

# Package ‘textplot’

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**Type** Package

**Title** Text Plots

**Version** 0.2.3

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## Description

Visualise complex relations in texts. This is done by providing functionalities for displaying text co-occurrence networks, text correlation networks, dependency relationships as well as text clustering and semantic text 'embeddings'.

Feel free to join the effort of providing interesting text visualisations. Do note that to avoid the risk of CRAN archival that you should put packages as much as possible in Suggests.

Package 'ggalt' is available in the CRAN archive: <<https://cran.r-project.org/package=ggalt>>.

**License** GPL-2

**URL** <https://github.com/bnosac/textplot>

**LazyData** true

**Imports** utils, methods, lattice, stats, Matrix, graphics, data.table  
(>= 1.9.6)

**Suggests** knitr, udpipe, BTM, igraph, graph, Rgraphviz, qgraph, glasso, ggplot2, ggraph, ggforce, concaveman, ggrepel, ggalt, uwot

**VignetteBuilder** knitr

**RoxygenNote** 7.3.2

**NeedsCompilation** no

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Ingo Feinerer and Kurt Hornik [ctb, cph] (partial code in R/textplot\_corlines.R adapted from the tm package version 0.4 which is GPL-2 licensed)

**Repository** CRAN

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example_btm	<i>Example Biterm Topic Model</i>
-------------	-----------------------------------

---

### Description

The object is a BTM topic model created with the BTM package. It was created on a subset of all CRAN packages, namely package which are part of the NaturalLanguageProcessing and Machine-Learning task views.

Timepoint of creation was 2020-04-10.

### Examples

```
library(BTM)
data(example_btm, package = 'textplot')
example_btm
str(example_btm)
```

---

example_embedding	<i>Example word embedding matrix</i>
-------------------	--------------------------------------

---

### Description

A matrix with 25-dimensional word embeddings, constructed upon the be\_parliament\_2020 dataset in the doc2vec R package

### Examples

```
data(example_embedding, package = 'textplot')
head(example_embedding)
```

---

`example_embedding_clusters`*Example words emitted in a ETM text clustering model*

---

**Description**

Example words emitted in a ETM text clustering model constructed upon the be\_parliament\_2020 dataset in the doc2vec R package

**Examples**

```
data(example_embedding_clusters, package = 'textplot')
head(example_embedding_clusters)
terminology <- split(example_embedding_clusters, example_embedding_clusters$cluster)
lapply(terminology, head, n = 5)
```

---

`example_udpipe`*Example annotation of text using udpipe*

---

**Description**

The object is a data.frame of the annotation of the text: "UDPipe provides tokenization, tagging, lemmatization and dependency parsing of raw text"

**Examples**

```
data(example_udpipe)
str(example_udpipe)
```

---

`plot.BTM`*Plot function for a BTM object*

---

**Description**

Plot biterns as a clustered graph. The graph is constructed by assigning each word to a topic and within a topic of words bitern frequencies are shown.

**Usage**

```
## S3 method for class 'BTM'
plot(
  x,
  biterns = terms(x, type = "biterns")$biterns,
  top_n = 7,
  which,
  labels = seq_len(x$K),
  title = "Bitern topic model",
  subtitle = list(),
  ...
)
```

**Arguments**

x	an object of class <a href="#">BTM</a> with a bitern topic model
biterns	a data.frame with columns term1, term2, topic with all biterns and the topic these were assigned to. Defaults to the biterns used to construct the model.
top_n	integer indicating to limit to displaying the top_n terms for each topic. Defaults to 7.
which	integer vector indicating to display only these topics. See the examples.
labels	a character vector of names. Should be of the same length as the number of topics in the data.
title	character string with the title to use in the plot
subtitle	character string with the subtitle to use in the plot
...	not used

**Value**

an object of class ggplot

**See Also**

[BTM](#), [textplot\\_biternclusters.default](#)

