Package ‘tm’

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50 Exemplary News Articles from the Reuters-21578 Data Set of Topic acq

Description

This dataset holds 50 news articles with additional meta information from the Reuters-21578 data set. All documents belong to the topic acq dealing with corporate acquisitions.

Usage

data("acq")

Format

A VCorpus of 50 text documents.

Source

Reuters-21578 Text Categorization Collection Distribution 1.0 (XML format).

References


Examples

data("acq")
acq
content_transformer  Content Transformers

Description

Create content transformers, i.e., functions which modify the content of an R object.

Usage

content_transformer(FUN)

Arguments

FUN  a function.

Value

A function with two arguments:

x  an R object with implemented content getter (content) and setter (content<-) functions.

... arguments passed over to FUN.

See Also

tm_map for an interface to apply transformations to corpora.

Examples

data("crude")
crude[[1]]
(f <- content_transformer(function(x, pattern) gsub(pattern, "", x)))
tm_map(crude, f, "[:digit:]*")[[1]]

Corpus  Corpora

Description

Representing and computing on corpora.
Details

Corpora are collections of documents containing (natural language) text. In packages which employ the infrastructure provided by package \texttt{tm}, such corpora are represented via the virtual S3 class \texttt{Corpus}: such packages then provide S3 corpus classes extending the virtual base class (such as \texttt{VCorpus} provided by package \texttt{tm} itself).

All extension classes must provide accessors to extract subsets ([], individual documents ([[[]), and metadata (meta). The function \texttt{length} must return the number of documents, and \texttt{as.list} must construct a list holding the documents.

A corpus can have two types of metadata (accessible via \texttt{meta}). \textit{Corpus metadata} contains corpus specific metadata in form of tag-value pairs. \textit{Document level metadata} contains document specific metadata but is stored in the corpus as a data frame. Document level metadata is typically used for semantic reasons (e.g., classifications of documents form an own entity due to some high-level information like the range of possible values) or for performance reasons (single access instead of extracting metadata of each document).

The function \texttt{Corpus} is a convenience alias to \texttt{SimpleCorpus} or \texttt{VCorpus}, depending on the arguments provided.

See Also

\texttt{SimpleCorpus}, \texttt{VCorpus}, and \texttt{PCorpus} for the corpora classes provided by package \texttt{tm}.

\texttt{D Corpus} for a distributed corpus class provided by package \texttt{tm.plugin.dc}.

---

### crude

20 Exemplary News Articles from the Reuters-21578 Data Set of Topic **crude**

---

Description

This data set holds 20 news articles with additional meta information from the Reuters-21578 data set. All documents belong to the topic crude dealing with crude oil.

Usage

data("crude")

Format

A \texttt{VCorpus} of 20 text documents.

Source

Reuters-21578 Text Categorization Collection Distribution 1.0 (XML format).

References

DataframeSource

Description
Create a data frame source.

Usage
DataframeSource(x)

Arguments
x A data frame giving the texts and metadata.

Details
A data frame source interprets each row of the data frame x as a document. The first column must be named "doc_id" and contain a unique string identifier for each document. The second column must be named "text" and contain a UTF-8 encoded string representing the document's content. Optional additional columns are used as document level metadata.

Value
An object inheriting from DataframeSource, SimpleSource, and Source.

See Also
Source for basic information on the source infrastructure employed by package tm, and meta for types of metadata.
readtext for reading in a text in multiple formats suitable to be processed by DataframeSource.

Examples
docs <- data.frame(doc_id = c("doc_1", "doc_2"),
  text = c("This is a text.", "This another one.")
  dmeta1 = 1:2, dmeta2 = letters[1:2],
  stringsAsFactors = FALSE)
(ds <- DataframeSource(docs))
x <- Corpus(ds)
inspect(x)
meta(x)
DirSource

Directory Source

Description
Create a directory source.

Usage
DirSource(directory = ".", encoding = "", pattern = NULL, recursive = FALSE, ignore.case = FALSE, mode = "text")

Arguments
- directory: A character vector of full path names; the default corresponds to the working directory getwd().
- encoding: A character string describing the current encoding. It is passed to iconv to convert the input to UTF-8.
- pattern: An optional regular expression. Only file names which match the regular expression will be returned.
- recursive: Logical. Should the listing recurse into directories?
- ignore.case: Logical. Should pattern-matching be case-insensitive?
- mode: A character string specifying if and how files should be read in. Available modes are:
  - "": No read. In this case getElem and pGetElem only deliver URIs.
  - "binary": Files are read in binary raw mode (via readBin).
  - "text": Files are read as text (via readLines).

Details
A directory source acquires a list of files via dir and interprets each file as a document.

Value
An object inheriting from DirSource, SimpleSource, and Source.

See Also
- Source for basic information on the source infrastructure employed by package tm.
- Encoding and iconv on encodings.
Access Document IDs and Terms

Description

Accessing document IDs, terms, and their number of a term-document matrix or document-term matrix.

