

Package ‘rainette’

January 20, 2021

Type Package

Title The Reinert Method for Textual Data Clustering

Version 0.1.2

Date 2021-01-19

Maintainer Julien Barnier <julien.barnier@cnrs.fr>

Description An R implementation of the Reinert text clustering method. For more details about the algorithm see the included vignettes or Reinert (1990) <doi:10.1177/075910639002600103>.

License GPL (>= 3)

VignetteBuilder knitr

URL <https://juba.github.io/rainette/>

BugReports <https://github.com/juba/rainette/issues>

Encoding UTF-8

Imports dplyr (>= 0.8.3), tidyr, purrr, ggplot2, stringr, quanteda (>= 1.5), RSpectra, dendextend, ggwordcloud, gridExtra, rlang, RColorBrewer, shiny, miniUI, formatR, highr, future, future.apply, progressr, Rcpp (>= 1.0.3)

Suggests testthat, knitr, rmarkdown, covr, tm, FNN, quanteda.textmodels

RoxygenNote 7.1.1

LinkingTo Rcpp

NeedsCompilation yes

Author Julien Barnier [aut, cre],
Florian Privé [ctb]

Repository CRAN

Date/Publication 2021-01-20 12:30:02 UTC

R topics documented:

cluster_tab	2
compute_uc	3
cutree	3
cutree_rainette	4
cutree_rainette2	4
import_corpus_iramuteq	5
order_docs	5
rainette	6
rainette2	7
rainette2_complete_groups	9
rainette2_explor	10
rainette2_plot	10
rainette_explor	11
rainette_plot	12
rainette_stats	13
select_features	14
split_segments	15
switch_docs	16
Index	18

cluster_tab	<i>Split a dtm into two clusters with reinert algorithm</i>
-------------	---

Description

Split a dtm into two clusters with reinert algorithm

Usage

```
cluster_tab(dtm, cc_test = 0.3, tsj = 3)
```

Arguments

dtm	to be split, passed by rainette
cc_test	maximum contingency coefficient value for the feature to be kept in both groups.
tsj	minimum feature frequency in the dtm

Details

Internal function, not to be used directly

Value

An object of class hclust and rainette

compute_uc	<i>Merges uces into uc according to minimum uc size</i>
------------	---

Description

rainette_uc_index docvar

Usage

```
compute_uc(dtm, min_uc_size = 10)
```

Arguments

dtm	dtm of uces, with a rainette_uce_id docvar
min_uc_size	minimum number of forms by uc

Details

Internal function, not to be used directly

Value

the original dtm with a new rainette_uc_id docvar.

cutree	<i>Cut a tree into groups</i>
--------	-------------------------------

Description

Cut a tree into groups

Usage

```
cutree(tree, ...)
```

Arguments

tree	the hclust tree object to be cut
...	arguments passed to other methods

Details

If tree is of class rainette, invokes `cutree_rainette()`. Otherwise, just run `stats::cutree()`.

Value

A vector with group membership.

cutree_rainette *Cut a rainette result tree into groups of documents*

Description

Cut a rainette result tree into groups of documents

Usage

```
cutree_rainette(hres, k = NULL, h = NULL, ...)
```

Arguments

hres	the rainette result object to be cut
k	the desired number of groups
h	unsupported
...	arguments passed to other methods

Value

A vector with group membership.

cutree_rainette2 *Cut a rainette2 result object into groups of documents*

Description

Cut a rainette2 result object into groups of documents

Usage

```
cutree_rainette2(res, k, criterion = c("chi2", "n"), ...)
```

Arguments

res	the rainette2 result object to be cut
k	the desired number of groups
criterion	criterion to use to choose the best partition. chi2 means the partition with the maximum sum of chi2, n the partition with the maximum size.
...	arguments passed to other methods

Value

A vector with group membership.