**Examples**

```
library(igraph)
library(BTM)
library(ggraph)
library(ggforce)
library(concaveman)
data(example_btm, package = 'textplot')

model <- example_btm

plot(model, title = "BTM model", top_n = 3)
plot(model, title = "BTM model", top_n = 3, labels = 1:model$K)
```

```

plot(model, title = "BTM model", which = 7:15)
plot(model, title = "BTM model", subtitle = "First 5 topics",
      which = 1:5, top_n = 10)
plot(model, title = "Biterm topic model", subtitle = "First 8 topics",
      which = 1:8, top_n = 7)

topiclabels <- c("Garbage",
  "Data Mining", "Gradient descent", "API's",
  "Random Forests", "Stat models", "Text Mining / NLP",
  "GLM / GAM / Bayesian", "Machine learning", "Variable selection",
  "Regularisation techniques", "Optimisation", "Fuzzy logic",
  "Classification/Regression trees", "Text frequencies",
  "Neural / Deep learning", "Variable selection",
  "Text file handling", "Text matching", "Topic modelling")
plot(model, title = "Biterm topic model", subtitle = "some topics",
      top_n = 7,
      which = c(3, 4, 5, 6, 7, 9, 12, 16, 20),
      labels = topiclabels)

library(BTM)
library(data.table)
library(udpipe)
## Annotate text with parts of speech tags
data("brussels_reviews", package = "udpipe")
anno <- subset(brussels_reviews, language %in% "nl")
anno <- data.frame(doc_id = anno$id, text = anno$feedback, stringsAsFactors = FALSE)
anno <- udpipe(anno, "dutch", trace = 10)
## Get cooccurrences of nouns / adjectives and proper nouns
biterns <- as.data.table(anno)
biterns <- biterns[, cooccurrence(x = lemma,
                                relevant = upos %in% c("NOUN", "PROPN", "ADJ"),
                                skipgram = 2),
                  by = list(doc_id)]
## Build the BTM model
set.seed(123456)
x <- subset(anno, upos %in% c("NOUN", "PROPN", "ADJ"))
x <- x[, c("doc_id", "lemma")]
model <- BTM(x, k = 5, beta = 0.01, iter = 2000, background = TRUE,
            biterns = biterns, trace = 100)
plot(model)

```

---

textplot\_bar

*Barplot of a frequency table using lattice*


---

## Description

Barplot of a frequency table using lattice

**Usage**

```
textplot_bar(x, ...)

## Default S3 method:
textplot_bar(
  x,
  panel = "Effect",
  total = sum(x),
  top = 40,
  col.panel = "lightgrey",
  col.line = "lightblue",
  lwd = 3,
  cextext = 0.5,
  addpct = FALSE,
  cexpct = 0.75,
  textpos = 3,
  pctpos = 1,
  v = NULL,
  col.abline = "red",
  ...
)
```

**Arguments**

x	a table to plot or a data.frame with the first column the label and the second column the frequency
...	other arguments passed on to <code>lattice::dotplot</code>
panel	character string what to put into the panel
total	integer with the total. Defaults to <code>sum(x)</code> . Is used to plot the table counts as a percentage. In which case this is divided by the total.
top	integer indicating to plot only the first 'top' table elements. Defaults to 40.
col.panel	color of the panel. Defaults to <code>lightgrey</code> .
col.line	color of the line. Passed on to the <code>col</code> argument in <code>lattice::panel.lines</code>
lwd	width of the line. Passed on to the <code>lwd</code> argument in <code>lattice::panel.lines</code>
cextext	numeric with the cex of the text with the counts plotted. Passed on to <code>lattice::panel.text</code> .
addpct	logical indicating to add the percent with <code>lattice::panel.text</code>
cexpct	numeric with the cex of the text plotted when using <code>addpct</code> . Passed on to <code>lattice::panel.text</code> .
textpos	passed on to the <code>pos</code> argument of <code>panel.text</code> to indicate where to put the text of the frequencies
pctpos	passed on to the <code>pos</code> argument of <code>panel.text</code> to indicate where to put the text of the percentages
v	passed on to <code>lattice::panel.abline</code> to draw a vertical line
col.abline	passed on to <code>lattice::panel.abline</code> to draw a vertical line