Usage

Docs(x)
nDocs(x)
nTerms(x)
Terms(x)

Arguments

x Either a TermDocumentMatrix or DocumentTermMatrix.

Value

For Docs and Terms, a character vector with document IDs and terms, respectively.

For nDocs and nTerms, an integer with the number of document IDs and terms, respectively.

Examples

data("crude")
tdm <- TermDocumentMatrix(crude)[1:10,1:20]
Docs(tdm)
nDocs(tdm)
nTerms(tdm)
Terms(tdm)
findAssocs  

Find Associations in a Term-Document Matrix

Description

Find associations in a document-term or term-document matrix.

Usage

## S3 method for class 'DocumentTermMatrix'
findAssocs(x, terms, corlimit)

## S3 method for class 'TermDocumentMatrix'
findAssocs(x, terms, corlimit)

Arguments

- **x**: A DocumentTermMatrix or a TermDocumentMatrix.
- **terms**: a character vector holding terms.
- **corlimit**: a numeric vector (of the same length as terms; recycled otherwise) for the (inclusive) lower correlation limits of each term in the range from zero to one.

Value

A named list. Each list component is named after a term in terms and contains a named numeric vector. Each vector holds matching terms from x and their rounded correlations satisfying the inclusive lower correlation limit of corlimit.

Examples

data("crude")

tdm <- TermDocumentMatrix(crude)

findAssocs(tdm, c("oil", "opec", "xyz"), c(0.7, 0.75, 0.1))

findFreqTerms  

Find Frequent Terms

Description

Find frequent terms in a document-term or term-document matrix.

Usage

findFreqTerms(x, lowfreq = 0, highfreq = Inf)
findMostFreqTerms

**Arguments**

x  A `DocumentTermMatrix` or `TermDocumentMatrix`.

lowfreq  A numeric for the lower frequency bound.

highfreq  A numeric for the upper frequency bound.

**Details**

This method works for all numeric weightings but is probably most meaningful for the standard term frequency (tf) weighting of x.

**Value**

A character vector of terms in x which occur more or equal often than lowfreq times and less or equal often than highfreq times.

**Examples**

```r
data("crude")
tdm <- TermDocumentMatrix(crude)
findFreqTerms(tdm, 2, 3)
```

---

findMostFreqTerms  Find Most Frequent Terms

**Description**

Find most frequent terms in a document-term or term-document matrix, or a vector of term frequencies.

**Usage**

```r
findMostFreqTerms(x, n = 6L, ...) 
## S3 method for class 'DocumentTermMatrix'
findMostFreqTerms(x, n = 6L, INDEX = NULL, ...) 
## S3 method for class 'TermDocumentMatrix'
findMostFreqTerms(x, n = 6L, INDEX = NULL, ...)
```

**Arguments**

x  A `DocumentTermMatrix` or `TermDocumentMatrix`, or a vector of term frequencies as obtained by `termFreq()`.

n  A single integer giving the maximal number of terms.

INDEX  an object specifying a grouping of documents for rollup, or NULL (default) in which case each document is considered individually.

...  arguments to be passed to or from methods.
Details

Only terms with positive frequencies are included in the results.

Value

For the document-term or term-document matrix methods, a list with the named frequencies of the up to n most frequent terms occurring in each document (group). Otherwise, a single such vector of most frequent terms.

Examples

data("crude")

## Term frequencies:
tf <- termFreq(crude[[14L]])
findMostFreqTerms(tf)

## Document-term matrices:
dtm <- DocumentTermMatrix(crude)
## Most frequent terms for each document:
findMostFreqTerms(dtm)
## Most frequent terms for the first 10 the second 10 documents, respectively:
findMostFreqTerms(dtm, INDEX = rep(1 : 2, each = 10L))

---

**foreign**

*Read Document-Term Matrices*

Description

Read document-term matrices stored in special file formats.

Usage

read_dtm_Blei_et_al(file, vocab = NULL)
read_dtm_MC(file, scalingtype = NULL)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>file</td>
<td>a character string with the name of the file to read.</td>
</tr>
<tr>
<td>vocab</td>
<td>a character string with the name of a vocabulary file (giving the terms, one per line), or NULL.</td>
</tr>
<tr>
<td>scalingtype</td>
<td>a character string specifying the type of scaling to be used, or NULL (default), in which case the scaling will be inferred from the names of the files with non-zero entries found (see Details).</td>
</tr>
</tbody>
</table>
getTokenizers

Details

read_dtm_Blei_et_al reads the (List of Lists type sparse matrix) format employed by the Latent Dirichlet Allocation and Correlated Topic Model C codes by Blei et al (http://www.cs.columbia.edu/~blei/).

MC is a toolkit for creating vector models from text documents (see https://www.cs.utexas.edu/users/dml/software/mc/). It employs a variant of Compressed Column Storage (CCS) sparse matrix format, writing data into several files with suitable names: e.g., a file with ‘_dim’ appended to the base file name stores the matrix dimensions. The non-zero entries are stored in a file the name of which indicates the scaling type used: e.g., ‘_tfx_nz’ indicates scaling by term frequency (‘t’), inverse document frequency (‘f’) and no normalization (‘x’). See ‘README’ in the MC sources for more information.

read_dtm_MC reads such sparse matrix information with argument file giving the path with the base file name.

