

Package ‘ggnetwork’

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Type Package

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URL <https://github.com/briatte/ggnetwork>

BugReports <https://github.com/briatte/ggnetwork/issues>

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fortify.igraph	<i>Fortify method for networks of class igraph</i>
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Description

Fortify method for networks of class [igraph](#)

Usage

```
## S3 method for class 'igraph'
fortify(
  model,
  data = NULL,
  layout = igraph::nicely(),
  arrow.gap = ifelse(igraph::is.directed(model), 0.025, 0),
  by = NULL,
  scale = TRUE,
  stringsAsFactors = getOption("stringsAsFactors", FALSE),
  ...
)
```

Arguments

model	an object of class igraph .
data	not used by this method.
layout	a function call to an igraph layout function, such as layout_nicely (the default), or a 2 column matrix giving the x and y coordinates for the vertices. See layout_ for details.

arrow.gap	a parameter that will shorten the network edges in order to avoid overplotting edge arrows and nodes; defaults to 0 when the network is undirected (no edge shortening), or to 0.025 when the network is directed. Small values near 0.025 will generally achieve good results when the size of the nodes is reasonably small.
by	a character vector that matches an edge attribute, which will be used to generate a data frame that can be plotted with <code>facet_wrap</code> or <code>facet_grid</code> . The nodes of the network will appear in all facets, at the same coordinates. Defaults to NULL (no faceting).
scale	whether to (re)scale the layout coordinates. Defaults to TRUE, but should be set to FALSE if layout contains meaningful spatial coordinates, such as latitude and longitude.
stringsAsFactors	whether vertex and edge attributes should be converted to factors if they are of class character. Defaults to the value of <code>getOption("stringsAsFactors")</code> , which is FALSE by default: see <code>data.frame</code> .
...	additional parameters for the <code>layout_</code> function

Value

a `data.frame` object.

fortify.network	<i>Fortify method for networks of class <code>network</code></i>
-----------------	--

Description

See the vignette at <https://briatte.github.io/ggnetwork/> for a description of both this function and the rest of the `ggnetwork` package.

Usage

```
## S3 method for class 'network'
fortify(
  model,
  data = NULL,
  layout = "fruchtermanreingold",
  weights = NULL,
  arrow.gap = ifelse(network::is.directed(model), 0.025, 0),
  by = NULL,
  scale = TRUE,
  stringsAsFactors = getOption("stringsAsFactors", FALSE),
  ...
)
```

Arguments

model	an object of class network .
data	not used by this method.
layout	a network layout supplied by gplot.layout , such as "fruchtermanreingold" (the default), or a two-column matrix with as many rows as there are nodes in the network, in which case the matrix is used as nodes coordinates.
weights	the name of an edge attribute to use as edge weights when computing the network layout, if the layout supports such weights (see 'Details'). Defaults to NULL (no edge weights).
arrow.gap	a parameter that will shorten the network edges in order to avoid overplotting edge arrows and nodes; defaults to 0 when the network is undirected (no edge shortening), or to 0.025 when the network is directed. Small values near 0.025 will generally achieve good results when the size of the nodes is reasonably small.
by	a character vector that matches an edge attribute, which will be used to generate a data frame that can be plotted with facet_wrap or facet_grid . The nodes of the network will appear in all facets, at the same coordinates. Defaults to NULL (no faceting).
scale	whether to (re)scale the layout coordinates. Defaults to TRUE, but should be set to FALSE if layout contains meaningful spatial coordinates, such as latitude and longitude.
stringsAsFactors	whether vertex and edge attributes should be converted to factors if they are of class character. Defaults to the value of <code>getOption("stringsAsFactors")</code> , which is FALSE by default: see data.frame .
...	additional parameters for the layout argument; see gplot.layout for available options.

Details

fortify.network will return a warning if it finds duplicated edges after converting the network to an edge list. Duplicated edges should be eliminated in favour of single weighted edges before using a network layout that supports edge weights, such as the Kamada-Kawai force-directed placement algorithm.

Value

a [data.frame](#) object.