**Value**

the result of a call to `lattice::dotplot`

**Examples**

```
data(brussels_listings, package = 'udpipe')
x <- table(brussels_listings$neighbourhood)
x <- sort(x)
textplot_bar(x,
  panel = "Locations", col.panel = "darkgrey", xlab = "Listings",
  cextext = 0.75, addpct = TRUE, cexpct = 0.5)

x <- sample(LETTERS, 1000, replace = TRUE)
textplot_bar(sort(table(x)), panel = "Frequencies", xlab = "Frequency",
  cextext = 0.75, main = "Freq stats")
textplot_bar(sort(table(x)), panel = "Frequencies", addpct = TRUE, top = 15)

## x can also be a data.frame where the first column
## is the label and the second column the frequency
x <- data.frame(l = LETTERS, amount = rnorm(26))
textplot_bar(x)
textplot_bar(x, v = 0)
```

---

textplot\_bitermclusters

*Plot biterm cluster groups*

---

**Description**

Plot biterms as a clustered graph. The graph is constructed by assigning each word to a topic and within a topic of words biterm frequencies are shown.

**Usage**

```
textplot_bitermclusters(x, ...)

## Default S3 method:
textplot_bitermclusters(
  x,
  biterms,
  which,
  labels = seq_len(length(table(biterms$topic))),
  title = "Biterm topic model",
  subtitle = list(),
  ...
)
```

**Arguments**

<code>x</code>	a list of data.frames, each containing the columns token and probability corresponding to how good a token is emitted by a topic. The list index is assumed to be the topic number
<code>...</code>	not used
<code>biterms</code>	a data.frame with columns term1, term2, topic with all biterms and the topic these were assigned to
<code>which</code>	integer vector indicating to display only these topics. See the examples.
<code>labels</code>	a character vector of names. Should be of the same length as the number of topics in the data.
<code>title</code>	character string with the title to use in the plot
<code>subtitle</code>	character string with the subtitle to use in the plot

**Value**

an object of class ggplot

**Examples**

```
library(igraph)
library(ggraph)
library(concaveman)
library(ggplot2)
library(BTM)
data(example_btm, package = 'textplot')
group_terms <- terms(example_btm, top_n = 3)
group_biterms <- example_btm$biterms$biterms

textplot_bitermclusters(x = group_terms, biterms = group_biterms)
textplot_bitermclusters(x = group_terms, biterms = group_biterms,
  title = "BTM model", subtitle = "Topics 7-15",
  which = 7:15, labels = seq_len(example_btm$K))

group_terms <- terms(example_btm, top_n = 10)
textplot_bitermclusters(x = group_terms, biterms = group_biterms,
  title = "BTM model", subtitle = "Topics 1-5",
  which = 1:5, labels = seq_len(example_btm$K))

group_terms <- terms(example_btm, top_n = 7)
topiclabels <- c("Garbage",
  "Data Mining", "Gradient descent", "API's",
  "Random Forests", "Stat models", "Text Mining / NLP",
  "GLM / GAM / Bayesian", "Machine learning", "Variable selection",
  "Regularisation techniques", "Optimisation", "Fuzzy logic",
  "Classification/Regression trees", "Text frequencies",
  "Neural / Deep learning", "Variable selection",
  "Text file handling", "Text matching", "Topic modelling")
textplot_bitermclusters(x = group_terms, biterms = group_biterms,
```

```

title = "Biterm topic model", subtitle = "some topics",
which = c(3, 4, 5, 6, 7, 9, 12, 16, 20),
labels = topiclabels)

```

---

textplot\_cooccurrence *Plot term cooccurrences as a network*

---

## Description

Plot term cooccurrences in a graph structure

## Usage

```

textplot_cooccurrence(x, ...)

## Default S3 method:
textplot_cooccurrence(
  x,
  terms,
  top_n = 50,
  title = "Term cooccurrences",
  subtitle = list(),
  vertex_color = "darkgreen",
  edge_color = "grey",
  base_family = "",
  ...
)