Value

A document-term matrix.

See Also

read_stm_MC in package slam.

gTokenizers           Tokens

Description

Predefined tokenizers.

Usage

gTokenizers()

Value

A character vector with tokenizers provided by package tm.

See Also

Boost_tokenizer, MC_tokenizer, scan_tokenizer.

Examples

gTokenizers()
getTransformations

Transformations

Description
Predefined transformations (mappings) which can be used with tm_map.

Usage
getTransformations()

Value
A character vector with transformations provided by package tm.

See Also
removeNumbers, removePunctuation, removeWords, stemDocument, and stripWhitespace. content_transformer to create custom transformations.

Examples
getTransformations()

hpc

Parallelized ‘lapply’

Description
Parallelize applying a function over a list or vector according to the registered parallelization engine.

Usage
tm_parLapply(X, FUN, ...)
tm_parLapply_engine(new)

Arguments

X
A vector (atomic or list), or other objects suitable for the engine in use.

FUN
the function to be applied to each element of X.

...
optional arguments to FUN.

new
an object inheriting from class cluster as created by makeCluster() from package parallel, or a function with formals X, FUN and ..., or NULL corresponding to the default of using no parallelization engine.
Details

Parallelization can be employed to speed up some of the embarrassingly parallel computations performed in package `tm`, specifically `tm_index()`, `tm_map()` on a non-lazy-mapped `VCorpus`, and `TermDocumentMatrix()` on a `VCorpus` or `PCorpus`.

Functions `tm_parLapply()` and `tm_parLapply_engine()` can be used to customize parallelization according to the available resources.

`tm_parLapply_engine()` is used for getting (with no arguments) or setting (with argument `new`) the parallelization engine employed (see below for examples).

If an engine is set to an object inheriting from class `cluster`, `tm_parLapply()` calls `parLapply()` with this cluster and the given arguments. If set to a function, `tm_parLapply()` calls the function with the given arguments. Otherwise, it simply calls `lapply()`.

Hence, parallelization via `parLapply()` and a default cluster registered via `setDefaultCluster()` can be achieved via

```r
tm_parLapply_engine(function(X, FUN, ...)
    parallel::parLapply(NULL, X, FUN, ...))
```

or re-registering the cluster, say `cl`, using

```r
tm_parLapply_engine(cl)
```

(note that since R version 3.5.0, one can use `getDefaultCluster()` to get the registered default cluster). Using

```r
tm_parLapply_engine(function(X, FUN, ...)
    parallel::parLapplyLB(NULL, X, FUN, ...))
```

or

```r
tm_parLapply_engine(function(X, FUN, ...)
    parallel::parLapplyLB(cl, X, FUN, ...))
```

gives load-balancing parallelization with the registered default or given cluster, respectively. To achieve parallelization via forking (on Unix-alike platforms), one can use the above with clusters created by `makeForkCluster()`, or use

```r
tm_parLapply_engine(parallel::mclapply)
```

or

```r
tm_parLapply_engine(function(X, FUN, ...)
    parallel::mclapply(X, FUN, ..., mc.cores = n))
```

to use `mclapply()` with the default or given number `n` of cores.

Value

A list the length of `X`, with the result of applying `FUN` together with the `...` arguments to each element of `X`. 
inspect

See Also

`makeCluster()`, `parLapply()`, `parLapplyLB()`, and `mclapply()`.

---

**inspect**

**Inspect Objects**

**Description**

Inspect, i.e., display detailed information on a corpus, a term-document matrix, or a text document.

**Usage**

```r
## S3 method for class 'PCorpus'
inspect(x)
## S3 method for class 'VCorpus'
inspect(x)
## S3 method for class 'TermDocumentMatrix'
inspect(x)
## S3 method for class 'TextDocument'
inspect(x)
```

**Arguments**

- `x`  Either a corpus, a term-document matrix, or a text document.

**Examples**

```r
data("crude")
inspect(crude[1:3])
inspect(crude[[1]])
tdm <- TermDocumentMatrix(crude)[1:10, 1:10]
inspect(tdm)
```

---

**meta**

**Metadata Management**

**Description**

Accessing and modifying metadata of text documents and corpora.
Usage

```r
## S3 method for class 'PCorpus'
meta(x, tag = NULL, type = c("indexed", "corpus", "local"), ...)
## S3 replacement method for class 'PCorpus'
meta(x, tag, type = c("indexed", "corpus", "local"), ...) <- value
## S3 method for class 'SimpleCorpus'
meta(x, tag = NULL, type = c("indexed", "corpus"), ...)
## S3 replacement method for class 'SimpleCorpus'
meta(x, tag, type = c("indexed", "corpus"), ...) <- value
## S3 method for class 'VCorpus'
meta(x, tag = NULL, type = c("indexed", "corpus", "local"), ...)
## S3 replacement method for class 'VCorpus'
meta(x, tag, type = c("indexed", "corpus", "local"), ...) <- value
## S3 method for class 'PlainTextDocument'
meta(x, tag = NULL, ...)
## S3 replacement method for class 'PlainTextDocument'
meta(x, tag = NULL, ...) <- value
## S3 method for class 'XMLTextDocument'
meta(x, tag = NULL, ...)
## S3 replacement method for class 'XMLTextDocument'
meta(x, tag = NULL, ...) <- value
DublinCore(x, tag = NULL)
DublinCore(x, tag) <- value
```

