geom\_label\_repel), 5

grid::arrow(), 4

layer, 7

margin(), 3

position\_nudge\_repel, 10

set.seed, 4, 8