See Also

[rainette2_complete_groups\(\)](#)

import_corpus_iramuteq

Import a corpus in Iramuteq format

Description

Import a corpus in Iramuteq format

Usage

```
import_corpus_iramuteq(f, id_var = NULL, thematics = c("remove", "split"), ...)
```

Arguments

f	a file name or a connection
id_var	name of metadata variable to be used as documents id
thematics	if "remove", thematics lines are removed. If "split", texts as splitted at each thematic, and metadata duplicated accordingly
...	arguments passed to file if f is a file name.

Details

A description of the Iramuteq corpus format can be found here : <http://www.iramuteq.org/documentation/html/2-2-2-les-regles-de-formatages>

Value

A quanteda corpus object. Note that metadata variables in docvars are all imported as characters.

order_docs

return documents indices ordered by CA first axis coordinates

Description

return documents indices ordered by CA first axis coordinates

Usage

```
order_docs(m)
```

Arguments

`m` dtm on which to compute the CA and order documents, converted to an integer matrix.

Details

Internal function, not to be used directly

Value

ordered list of document indices

rainette *Corpus clustering based on the Reinert method - Simple clustering*

Description

Corpus clustering based on the Reinert method - Simple clustering

Usage

```
rainette(
  dtm,
  k = 10,
  min_uc_size = 10,
  min_split_members = 5,
  cc_test = 0.3,
  tsj = 3,
  min_members
)
```

Arguments

`dtm` quanteda dfm object of documents to cluster, usually the result of `split_segments()`

`k` maximum number of clusters to compute

`min_uc_size` minimum number of forms by document

`min_split_members` don't try to split groups with fewer members

`cc_test` contingency coefficient value for feature selection

`tsj` minimum frequency value for feature selection

`min_members` deprecated, use `min_split_members` instead

Details

See the references for original articles on the method. Computations and results may differ quite a bit, see the package vignettes for more details.

The dtm object is automatically converted to boolean.

Value

The result is a list of both class `hclust` and `rainette`. Besides the elements of an `hclust` object, two more results are available :

- `uce_groups` give the group of each document for each `k`
- `group` give the group of each document for the maximum value of `k` available

References

- Reinert M, Une méthode de classification descendante hiérarchique : application à l'analyse lexicale par contexte, Cahiers de l'analyse des données, Volume 8, Numéro 2, 1983. http://www.numdam.org/item/?id=CAD_1983__8_2_187_0
- Reinert M., Alceste une méthodologie d'analyse des données textuelles et une application: Aurelia De Gerard De Nerval, Bulletin de Méthodologie Sociologique, Volume 26, Numéro 1, 1990. doi: [10.1177/075910639002600103](https://doi.org/10.1177/075910639002600103)

See Also

[split_segments\(\)](#), [rainette2\(\)](#), [cutree_rainette\(\)](#), [rainette_plot\(\)](#), [rainette_explor\(\)](#)

Examples

```
require(quanteda)
corpus <- data_corpus_inaugural
corpus <- head(corpus, n = 10)
corpus <- split_segments(corpus)
dtm <- dfm(corpus, remove = stopwords("en"), tolower = TRUE, remove_punct = TRUE)
dtm <- dfm_wordstem(dtm, language = "english")
dtm <- dfm_trim(dtm, min_termfreq = 3)
res <- rainette(dtm, k = 3)
```

rainette2

Corpus clustering based on the Reinert method - Double clustering

Description

Corpus clustering based on the Reinert method - Double clustering

Usage

```
rainette2(
  x,
  y = NULL,
  max_k = 5,
  uc_size1 = 10,
```

```

uc_size2 = 15,
min_members = 10,
min_chi2 = 3.84,
...
)

```

Arguments

x	either a quanteda dfm object or the result of <code>rainette()</code>
y	if x is a <code>rainette()</code> result, this must be another <code>rainette()</code> result from same dfm but with different uc size.
max_k	maximum number of clusters to compute
uc_size1	if x is a dfm, minimum uc size for first clustering
uc_size2	if x is a dfm, minimum uc size for second clustering
min_members	minimum members of each cluster
min_chi2	minimum chi2 for each cluster
...	if x is a dfm object, parameters passed to <code>rainette()</code> for both simple clusterings

Details

You can pass a quanteda dfm as x object, the function then performs two simple clustering with varying minimum uc size, and then proceed to find optimal partitions based on the results of both clusterings.