Arguments

- `x` For DublinCore a `TextDocument`, and for meta a `TextDocument` or a `Corpus`.
- `tag` a character giving the name of a metadatum. No tag corresponds to all available metadata.
- `type` a character specifying the kind of corpus metadata (see Details).
- `...` Not used.
- `value` replacement value.

Details

A corpus has two types of metadata. **Corpus metadata** ("corpus") contains corpus specific metadata in form of tag-value pairs. **Document level metadata** ("indexed") contains document specific metadata but is stored in the corpus as a data frame. Document level metadata is typically used for semantic reasons (e.g., classifications of documents form an own entity due to some high-level information like the range of possible values) or for performance reasons (single access instead of extracting metadata of each document). The latter can be seen as a from of indexing, hence the name "indexed". **Document metadata** ("local") are tag-value pairs directly stored locally at the individual documents.

`DublinCore` is a convenience wrapper to access and modify the metadata of a text document using the Simple Dublin Core schema (supporting the 15 metadata elements from the Dublin Core Metadata Element Set [https://dublincore.org/documents/dces/]).
References

Dublin Core Metadata Initiative. https://dublincore.org/

See Also

meta for metadata in package NLP.

Examples

```r
data("crude")
meta(crude[[1]])
DublinCore(crude[[1]])
meta(crude[[1]], tag = "topics")
meta(crude[[1]], tag = "comment") <- "A short comment."
meta(crude[[1]], tag = "topics") <- NULL
DublinCore(crude[[1]], tag = "creator") <- "Anon Nymous"
DublinCore(crude[[1]], tag = "format") <- "XML"
DublinCore(crude[[1]])
meta(crude[[1]])
meta(crude)
meta(crude, type = "corpus")
meta(crude, "labels") <- 21:40
meta(crude)
```

---

**PCorpus**

**Permanent Corpora**

**Description**

Create permanent corpora.

**Usage**

```r
PCorpus(x, 
  readerControl = list(reader = reader(x), language = "en"),
  dbControl = list(dbName = "", dbType = "DB1"))
```

**Arguments**

- **x** A Source object.
- **readerControl** a named list of control parameters for reading in content from x.
- **reader** a function capable of reading in and processing the format delivered by x.
- **language** a character giving the language (preferably as IETF language tags, see language in package NLP). The default language is assumed to be English ("en").
dbControl 

a named list of control parameters for the underlying database storage provided by package `filehash`.

dbName 
a character giving the filename for the database.

dbType 
a character giving the database format (see `filehashOption` for possible database formats).

Details

A permanent corpus stores documents outside of R in a database. Since multiple PCorpus R objects with the same underlying database can exist simultaneously in memory, changes in one get propagated to all corresponding objects (in contrast to the default R semantics).

Value

An object inheriting from PCorpus and Corpus.

See Also

`Corpus` for basic information on the corpus infrastructure employed by package `tm`.

`VCorpus` provides an implementation with volatile storage semantics.

Examples

```r
  txt <- system.file("texts", "txt", package = "tm")
  ## Not run:
  PCorpus(DirSource(txt),
          dbControl = list(dbName = "pcorpus.db", dbType = "DB1"))
  ## End(Not run)
```

Description

Create plain text documents.

Usage

```r
PlainTextDocument(x = character(0),
                   author = character(0),
                   datetimestamp = as.POSIXlt(Sys.time(), tz = "GMT"),
                   description = character(0),
                   heading = character(0),
                   id = character(0),
                   language = character(0),
                   origin = character(0),
                   ...,
                   meta = NULL,
                   class = NULL)
```
plot

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Arguments

- **x**  A character string giving the plain text content.
- **author**  a character string or an object of class `person` giving the author names.
- **datetimestamp**  an object of class `POSIXt` or a character string giving the creation date/time information. If a character string, exactly one of the ISO 8601 formats defined by [https://www.w3.org/TR/NOTE-datetime](https://www.w3.org/TR/NOTE-datetime) should be used. See `parse_ISO_8601_datetime` in package `NLP` for processing such date/time information.
- **description**  a character string giving a description.
- **heading**  a character string giving the title or a short heading.
- **id**  a character string giving a unique identifier.
- **language**  a character string giving the language (preferably as IETF language tags, see `language` in package `NLP`).
- **origin**  a character string giving information on the source and origin.
- **...**  user-defined document metadata tag-value pairs.
- **meta**  a named list or NULL (default) giving all metadata. If set all other metadata arguments are ignored.
- **class**  a character vector or NULL (default) giving additional classes to be used for the created plain text document.