```

## Arguments

x	a data.frame with columns term1, term2 and cooc indicating how many times 2 terms are occurring together
...	other parameters passed on to ggraph::geom_node_text
terms	a character vector with terms to only plot. Prevails compared to using top_n
top_n	integer indicating to show only the top n occurrences as in head(x, n = top_n)
title	character string with the title to use in the plot
subtitle	character string with the subtitle to use in the plot
vertex_color	character with the color of the label of each node. Defaults to darkgreen.
edge_color	character with the color of the edges between the nodes. Defaults to grey.
base_family	character passed on to theme_void setting the base font family

## Value

an object of class ggplot

**Examples**

```

library(udpipe)
library(igraph)
library(ggraph)
library(ggplot2)
data(brussels_reviews_anno, package = 'udpipe')
x <- subset(brussels_reviews_anno, xpos %in% "JJ" & language %in% "fr")
x <- cooccurrence(x, group = "doc_id", term = "lemma")

textplot_cooccurrence(x, top_n = 25, subtitle = "showing only top 25")
textplot_cooccurrence(x, top_n = 25, title = "Adjectives",
                      vertex_color = "orange", edge_color = "black",
                      fontface = "bold")

```

---

textplot\_correlation\_glasso

*Plot sparse term correlations as a graph structure*


---

**Description**

Plot sparse term correlations as a graph structure. Uses the glasso procedure (`glasso::glassopath`) to reduce the correlation matrix to retain only the relevant correlations and next visualises these sparse correlations.

**Usage**

```
textplot_correlation_glasso(x, ...)
```

```

## Default S3 method:
textplot_correlation_glasso(
  x,
  n = 1000,
  exclude_zero = TRUE,
  label.cex = 1,
  node.width = 0.5,
  ...
)

```

**Arguments**

x	a correlation matrix
...	further arguments passed on to <code>qgraph::qgraph</code> , except layout which is set to 'spring', labels (taken from the colnames of x), and borders which is set to FALSE.
n	sample size used in computing the sparse correlation matrix. Defaults to 1000.

exclude\_zero    logical indicating to exclude zero-correlations from the graph  
 label.cex        passed on to qgraph::qgraph  
 node.width      passed on to qgraph::qgraph

**Value**

an object of class ggplot

**Examples**

```

library(udpipe)
library(qgraph)
library(glasso)
data(brussels_reviews_anno, package = 'udpipe')
x <- subset(brussels_reviews_anno, xpos %in% "NN" & language %in% "fr" & !is.na(lemma))
x <- document_term_frequencies(x, document = "doc_id", term = "lemma")
dtm <- document_term_matrix(x)
dtm <- dtm_remove_lowfreq(dtm, maxterms = 60)

m <- dtm_cor(dtm)
textplot_correlation_glasso(m, exclude_zero = TRUE)

textplot_correlation_glasso(m, exclude_zero = FALSE)

```

---

textplot\_correlation\_lines

*Document/Term Correlation Plot*

---

**Description**

Plots the highest occurring correlations among terms.

This is done by plotting the terms into nodes and the correlations between the terms as lines between the nodes. Lines of the edges are proportional to the correlation height. This uses the plot function for graphNEL objects (using the Rgraphviz package)

**Usage**

```
textplot_correlation_lines(x, ...)
```

```
## Default S3 method:
```

```

textplot_correlation_lines(
  x,
  terms = colnames(x),
  threshold = 0.05,
  top_n,

```

```

  attrs = textplot_correlation_lines_attrs(),
  terms_highlight,
  label = FALSE,
  cex.label = 1,
  col.highlight = "red",
  lwd = 1,
  ...
)