If both clusterings have already been computed, you can pass them as x and y arguments and the function will only look for optimal partitions.

For more details on optimal partitions search algorithm, please see package vignettes.

Value

A tibble with optimal partitions found for each available value of k as rows, and the following columns :

- clusters list of the crossed original clusters used in the partition
- k the number of clusters
- chi2 sum of the chi2 value of each cluster
- n sum of the size of each cluster
- groups group membership of each document for this partition (NA if not assigned)

References

- Reinert M, Une méthode de classification descendante hiérarchique : application à l'analyse lexicale par contexte, Cahiers de l'analyse des données, Volume 8, Numéro 2, 1983. http://www.numdam.org/item/?id=CAD_1983__8_2_187_0
- Reinert M., Alceste une méthodologie d'analyse des données textuelles et une application: Aurelia De Gerard De Nerval, Bulletin de Méthodologie Sociologique, Volume 26, Numéro 1, 1990. doi: [10.1177/075910639002600103](https://doi.org/10.1177/075910639002600103)

See Also

[rainette\(\)](#), [cutree_rainette2\(\)](#), [rainette2_plot\(\)](#), [rainette2_explor\(\)](#)

Examples

```
require(quanteda)
mini_corpus <- head(data_corpus_inaugural, n = 2)
mini_corpus <- split_segments(mini_corpus, 5)
dtm <- dfm(mini_corpus, remove = stopwords("en"), tolower = TRUE, remove_punct = TRUE)
dtm <- dfm_wordstem(dtm, language = "english")
dtm <- dfm_trim(dtm, min_termfreq = 3)

res1 <- rainette(dtm, k = 5, min_uc_size = 2, min_split_members = 2)
res2 <- rainette(dtm, k = 5, min_uc_size = 3, min_split_members = 2)

res <- rainette2(res1, res2, min_members = 2)
```

`rainette2_complete_groups`

Complete groups membership with knn classification

Description

Starting with groups membership computed from a `rainette2` clustering, every document not assigned to a cluster is reassigned using a k-nearest neighbour classification.

Usage

```
rainette2_complete_groups(dfm, groups, k = 1, ...)
```

Arguments

<code>dfm</code>	dfm object used for <code>rainette2</code> clustering.
<code>groups</code>	group membership computed by <code>cutree</code> on <code>rainette2</code> result.
<code>k</code>	number of neighbours considered.
<code>...</code>	other arguments passed to <code>FNN::knn</code> .

Value

Completed group membership vector.

See Also

[cutree_rainette2\(\)](#), [FNN::knn\(\)](#)

<code>rainette2_explor</code>	<i>Shiny gadget for rainette2 clustering exploration</i>
-------------------------------	--

Description

Shiny gadget for rainette2 clustering exploration

Usage

```
rainette2_explor(res, dtm)
```

Arguments

<code>res</code>	result object of a rainette2 clustering
<code>dtm</code>	the dtm object used to compute the clustering

Value

No return value, called for side effects.

See Also

[rainette2_plot\(\)](#)

<code>rainette2_plot</code>	<i>Generate a clustering description plot from a rainette2 result</i>
-----------------------------	---

Description

Generate a clustering description plot from a rainette2 result

Usage

```
rainette2_plot(  
  res,  
  dtm,  
  k = NULL,  
  criterion = c("chi2", "n"),  
  complete_groups = FALSE,  
  type = c("bar", "cloud"),  
  n_terms = 15,  
  free_scales = FALSE,  
  measure = c("chi2", "lr"),  
  show_negative = TRUE,  
  text_size = 10  
)
```