Value

An object inheriting from `class`, `PlainTextDocument` and `TextDocument`.

See Also

`TextDocument` for basic information on the text document infrastructure employed by package `tm`.

Examples

```r
(ptd <- PlainTextDocument("A simple plain text document",
                           heading = "Plain text document",
                           id = basename(tempfile()),
                           language = "en")

meta(ptd)
```

---

plot  Visualize a Term-Document Matrix

Description

Visualize correlations between terms of a term-document matrix.
Usage

## S3 method for class 'TermDocumentMatrix'
plot(x,
     terms = sample(Terms(x), 20),
     corThreshold = 0.7,
     weighting = FALSE,
     attrs = list(graph = list(rankdir = "BT"),
                  node = list(shape = "rectangle",
                               fixedsize = FALSE)),
     ...)  

Arguments

x       A term-document matrix.
terms   Terms to be plotted. Defaults to 20 randomly chosen terms of the term-document matrix.
corThreshold Do not plot correlations below this threshold. Defaults to 0.7.
weighting Define whether the line width corresponds to the correlation.
attrs   Argument passed to the plot method for class graphNEL.
...     Other arguments passed to the graphNEL plot method.

Details

Visualization requires that package Rgraphviz is available.

Examples

## Not run: data(crude)
tdm <- TermDocumentMatrix(crude,
                         control = list(removePunctuation = TRUE,
                                        removeNumbers = TRUE,
                                        stopwords = TRUE))
plot(tdm, corThreshold = 0.2, weighting = TRUE)
## End(Not run)

---

readDataframe  Read In a Text Document from a Data Frame

Description

Read in a text document from a row in a data frame.

Usage

readDataframe(elem, language, id)
Arguments

elem a named list with the component content which must hold a data frame with rows as the documents to read in. The names of the columns holding the text content and the document identifier must be "text" and "doc_id", respectively.

language a string giving the language.

id Not used.

Value

A PlainTextDocument representing elem$content.

See Also

Reader for basic information on the reader infrastructure employed by package tm.

Examples

docs <- data.frame(doc_id = c("doc_1", "doc_2"),
                   text = c("This is a text.", "This another one."),
                   stringsAsFactors = FALSE)
ds <- DataframeSource(docs)
elem <- getElem(stepNext(ds))
result <- readDataframe(elem, "en", NULL)
inspect(result)
meta(result)

Description

Return a function which reads in a Microsoft Word document extracting its text.

Usage

readDOC(engine = c("antiword", "executable"), AntiwordOptions = "")

Arguments

engine a character string for the preferred DOC extraction engine (see Details).
AntiwordOptions

Options passed over to antiword executable.
Details

Formally this function is a function generator, i.e., it returns a function (which reads in a text document) with a well-defined signature, but can access passed over arguments (e.g., options to antiword) via lexical scoping.

Available DOC extraction engines are as follows.

"antiword" (default) Antiword utility as provided by the function antiword in package antiword. 
"executable" command line antiword executable which must be installed and accessible on your system. This can convert documents from Microsoft Word version 2, 6, 7, 97, 2000, 2002 and 2003 to plain text.

The character vector AntiwordOptions is passed over to the executable.

Value

A function with the following formals:

- elem a list with the named component uri which must hold a valid file name.
- language a string giving the language.
- id Not used.

The function returns a PlainTextDocument representing the text and metadata extracted from elem$uri.

See Also

Reader for basic information on the reader infrastructure employed by package tm.

Reader     Readers

Description

Creating readers.

Usage

getReaders()

Details

Readers are functions for extracting textual content and metadata out of elements delivered by a Source, and for constructing a TextDocument. A reader must accept following arguments in its signature:

- elem a named list with the components content and uri (as delivered by a Source via getElem or pGetElem).
- language a character string giving the language.
id a character giving a unique identifier for the created text document.

The element elem is typically provided by a source whereas the language and the identifier are normally provided by a corpus constructor (for the case that elem$content does not give information on these two essential items).

In case a reader expects configuration arguments we can use a function generator. A function generator is indicated by inheriting from class FunctionGenerator and function. It allows us to process additional arguments, store them in an environment, return a reader function with the well-defined signature described above, and still be able to access the additional arguments via lexical scoping. All corpus constructors in package tm check the reader function for being a function generator and if so apply it to yield the reader with the expected signature.

**Value**

For getReaders(), a character vector with readers provided by package tm.

**See Also**

readDOC, readPDF, readPlain, readRCV1, readRCV1asPlain, readReut21578XML, readReut21578XMLasPlain, and readXML.

---

**readPDF**

**Read In a PDF Document**

**Description**

Return a function which reads in a portable document format (PDF) document extracting both its text and its metadata.