```

### Arguments

<code>x</code>	a document-term matrix of class <code>dgCMatrix</code>
<code>...</code>	other arguments passed on to <code>plot</code>
<code>terms</code>	a character vector with terms present in the columns of <code>x</code> indicating terms to focus on
<code>threshold</code>	a threshold to show only correlations between the terms with absolute values above this threshold. Defaults to 0.05.
<code>top_n</code>	an integer indicating to show only the top <code>top_n</code> correlations. This can be set to plot only the top correlations. E.g. set it to 20 to show only the top 20 correlations with the highest absolute value.
<code>attrs</code>	a list of attributes with graph visualisation elements passed on to the <code>plot</code> function of an object of class <code>graphNEL</code> . Defaults to <code>textplot_correlation_lines_attrs</code> .
<code>terms_highlight</code>	a vector of character terms to highlight or a vector of numeric values in the 0-1 range indicating how much (in percentage) to increase the node font size. See the examples.
<code>label</code>	logical indicating to draw the label with the correlation size between the nodes
<code>cex.label</code>	cex of the label of the correlation size
<code>col.highlight</code>	color to use for highlighted terms specified in <code>terms_highlight</code> . Defaults to red.
<code>lwd</code>	numeric value - graphical parameter used to increase the edge thickness which indicates the correlation strength. Defaults to 1.

### Value

invisibly the plot

### Examples

```

## Construct document/frequency/matrix
library(graph)
library(Rgraphviz)
library(udpipe)
data(brussels_reviews_anno, package = 'udpipe')
exclude <- c(32337682L, 27210436L, 26820445L, 37658826L, 33661134L, 48756422L,
            23454554L, 30461127L, 23292176L, 32850277L, 30566303L, 21595142L,
            20441279L, 38097066L, 28651065L, 29011387L, 37316020L, 22135291L,

```

```

40169379L, 38627667L, 29470172L, 24071827L, 40478869L, 36825304L,
21597085L, 21427658L, 7890178L, 32322472L, 39874379L, 32581310L,
43865675L, 31586937L, 32454912L, 34861703L, 31403168L, 35997324L,
29002317L, 33546304L, 47677695L)
dtm <- brussels_reviews_anno
dtm <- subset(dtm, !doc_id %in% exclude)
dtm <- subset(dtm, xpos %in% c("NN") & language == "nl" & !is.na(lemma))
dtm <- document_term_frequencies(dtm, document = "doc_id", term = "lemma")
dtm <- document_term_matrix(dtm)
dtm <- dtm_remove_lowfreq(dtm, minfreq = 5)
dtm <- dtm_remove_tfidf(dtm, top = 500)

## Plot top 20 correlations, having at least a correlation of 0.01
textplot_correlation_lines(dtm, top_n = 25, threshold = 0.01)

## Plot top 20 correlations
textplot_correlation_lines(dtm, top_n = 25, label = TRUE, lwd = 5)

## Plot top 20 correlations and highlight some terms
textplot_correlation_lines(dtm, top_n = 25, label = TRUE, lwd = 5,
                           terms_highlight = c("prijs", "privacy"),
                           main = "Top correlations in topic xyz")

## Plot top 20 correlations and highlight + increase some terms
textplot_correlation_lines(dtm, top_n = 25, label = TRUE, lwd=5,
                           terms_highlight = c(prijs = 0.8, privacy = 0.1),
                           col.highlight = "red")

## Plot correlations between specific terms
w <- dtm_colsums(dtm)
w <- head(sort(w, decreasing = TRUE), 100)
textplot_correlation_lines(dtm, terms = names(w), top_n = 20, label = TRUE)

attrs <- textplot_correlation_lines_attrs()
attrs$node$shape <- "rectangle"
attrs$edge$color <- "steelblue"
textplot_correlation_lines(dtm, top_n = 20, label = TRUE,
                           attrs = attrs)

```

---

textplot\_correlation\_lines\_attrs

*Document/Term Correlation Plot graphical attributes*

---

## Description

Document/Term Correlation Plot graphical attributes

**Usage**

```
textplot_correlation_lines_attrs(fontsize = 25)
```

**Arguments**

fontsize            size of the font. Defaults to 25

**Value**

a list with graph visualisation elements used by [textplot\\_correlation\\_lines](#)

**Examples**

```
textplot_correlation_lines_attrs()
```

---

```
textplot_dependencyparser
```

*Plot output of a dependency parser*

---

**Description**

Plot output of a dependency parser. This plot takes one sentence and shows for the sentence, the words, the parts of speech tag and the dependency relationship between the words.