Examples

```
if (require(ggplot2) && require(network)) {
  # source: ?network::flo
  data(flo)

  # data example
```

```

ggnetwork(flo)

# plot example
ggplot(ggnetwork(flo), aes(x, y, xend = xend, yend = yend)) +
  geom_edges(alpha = 0.5) +
  geom_nodes(size = 12, color = "white") +
  geom_nodetext(aes(label = vertex.names), fontface = "bold") +
  theme_blank()

# source: ?network::emon
data(emon)

# data example
ggnetwork(emon[[1]], layout = "target", niter = 100)

# data example with edge weights
ggnetwork(emon[[1]], layout = "kamadakawai", weights = "Frequency")

# plot example with straight edges
ggplot(
  ggnetwork(emon[[1]], layout = "kamadakawai", arrow.gap = 0.025),
  aes(x, y, xend = xend, yend = yend)
) +
  geom_edges(aes(color = Frequency),
    arrow = arrow(length = unit(10, "pt"), type = "closed")
  ) +
  geom_nodes(aes(size = Formalization)) +
  scale_color_gradient(low = "grey50", high = "tomato") +
  scale_size_area(breaks = 1:3) +
  theme_blank()

# plot example with curved edges
ggplot(
  ggnetwork(emon[[1]], layout = "kamadakawai", arrow.gap = 0.025),
  aes(x, y, xend = xend, yend = yend)
) +
  geom_edges(aes(color = Frequency),
    curvature = 0.1,
    arrow = arrow(length = unit(10, "pt"), type = "open")
  ) +
  geom_nodes(aes(size = Formalization)) +
  scale_color_gradient(low = "grey50", high = "tomato") +
  scale_size_area(breaks = 1:3) +
  theme_blank()

# facet by edge attribute
ggplot(
  ggnetwork(emon[[1]], arrow.gap = 0.02, by = "Frequency"),
  aes(x, y, xend = xend, yend = yend)
) +
  geom_edges(arrow = arrow(length = unit(5, "pt"), type = "closed")) +
  geom_nodes() +
  theme_blank() +

```

```

    facet_grid(. ~ Frequency, labeller = label_both)

# user-provided layout
ggplot(
  ggnetwork(emon[[1]], layout = matrix(runif(28), ncol = 2)),
  aes(x, y, xend = xend, yend = yend)
) +
  geom_edges(arrow = arrow(length = unit(5, "pt"), type = "closed")) +
  geom_nodes() +
  theme_blank()
}

```

geom_edges

Draw the edges of a network.

Description

All arguments to this geom are identical to those of [geom_segment](#), including `arrow`, which is useful to plot directed networks in conjunction with the `arrow.gap` argument of [fortify.network](#). The `curvature`, `angle` and `ncp` arguments of [geom_curve](#) are also available: if `curvature` is set to any value above 0 (the default), the edges produced by `geom_edges` will be curved.

Usage

```

geom_edges(
  mapping = NULL,
  data = NULL,
  position = "identity",
  arrow = NULL,
  curvature = 0,
  angle = 90,
  ncp = 5,
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE,
  ...
)

```

Arguments

<code>mapping</code>	Set of aesthetic mappings created by aes() . 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 <code>mapping</code> if there is no plot mapping.
<code>data</code>	The data to be displayed in this layer. There are three options: If <code>NULL</code> , the default, the data is inherited from the plot data as specified in the call to ggplot() .

	A data.frame, or other object, will override the plot data. All objects will be fortified to produce a data frame. See <code>fortify()</code> for which variables will be created.
	A function will be called with a single argument, the plot data. The return value must be a data.frame, and will be used as the layer data. A function can be created from a formula (e.g. <code>~ head(.x, 10)</code>).
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.
arrow	specification for arrow heads, as created by <code>grid::arrow()</code> .
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.
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> .
...	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> . They may also be parameters to the paired geom/stat.