**Usage**

readPDF(engine = c("pdftools", "xpdf", "Rpoppler", "ghostscript", "Rcampdf", "custom"),
        control = list(info = NULL, text = NULL))

**Arguments**

- **engine** a character string for the preferred PDF extraction engine (see Details).
- **control** a list of control options for the engine with the named components info and text (see Details).

**Details**

Formally this function is a function generator, i.e., it returns a function (which reads in a text document) with a well-defined signature, but can access passed over arguments (e.g., the preferred PDF extraction engine and control options) via lexical scoping.

Available PDF extraction engines are as follows.
"pdftools" (default) Poppler PDF rendering library as provided by the functions \code{pdf_info} and \code{pdf_text} in package \pkg{pdftools}.

"xpdf" command line \code{pdfinfo} and \code{pdftotext} executables which must be installed and accessible on your system. Suitable utilities are provided by the Xpdf (\url{http://www.xpdfreader.com/}) PDF viewer or by the Poppler (\url{https://poppler.freedesktop.org/}) PDF rendering library.

"Rpoppler" Poppler PDF rendering library as provided by the functions \code{PDF_info} and \code{PDF_text} in package \pkg{Rpoppler}.

"ghostscript" Ghostscript using \code{pdf_info.ps} and \code{ps2ascii.ps}.

"Rcampdf" Perl CAM::PDF PDF manipulation library as provided by the functions \code{pdf_info} and \code{pdf_text} in package \pkg{Rcampdf}, available from the repository at \url{http://datacube.wu.ac.at}.

"custom" custom user-provided extraction engine.

Control parameters for engine "xpdf" are as follows.

\codeinfo} a character vector specifying options passed over to the \code{pdfinfo} executable.

\code{text} a character vector specifying options passed over to the \code{pdftotext} executable.

Control parameters for engine "custom" are as follows.

\codeinfo} a function extracting metadata from a PDF. The function must accept a file path as first argument and must return a named list with the components \code{Author} (as character string), \code{CreationDate} (of class \code{POSIXlt}), \code{Subject} (as character string), \code{Title} (as character string), and \code{Creator} (as character string).

\code{text} a function extracting content from a PDF. The function must accept a file path as first argument and must return a character vector.

Value

A function with the following formals:

\code{elem} a named list with the component \code{uri} which must hold a valid file name.

\code{language} a string giving the language.

\code{id} Not used.

The function returns a \code{PlainTextDocument} representing the text and metadata extracted from \code{elem$uri}.

See Also

\code{Reader} for basic information on the reader infrastructure employed by package \pkg{tm}.

Examples

\begin{Soutput}
uri <- paste0("file://",
    system.file(file.path("doc", "tm.pdf"), package = "tm"))
engine <- if(nzchar(system.file(package = "pdftools"))) {
    "pdftools"
} else {

\end{Soutput}
readPlain

"ghostscript"
}
reader <- readPDF(engine)
pdf <- reader(elem = list(uri = uri, language = "en", id = "id1"))
cat(content(pdf)[1])
VCorpus(URISource(uri, mode = ""),
       readerControl = list(reader = readPDF(engine = "ghostscript")))

---

readPlain                    Read In a Text Document

Description

Read in a text document without knowledge about its internal structure and possible available metadata.

Usage

readPlain(elem, language, id)

Arguments

elem       a named list with the component content which must hold the document to be read in.
language    a string giving the language.
id          a character giving a unique identifier for the created text document.

Value

A PlainTextDocument representing elem$content. The argument id is used as fallback if elem$uri is null.

See Also

Reader for basic information on the reader infrastructure employed by package tm.

Examples

docs <- c("This is a text.", "This another one.")
vs <- VectorSource(docs)
elem <- getElem(stepNext(vs))
(result <- readPlain(elem, "en", "id1"))
meta(result)
readRCV1  

\textit{Read In a Reuters Corpus Volume 1 Document}

\begin{description}
\item[Description] Read in a Reuters Corpus Volume 1 XML document.
\item[Usage] 
\begin{verbatim}
readRCV1(elem, language, id)
readRCV1asPlain(elem, language, id)
\end{verbatim}
\item[Arguments] 
\begin{description}
\item(elem) a named list with the component \texttt{content} which must hold the document to be read in.
\item(language) a string giving the language.
\item(id) Not used.
\end{description}
\item[Value] An \texttt{XMLTextDocument} for readRCV1, or a \texttt{PlainTextDocument} for readRCV1asPlain, representing the text and metadata extracted from elem$content. 
\item[See Also] Reader for basic information on the reader infrastructure employed by package \texttt{tm}.
\item[Examples] 
\begin{verbatim}
f <- system.file("texts", "rcv1_2330.xml", package = "tm")
f_bin <- readBin(f, raw(), file.size(f))
rcv1 <- readRCV1(elem = list(content = f_bin), language = "en", id = "id1")
content(rcv1)
meta(rcv1)
\end{verbatim}
\end{description}
readReut21578XML

Read In a Reuters-21578 XML Document

Description
Read in a Reuters-21578 XML document.