Arguments

res	result object of a rainette2 clustering
dtm	the dfm object used to compute the clustering
k	number of groups. If NULL, use the biggest number possible
criterion	criterion to use to choose the best partition. chi2 means the partition with the maximum sum of chi2, n the partition with the maximum size.
complete_groups	if TRUE, documents with NA cluster are reaffected by k-means clustering initialised with current groups centers.
type	type of term plots : barplot or wordcloud
n_terms	number of terms to display in keyness plots
free_scales	if TRUE, all the keyness plots will have the same scale
measure	statistics to compute
show_negative	if TRUE, show negative keyness features
text_size	font size for barplots, max word size for wordclouds

Value

A gtable object.

See Also

[quanteda::textstat_keyness\(\)](#), [rainette2_explor\(\)](#), [rainette2_complete_groups\(\)](#)

rainette_explor	<i>Shiny gadget for rainette clustering exploration</i>
-----------------	---

Description

Shiny gadget for rainette clustering exploration

Usage

```
rainette_explor(res, dtm)
```

Arguments

res	result object of a rainette clustering
dtm	the dfm object used to compute the clustering

Value

No return value, called for side effects.

See Also

rainette_plot

Examples

```
## Not run:
library(quanteda)
corpus <- data_corpus_inaugural
corpus <- head(corpus, n = 10)
corpus <- split_segments(corpus)
dtm <- dfm(corpus, remove = stopwords("en"), tolower = TRUE, remove_punct = TRUE)
dtm <- dfm_trim(dtm, min_termfreq = 3)
res <- rainette(dtm, k = 3)
rainette_explor(dtm, res)

## End(Not run)
```

rainette_plot

Generate a clustering description plot from a rainette result

Description

Generate a clustering description plot from a rainette result

Usage

```
rainette_plot(
  res,
  dtm,
  k = NULL,
  type = c("bar", "cloud"),
  n_terms = 15,
  free_scales = FALSE,
  measure = c("chi2", "lr"),
  show_negative = TRUE,
  text_size = NULL
)
```

Arguments

res	result object of a rainette clustering
dtm	the dfm object used to compute the clustering
k	number of groups. If NULL, use the biggest number possible
type	type of term plots : barplot or wordcloud
n_terms	number of terms to display in keyness plots

free_scales if TRUE, all the keyness plots will have the same scale
measure statistics to compute
show_negative if TRUE, show negative keyness features
text_size font size for barplots, max word size for wordclouds

Value

A gtable object.

See Also

[quanteda::textstat_keyness\(\)](#), [rainette_explor\(\)](#), [rainette_stats\(\)](#)

Examples

```
library(quanteda)
corpus <- data_corpus_inaugural
corpus <- head(corpus, n = 10)
corpus <- split_segments(corpus)
dtm <- dfm(corpus, remove = stopwords("en"), tolower = TRUE, remove_punct = TRUE)
dtm <- dfm_trim(dtm, min_termfreq = 3)
res <- rainette(dtm, k = 3)
rainette_plot(res, dtm)
```

<code>rainette_stats</code>	<i>Generate cluster keyness statistics from a rainette result</i>
-----------------------------	---

Description

Generate cluster keyness statistics from a rainette result

Usage

```
rainette_stats(  
  groups,  
  dtm,  
  measure = c("chi2", "lr"),  
  n_terms = 15,  
  show_negative = TRUE,  
  max_p = 0.05  
)
```

Arguments

groups	groups membership computed by <code>cutree_rainette</code> or <code>cutree_rainette2</code>
dtm	the dtm object used to compute the clustering
measure	statistics to compute
n_terms	number of terms to display in keyness plots
show_negative	if TRUE, show negative keyness features
max_p	maximum keyness statistic p-value

Value

A list with, for each group, a data.frame of keyness statistics for the most specific `n_terms` features.