Examples

```
if (require(network) && require(sna)) {

  # rerun if the example does not produce reciprocated ties
  n <- network(rgraph(10, tprob = 0.2), directed = TRUE)

  # just edges
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(size = 1, colour = "steelblue") +
    theme_blank()

  # with nodes
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(size = 1, colour = "steelblue") +
    geom_nodes(size = 3, colour = "steelblue") +
    theme_blank()
}
```

```

# with arrows
ggplot(n, aes(x, y, xend = xend, yend = yend)) +
  geom_edges(
    size = 1, colour = "steelblue",
    arrow = arrow(length = unit(0.5, "lines"), type = "closed")
  ) +
  geom_nodes(size = 3, colour = "steelblue") +
  theme_blank()

# with curvature
ggplot(n, aes(x, y, xend = xend, yend = yend)) +
  geom_edges(
    size = 1, colour = "steelblue", curvature = 0.15,
    arrow = arrow(length = unit(0.5, "lines"), type = "closed")
  ) +
  geom_nodes(size = 3, colour = "steelblue") +
  theme_blank()

# arbitrary categorical edge attribute
e <- sample(letters[ 1:2 ], network.edgcount(n), replace = TRUE)
set.edge.attribute(n, "type", e)
ggplot(n, aes(x, y, xend = xend, yend = yend)) +
  geom_edges(aes(linetype = type),
    size = 1, curvature = 0.15,
    arrow = arrow(length = unit(0.5, "lines"), type = "closed")
  ) +
  geom_nodes(size = 3, colour = "steelblue") +
  theme_blank()

# arbitrary numeric edge attribute (signed network)
e <- sample(-2:2, network.edgcount(n), replace = TRUE)
set.edge.attribute(n, "weight", e)
ggplot(n, aes(x, y, xend = xend, yend = yend)) +
  geom_edges(aes(colour = weight),
    curvature = 0.15,
    arrow = arrow(length = unit(0.5, "lines"), type = "closed")
  ) +
  geom_nodes(size = 3, colour = "grey50") +
  scale_colour_gradient(low = "steelblue", high = "tomato") +
  theme_blank()

# draw only a subset of all edges
positive_weight <- function(x) {
  x[ x$weight >= 0, ]
}
ggplot(n, aes(x, y, xend = xend, yend = yend)) +
  geom_edges(aes(colour = weight), data = positive_weight) +
  geom_nodes(size = 4, colour = "grey50") +
  scale_colour_gradient(low = "gold", high = "tomato") +
  theme_blank()
}

```

geom_edgetext	<i>Label the edges of a network.</i>
---------------	--------------------------------------

Description

All arguments to both `geom_edgetext` and `geom_edgelaabel` are identical to those of `geom_label`, with the only difference that the `label.size` argument defaults to 0 in order to avoid drawing a border around the edge labels. The labels will be drawn at mid-edges. `geom_text` and `geom_label` produce strictly identical results.

Usage

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

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

Arguments

`mapping` Set of aesthetic mappings created by `aes()`. If specified and `inherit.aes = TRUE` (the default), 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 NULL, 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>
position	Position adjustment, either as a string, or the result of a call to a position adjustment function. Cannot be jointly specified with <code>nudge_x</code> or <code>nudge_y</code> .
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> . 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 <code>geom/stat</code> .
<code>nudge_x</code> , <code>nudge_y</code>	Horizontal and vertical adjustment to nudge labels by. Useful for offsetting text from points, particularly on discrete scales. Cannot be jointly specified with <code>position</code> .
<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>label.size</code>	Size of label border, in mm.
<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> .

Examples

```

if (require(network) && require(sna)) {
  data(flo, package = "network")
  n <- network(flo, directed = FALSE)

  # arbitrary categorical edge attribute
  e <- sample(letters[ 1:4 ], network.edgecount(n), replace = TRUE)
  set.edge.attribute(n, "type", e)

  # with labelled edges
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(aes(colour = type)) +

```

```

geom_edgetext(aes(label = type, colour = type)) +
geom_nodes(size = 4, colour = "grey50") +
theme_blank()

# label only a subset of all edges with arbitrary symbol
edge_type <- function(x) {
  x[ x$type == "a", ]
}
ggplot(n, aes(x, y, xend = xend, yend = yend)) +
  geom_edges() +
  geom_edgetext(label = "=", data = edge_type) +
  geom_nodes(size = 4, colour = "grey50") +
  theme_blank()
}

```

geom_edgetext_repel *Draw repulsive edge labels.*

Description

All arguments to both [geom_edgetext_repel](#) and [geom_edglabel_repel](#) are identical to those of [geom_label_repel](#). [geom_text_repel](#) and [geom_label_repel](#) produce strictly identical results.