Usage
readReut21578XML(elem, language, id)
readReut21578XMLasPlain(elem, language, id)

Arguments
- **elem**: a named list with the component content which must hold the document to be read in.
- **language**: a string giving the language.
- **id**: Not used.

Value
An [XMLTextDocument](#) for readReut21578XML or a [PlainTextDocument](#) for readReut21578XMLasPlain, representing the text and metadata extracted from elem$content.

References

See Also
Reader for basic information on the reader infrastructure employed by package `tm`.

readTagged

Read In a POS-Tagged Word Text Document

Description
Return a function which reads in a text document containing POS-tagged words.

Usage
readTagged(…)
Arguments

... Arguments passed to `TaggedTextDocument`.

Details

Formally this function is a function generator, i.e., it returns a function (which reads in a text document) with a well-defined signature, but can access passed over arguments (...) via lexical scoping.

Value

A function with the following formals:

- `elem` a named list with the component `content` which must hold the document to be read in or the component `uri` holding a connection object or a character string.
- `language` a string giving the language.
- `id` a character giving a unique identifier for the created text document.

The function returns a `TaggedTextDocument` representing the text and metadata extracted from `elem$content` or `elem$uri`. The argument `id` is used as fallback if `elem$uri` is null.

See Also

`Reader` for basic information on the reader infrastructure employed by package `tm`.

Examples

```r
# See http://www.nltk.org/book/ch05.html or file ca01 in the Brown corpus
x <- paste("The/at grand/jj jury/nn commented/vbd on/in a/at number/nn of/in",
           "other/ap topics/nns ,/, among/in them/ppo the/at Atlanta/np and/cc",
           "Fulton/np-tl County/nn-tl purchasing/vbg departments/nns which/wdt",
           "it/pps said/vbd ""/"" are/ber well/q1 operated/vbg and/cc follow/vb",
           "generally/rb accepted/vbn practices/nns which/wdt inure/vb to/in the/at",
           "best/jjt interest/nn of/in both/abx governments/nns /quotesingle.Var/quotesingle.Var",
           "/quotesingle.Var/quotesingle.Var ./").")
vs <- VectorSource(x)
elem <- getElem(stepNext(vs))
(doc <- readTagged()(elem, language = "en", id = "id1"))
tagged_words(doc)
```

---

**readXML**

Read In an XML Document

Description

Return a function which reads in an XML document. The structure of the XML document is described with a specification.

Usage

```
readXML(spec, doc)
```
Arguments

spec  A named list of lists each containing two components. The constructed reader will map each list entry to the content or metadata of the text document as specified by the named list entry. Valid names include content to access the document's content, and character strings which are mapped to metadata entries. Each list entry must consist of two components: the first must be a string describing the type of the second argument, and the second is the specification entry. Valid combinations are:
  
type = "node", spec = "XPathExpression"  The XPath (1.0) expression spec extracts information from an XML node.
  
type = "function", spec = function(doc) ...  The function spec is called, passing over the XML document (as delivered by read_xml from package xml2) as first argument.
  
type = "unevaluated", spec = "String"  The character vector spec is returned without modification.

doc  An (empty) document of some subclass of TextDocument.

Details

Formally this function is a function generator, i.e., it returns a function (which reads in a text document) with a well-defined signature, but can access passed over arguments (e.g., the specification) via lexical scoping.

Value

A function with the following formals:

elem  a named list with the component content which must hold the document to be read in.

language  a string giving the language.

id  a character giving a unique identifier for the created text document.

The function returns doc augmented by the parsed information as described by spec out of the XML file in elem$content. The arguments language and id are used as fallback: language if no corresponding metadata entry is found in elem$content, and id if no corresponding metadata entry is found in elem$content and if elem$uri is null.

See Also

Reader for basic information on the reader infrastructure employed by package tm.

Vignette 'Extensions: How to Handle Custom File Formats', and XMLSource.
removeNumbers

Remove Numbers from a Text Document

Description

Remove numbers from a text document.

Usage

```r
## S3 method for class 'character'
removeNumbers(x, ucp = FALSE, ...)
## S3 method for class 'PlainTextDocument'
removeNumbers(x, ...)
```

Arguments

- **x**: a character vector or text document.
- **ucp**: a logical specifying whether to use Unicode character properties for determining digit characters. If FALSE (default), characters in the ASCII [:digit:] class (i.e., the decimal digits from 0 to 9) are taken; if TRUE, the characters with Unicode general category Nd (Decimal_Number).
- **...**: arguments to be passed to or from methods; in particular, from the PlainTextDocument method to the character method.

Value

The text document without numbers.

See Also

- `getTransformations` to list available transformation (mapping) functions.
- [https://unicode.org/reports/tr44/#General_Category_Values](https://unicode.org/reports/tr44/#General_Category_Values).

Examples

```r
data("crude")
crude[[1]]
removeNumbers(crude[[1]])
```
**Description**

Remove punctuation marks from a text document.