**Usage**

```
textplot_dependencyparser(x, ...)
```

```
## Default S3 method:
```

```
textplot_dependencyparser(
  x,
  title = "Dependency Parser",
  subtitle = "tokenisation, parts of speech tagging & dependency relations",
  vertex_color = "darkgreen",
  edge_color = "red",
  size = 3,
  base_family = "",
  layout = "linear",
  ...
)
```

**Arguments**

x	a data.frame as returned by a call to <a href="#">udpipe</a> containing 1 sentence
...	not used yet
title	character string with the title to use in the plot
subtitle	character string with the title to use in the plot
vertex_color	character with the color of the label of each node. Defaults to darkgreen.
edge_color	character with the color of the edges between the nodes. Defaults to red.
size	size of the labels in the plot. Defaults to 3.
base_family	character passed on to theme_void setting the base font family
layout	the type of layout, defaults to 'linear', passed on to <a href="#">ggraph</a>

**Value**

an object of class `ggplot`

**See Also**

[udpipe](#)

**Examples**

```
library(udpipe)
library(ggraph)
library(ggplot2)
library(igraph)

x <- udpipe("The economy is weak but the outlook is bright", "english")
textplot_dependencyparser(x)

x <- udpipe("His speech about marshmallows in New York is utter bullshit", "english")
textplot_dependencyparser(x, size = 4)

x <- udpipe("UDPipe provides tokenization, tagging, lemmatization and
            dependency parsing of raw text", "english")
textplot_dependencyparser(x, size = 4)

data("example_udpipe", package = "textplot")
textplot_dependencyparser(example_udpipe, size = 4)
```

---

textplot\_embedding\_2d *Plot word embeddings in 2D*

---

### Description

This plot displays words in 2 dimensions, optionally grouped by cluster.

This allows to visualise embeddings which are reduced by dimensionality reduction techniques like UMAP, t-SNE, PCA or similar techniques. It allows to highlight the words by groups and is a good way to visualise a small sets of word or topic embeddings.

### Usage

```
textplot_embedding_2d(x, ...)  
  
## Default S3 method:  
textplot_embedding_2d(  
  x,  
  title = "Embedding plot in 2D",  
  subtitle = list(),  
  encircle = FALSE,  
  points = FALSE,  
  alpha = 0.4,  
  ...  
)
```

### Arguments

x	a data.frame with columns 'x', 'y', 'term' and optionally 'group' (color by group), 'weight' (size of the text / point shown), 'type' (pch used for the type of point)
...	not used yet
title	character string with the title to use in the plot
subtitle	character string with the subtitle to use in the plot
encircle	logical indicating to encircle all the points belonging to a group using geom_encircle from the ggalt package
points	logical indicating to add points. Defaults to FALSE.
alpha	transparency level passed on to geom_encircle from the ggalt package in case encircle is set to TRUE

### Value

an object of class ggplot

**Examples**

```
library(ggplot2)
library(ggrepel)
library(ggalt)
##
## Generate some fake embeddings
## probably you want to use word2vec::word2vec(...) + uwot::umap(...)
embeddings <- matrix(runif(26 * 2), nrow = 26, ncol = 2, dimnames = list(letters))
x <- data.frame(term = rownames(embeddings), x = embeddings[, 1], y = embeddings[, 2])

## 2D plot
textplot_embedding_2d(x)

## 2D plot with groups
x$group <- sample(c("clustera", "clusterb", "clusterc"), size = 26, replace = TRUE)
textplot_embedding_2d(x)

## 2D plot with groups and weights for each word
x$weight <- runif(nrow(x))
textplot_embedding_2d(x)
textplot_embedding_2d(x, points = TRUE)

## 2D plot with groups and weights for each word and different types of points
x$type <- sample(c("word", "center"), size = 26, replace = TRUE)
x$type <- factor(x$type, levels = c("word", "center"))
textplot_embedding_2d(x, points = TRUE)
textplot_embedding_2d(x, title = "Embedding plot in 2D", subtitle = "example")

## Encircle the words belonging to each group
textplot_embedding_2d(x, title = "Embedding plot in 2D", subtitle = "example",
                      encircle = TRUE, alpha = 0.2)
```

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