Usage

```

geom_edgetext_repel(
  mapping = NULL,
  data = NULL,
  parse = FALSE,
  ...,
  box.padding = unit(0.25, "lines"),
  label.padding = unit(0.25, "lines"),
  point.padding = unit(1e-06, "lines"),
  label.r = unit(0.15, "lines"),
  label.size = 0.25,
  arrow = NULL,
  force = 1,
  max.iter = 10000,
  nudge_x = 0,
  nudge_y = 0,
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE
)

geom_edglabel_repel(
  mapping = NULL,

```

```

data = NULL,
parse = FALSE,
...,
box.padding = unit(0.25, "lines"),
label.padding = unit(0.25, "lines"),
point.padding = unit(1e-06, "lines"),
label.r = unit(0.15, "lines"),
label.size = 0.25,
arrow = NULL,
force = 1,
max.iter = 10000,
nudge_x = 0,
nudge_y = 0,
na.rm = FALSE,
show.legend = NA,
inherit.aes = TRUE
)

```

Arguments

mapping	Set of aesthetic mappings created by aes or aes_ . 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.
parse	If TRUE, the labels will be parsed into expressions and displayed as described in <code>?plotmath</code>
...	other arguments passed on to layer . There are three types of arguments you can use here: <ul style="list-style-type: none"> • Aesthetics: to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code>. • Other arguments to the layer, for example you override the default stat associated with the layer. • Other arguments passed on to the stat.
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.
arrow	specification for arrow heads, as created by arrow

force	Force of repulsion between overlapping text labels. Defaults to 1.
max.iter	Maximum number of iterations to try to resolve overlaps. Defaults to 10000.
nudge_x, nudge_y	Horizontal and vertical adjustments to nudge the starting position of each text label. The units for nudge_x and nudge_y are the same as for the data units on the x-axis and y-axis.
na.rm	If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.
show.legend	logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes.
inherit.aes	If FALSE, overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. borders .

Examples

```

if (require(network) && require(sna)) {
  data(flo, package = "network")
  n <- network(flo, directed = FALSE)

  # arbitrary categorical edge attribute
  e <- sample(1:4, network.edgcount(n), replace = TRUE)
  set.edge.attribute(n, "day", e)

  # with repulsive edge labels
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges() +
    geom_edgetext_repel(aes(label = day), box.padding = unit(0.5, "lines")) +
    geom_nodes(size = 4, colour = "grey50") +
    theme_blank()

  # repulsive edge labels for only a subset of all edges
  edge_day <- function(x) {
    x[ x$day > 2, ]
  }
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(aes(colour = cut(day, (4:0)[ -3 ]))) +
    geom_edgetext_repel(aes(
      label = paste("day", day),
      colour = cut(day, (4:0)[ -3 ])
    ), data = edge_day) +
    geom_nodes(size = 4, colour = "grey50") +
    scale_colour_manual("day",
      labels = c("old ties", "day 3", "day 4"),
      values = c("grey50", "gold", "tomato")
    ) +
    theme_blank()
}

```

 geom_nodes

Draw the nodes of a network.

Description

All arguments to this geom are identical to those of [geom_point](#).

Usage

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

Arguments

mapping	Set of aesthetic mappings created by aes() . 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 ggplot().</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 fortify() 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>
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. borders() .

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

Examples

```
if (require(network) && require(sna)) {
  data(flo, package = "network")
  n <- network(flo, directed = FALSE)

  # just nodes
  ggplot(n, aes(x, y)) +
    geom_nodes(size = 3, shape = 21, colour = "steelblue") +
    theme_blank()

  # with edges
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(colour = "steelblue") +
    geom_nodes(size = 3, shape = 21, colour = "steelblue", fill = "white") +
    theme_blank()

  # with nodes sized according to degree centrality
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(colour = "steelblue") +
    geom_nodes(size = degree(n), shape = 21, colour = "steelblue", fill = "white") +
    theme_blank()

  # with nodes colored according to betweenness centrality

  n %v% "betweenness" <- betweenness(flo)
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(colour = "grey50") +
    geom_nodes(aes(colour = betweenness), size = 3) +
    scale_colour_gradient(low = "gold", high = "tomato") +
    theme_blank() +
    theme(legend.position = "bottom")
}
```

geom_nodetext

Label the nodes of a network.

Description

All arguments to these geoms are identical to those of `geom_text` and `geom_label`.