See Also

[quanteda::textstat_keyness\(\)](#), [rainette_explor\(\)](#), [rainette_plot\(\)](#)

Examples

```
library(quanteda)
corpus <- data_corpus_inaugural
corpus <- head(corpus, n = 10)
corpus <- split_segments(corpus)
dtm <- dfm(corpus, remove = stopwords("en"), tolower = TRUE, remove_punct = TRUE)
dtm <- dfm_trim(dtm, min_termfreq = 3)
res <- rainette(dtm, k = 3)
groups <- cutree_rainette(res, k = 3)
rainette_stats(groups, dtm)
```

select_features	<i>Remove features from dtm of each group base don cc_test and tsj</i>
-----------------	--

Description

Remove features from dtm of each group base don `cc_test` and `tsj`

Usage

```
select_features(m, indices1, indices2, cc_test = 0.3, tsj = 3)
```

Arguments

m	global dtm
indices1	indices of documents of group 1
indices2	indices of documents of group 2
cc_test	maximum contingency coefficient value for the feature to be kept in both groups.
tsj	minimum feature frequency in the dtm

Details

Internal function, not to be used directly

Value

a list of two character vectors : cols1 is the name of features to keep in group 1, cols2 the name of features to keep in group 2

split_segments	<i>Split a character string or corpus into segments</i>
----------------	---

Description

Split a character string or corpus into segments, taking into account punctuation where possible

Usage

```
split_segments(  
  obj,  
  segment_size = 40,  
  segment_size_window = NULL,  
  force_single_core = FALSE  
)  
  
## S3 method for class 'character'  
split_segments(  
  obj,  
  segment_size = 40,  
  segment_size_window = NULL,  
  force_single_core = FALSE  
)  
  
## S3 method for class 'Corpus'  
split_segments(  
  obj,  
  segment_size = 40,  
  segment_size_window = NULL,  
  force_single_core = FALSE  
)  
  
## S3 method for class 'corpus'  
split_segments(  
  obj,  
  segment_size = 40,  
  segment_size_window = NULL,  
  force_single_core = FALSE  
)
```

Arguments

obj character string, quanteda or tm corpus object
 segment_size segment size (in words)
 segment_size_window window around segment size to look for best splitting point
 force_single_core don't use multithreading even on large corpus

Details

By default, if the corpus is large (> 10 000 000 chars), multithreading is used for segments splitting.

Value

If obj is a tm or quanteda corpus object, the result is a quanteda corpus.

Examples

```
require(quanteda)
split_segments(data_corpus_inaugural)
```

 switch_docs

Switch documents between two groups to maximize chi-square value

Description

Switch documents between two groups to maximize chi-square value

Usage

```
switch_docs(m, indices, max_index, max_chisq)
```

Arguments

m original dtm
 indices documents indices ordered by first CA axis coordinates
 max_index document index where the split is maximum
 max_chisq maximum chi-square value

Details

Internal function, not to be used directly

Value

a list of two vectors `indices1` and `indices2`, which contain the documents indices of each group after documents switching, and a `chisq` value, the new corresponding chi-square value after switching

Index

cluster_tab, 2
compute_uc, 3
cutree, 3
cutree_rainette, 4
cutree_rainette(), 3, 7
cutree_rainette2, 4
cutree_rainette2(), 9

file, 5
FNN::knn(), 9

import_corpus_iramuteq, 5

order_docs, 5

quanteda::textstat_keyness(), 11, 13, 14

rainette, 6
rainette(), 8, 9
rainette2, 7
rainette2(), 7
rainette2_complete_groups, 9
rainette2_complete_groups(), 5, 11
rainette2_explor, 10
rainette2_explor(), 9, 11
rainette2_plot, 10
rainette2_plot(), 9, 10
rainette_explor, 11
rainette_explor(), 7, 13, 14
rainette_plot, 12
rainette_plot(), 7, 14
rainette_stats, 13
rainette_stats(), 13

select_features, 14
split_segments, 15
split_segments(), 6, 7
stats::cutree(), 3
switch_docs, 16