Usage

```
geom_nodetext(
  mapping = NULL,
```

```

data = NULL,
position = "identity",
...,
parse = FALSE,
nudge_x = 0,
nudge_y = 0,
check_overlap = FALSE,
na.rm = FALSE,
show.legend = NA,
inherit.aes = TRUE
)

geom_nodelabel(
  mapping = NULL,
  data = NULL,
  position = "identity",
  ...,
  parse = FALSE,
  nudge_x = 0,
  nudge_y = 0,
  label.padding = unit(0.25, "lines"),
  label.r = unit(0.15, "lines"),
  label.size = 0.25,
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE
)

```

Arguments

mapping	Set of aesthetic mappings created by aes() . 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 ggplot().</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 fortify() 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>
position	Position adjustment, either as a string, or the result of a call to a position adjustment function. Cannot be jointly specified with <code>nudge_x</code> or <code>nudge_y</code> .
...	Other arguments passed on to layer() . 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.

parse	If TRUE, the labels will be parsed into expressions and displayed as described in <code>?plotmath</code> .
nudge_x, nudge_y	Horizontal and vertical adjustment to nudge labels by. Useful for offsetting text from points, particularly on discrete scales. Cannot be jointly specified with <code>position</code> .
check_overlap	If TRUE, text that overlaps previous text in the same layer will not be plotted. <code>check_overlap</code> happens at draw time and in the order of the data. Therefore data should be arranged by the label column before calling <code>geom_text()</code> . Note that this argument is not supported by <code>geom_label()</code> .
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.padding	Amount of padding around label. Defaults to 0.25 lines.
label.r	Radius of rounded corners. Defaults to 0.15 lines.
label.size	Size of label border, in mm.

Examples

```
## geom_nodetext examples

if (require(network) && require(sna)) {
  n <- network(rgraph(10, tprob = 0.2), directed = FALSE)

  # just node labels
  ggplot(n, aes(x, y)) +
    geom_nodetext(aes(label = vertex.names)) +
    theme_blank()

  # with nodes underneath
  ggplot(n, aes(x, y)) +
    geom_nodes(colour = "gold", size = 9) +
    geom_nodetext(aes(label = vertex.names)) +
    theme_blank()

  # with nodes and edges
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(colour = "gold") +
    geom_nodes(colour = "gold", size = 9) +
    geom_nodetext(aes(label = vertex.names)) +
    theme_blank()
}
```

```
## geom_nodelabel examples

if (require(network) && require(sna)) {
  data(flo, package = "network")
  n <- network(flo, directed = FALSE)

  # with text labels
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(colour = "grey50") +
    geom_nodelabel(aes(label = vertex.names)) +
    theme_blank()

  # with text labels coloured according to degree centrality
  n %v% "degree" <- degree(n)
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(colour = "grey50") +
    geom_nodelabel(aes(label = vertex.names, fill = degree)) +
    scale_fill_gradient(low = "gold", high = "tomato") +
    theme_blank()

  # label only a subset of all nodes
  high_degree <- function(x) {
    x[ x$degree > median(x$degree), ]
  }
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(colour = "steelblue") +
    geom_nodes(aes(size = degree), colour = "steelblue") +
    geom_nodelabel(aes(label = vertex.names),
      data = high_degree,
      colour = "white", fill = "tomato"
    ) +
    theme_blank()
}
```

geom_nodetext_repel *Draw repulsive node labels*

Description

All arguments to these geoms are identical to those of [geom_text_repel](#) and [geom_label_repel](#).

Usage

```
geom_nodetext_repel(
  mapping = NULL,
  data = NULL,
  parse = FALSE,
  ...,
  box.padding = unit(0.25, "lines"),
```

```

    point.padding = unit(1e-06, "lines"),
    arrow = NULL,
    force = 1,
    max.iter = 10000,
    nudge_x = 0,
    nudge_y = 0,
    na.rm = FALSE,
    show.legend = NA,
    inherit.aes = TRUE
  )

  geom_nodelabel_repel(
    mapping = NULL,
    data = NULL,
    parse = FALSE,
    ...,
    box.padding = unit(0.25, "lines"),
    label.padding = unit(0.25, "lines"),
    point.padding = unit(1e-06, "lines"),
    label.r = unit(0.15, "lines"),
    label.size = 0.25,
    arrow = NULL,
    force = 1,
    max.iter = 10000,
    nudge_x = 0,
    nudge_y = 0,
    na.rm = FALSE,
    show.legend = NA,
    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.
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"> • Aesthetics: to set an aesthetic to a fixed value, like <code>colour = "red"</code> or <code>size = 3</code>. • Other arguments to the layer, for example you override the default <code>stat</code> associated with the layer.

- Other arguments passed on to the stat.

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>).
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>).
arrow	specification for arrow heads, as created by arrow
force	Force of repulsion between overlapping text labels. Defaults to 1.
max.iter	Maximum number of iterations to try to resolve overlaps. Defaults to 10000.
nudge_x, nudge_y	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.
na.rm	If FALSE (the default), removes missing values with a warning. If TRUE silently removes missing values.
show.legend	logical. Should this layer be included in the legends? NA, the default, includes if any aesthetics are mapped. FALSE never includes, and TRUE always includes.
inherit.aes	If FALSE, overrides the default aesthetics, rather than combining with them. This is most useful for helper functions that define both data and aesthetics and shouldn't inherit behaviour from the default plot specification, e.g. borders .
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>).
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.

Examples

```
## geom_nodetext_repel example

if (require(network) && require(sna)) {
  n <- network(rgraph(10, tprob = 0.2), directed = FALSE)
  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
    geom_edges(colour = "steelblue") +
    geom_nodetext_repel(aes(label = paste("node", vertex.names)),
      box.padding = unit(1, "lines")
    ) +
    geom_nodes(colour = "steelblue", size = 3) +
    theme_blank()
}

## geom_nodelabel_repel examples

if (require(network) && require(sna)) {
  data(flo, package = "network")
  n <- network(flo, directed = FALSE)

  ggplot(n, aes(x, y, xend = xend, yend = yend)) +
```

```

    geom_edges(colour = "steelblue") +
    geom_nodelabel_repel(aes(label = vertex.names),
      box.padding = unit(1, "lines")
    ) +
    geom_nodes(colour = "steelblue", size = 3) +
    theme_blank()

# label only a subset of all nodes
n %>% "degree" <- degree(n)
low_degree <- function(x) {
  x[ x$degree < median(x$degree), ]
}
ggplot(n, aes(x, y, xend = xend, yend = yend)) +
  geom_edges(colour = "steelblue") +
  geom_nodelabel_repel(aes(label = vertex.names),
    box.padding = unit(1.5, "lines"),
    data = low_degree,
    segment.colour = "tomato",
    colour = "white", fill = "tomato"
  ) +
  geom_nodes(aes(size = degree), colour = "steelblue") +
  theme_blank()
}

```

ggnetwork

Fortify network objects.

Description

A wrapper for the [fortify.network](#) and [fortify.igraph](#) functions that will also try to coerce matrices and data frames to network objects.

Usage

```
ggnetwork(x, ...)
```

Arguments

- x an object of class [network](#) or [igraph](#), or any object that can be coerced to that class, such as an adjacency or incidence matrix, or an edge list: see [edgeset.constructors](#) and [network](#) for details.
- ... arguments passed to the [fortify.network](#) or [fortify.igraph](#) functions.

scale_safely	<i>Rescale x to (0, 1), except if x is constant</i>
--------------	---

Description

Discussed in PR #32: <https://github.com/briatte/ggnetwork/pull/32>

Usage

```
scale_safely(x, scale = diff(range(x)))
```

Arguments

x	a vector to rescale
scale	the scale on which to rescale the vector

Value

The rescaled vector, coerced to a vector if necessary. If the original vector was constant, all of its values are replaced by 0.5.

Author(s)

Kipp Johnson

theme_blank	<i>Blank ggplot2 theme, suited for plotting networks.</i>
-------------	---

Description

A ggplot2 theme without lines, borders, axis text or titles, suited for plotting networks.

Usage

```
theme_blank(base_size = 12, base_family = "", ...)
```

Arguments

base_size	base font size
base_family	base font family
...	other theme arguments

theme_facet	<i>Blank ggplot2 theme with a panel border.</i>
-------------	---

Description

A variation of [theme_blank](#) that adds a panel border to the plot, which is often suitable for plotting faceted networks.

Usage

```
theme_facet(base_size = 12, base_family = "", ...)
```

Arguments

base_size	base font size
base_family	base font family
...	other theme arguments

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