**Usage**

```r
## S3 method for class 'character'
removePunctuation(x,
    preserve_intra_word_contractions = FALSE,
    preserve_intra_word_dashes = FALSE,
    ucp = FALSE, ...)
## S3 method for class 'PlainTextDocument'
removePunctuation(x, ...)
```

**Arguments**

- **x**: a character vector or text document.
- **preserve_intra_word_contractions**: a logical specifying whether intra-word contractions should be kept.
- **preserve_intra_word_dashes**: a logical specifying whether intra-word dashes should be kept.
- **ucp**: a logical specifying whether to use Unicode character properties for determining punctuation characters. If FALSE (default), characters in the ASCII `[:punct:]` class are taken; if TRUE, the characters with Unicode general category P (Punctuation).
- **...**: arguments to be passed to or from methods; in particular, from the `PlainTextDocument` method to the `character` method.

**Value**

The character or text document `x` without punctuation marks (besides intra-word contractions ("'\") and intra-word dashes ("-") if `preserve_intra_word_contractions` and `preserve_intra_word_dashes` are set, respectively).

**See Also**

- `getTransformations` to list available transformation (mapping) functions.
- `regex` shows the class `[:punct:]` of punctuation characters.
- [https://unicode.org/reports/tr44/#General_Category_Values](https://unicode.org/reports/tr44/#General_Category_Values).
Examples

```r
data("crude")
inspect(crude[[14]])
inpect(removePunctuation(crude[[14]]))
inspect(removePunctuation(crude[[14]],
    preserve_intra_word_contractions = TRUE,
    preserve_intra_word_dashes = TRUE))
```

---

**removeSparseTerms** Remove Sparse Terms from a Term-Document Matrix

### Description

Remove sparse terms from a document-term or term-document matrix.

### Usage

```r
removeSparseTerms(x, sparse)
```

### Arguments

- `x` A `DocumentTermMatrix` or a `TermDocumentMatrix`.
- `sparse` A numeric for the maximal allowed sparsity in the range from bigger zero to smaller one.

### Value

A term-document matrix where those terms from `x` are removed which have at least a `sparse` percentage of empty (i.e., terms occurring 0 times in a document) elements. I.e., the resulting matrix contains only terms with a sparse factor of less than `sparse`.

### Examples

```r
data("crude")
 tdm <- TermDocumentMatrix(crude)
removeSparseTerms(tdm, 0.2)
```
removeWords

Remove Words from a Text Document

Description
Remove words from a text document.

Usage

## S3 method for class 'character'
removeWords(x, words)
## S3 method for class 'PlainTextDocument'
removeWords(x, ...)

Arguments

x
A character or text document.

words
A character vector giving the words to be removed.

...
passed over argument words.

Value
The character or text document without the specified words.

See Also
getTransformations to list available transformation (mapping) functions.
remove_stopwords provided by package tau.

Examples

data("crude")
crude[[1]]
removeWords(crude[[1]], stopwords("english"))

SimpleCorpus

Simple Corpora

Description
Create simple corpora.

Usage
SimpleCorpus(x, control = list(language = "en"))
Arguments

- `x` a `DataframeSource`, `DirSource` or `VectorSource`.
- `control` a named list of control parameters.
  - `language` a character giving the language (preferably as IETF language tags, see `language` in package `NLP`). The default language is assumed to be English ("en").

Details

A *simple corpus* is fully kept in memory. Compared to a `VCorpus`, it is optimized for the most common usage scenario: importing plain texts from files in a directory or directly from a vector in R, preprocessing and transforming the texts, and finally exporting them to a term-document matrix. It adheres to the `Corpus` API. However, it takes internally various shortcuts to boost performance and minimize memory pressure; consequently it operates only under the following constraints:

- only `DataframeSource`, `DirSource` and `VectorSource` are supported,
- no custom readers, i.e., each document is read in and stored as plain text (as a string, i.e., a character vector of length one),
- transformations applied via `tm_map` must be able to process character vectors and return character vectors (of the same length),
- no lazy transformations in `tm_map`,
- no meta data for individual documents (i.e., no "local" in `meta`).

Value

An object inheriting from `SimpleCorpus` and `Corpus`.

See Also

- `Corpus` for basic information on the corpus infrastructure employed by package `tm`.
- `VCorpus` provides an implementation with volatile storage semantics, and `PCorpus` provides an implementation with permanent storage semantics.

Examples

```r
txt <- system.file("texts", "txt", package = "tm")
(ovid <- SimpleCorpus(DirSource(txt, encoding = "UTF-8"),
  control = list(language = "lat")))
```
Description

Creating and accessing sources.

Usage

```
SimpleSource(encoding = "", 
             length = 0, 
             position = 0, 
             reader = readPlain, 
             ..., 
             class)

getSources()
## S3 method for class 'SimpleSource'
close(con, ...) 
## S3 method for class 'SimpleSource'
eoi(x)
## S3 method for class 'DataframeSource'
getMeta(x)
## S3 method for class 'DataframeSource'
getElem(x)
## S3 method for class 'DirSource'
getElem(x)
## S3 method for class 'URISource'
getElem(x)
## S3 method for class 'VectorSource'
getElem(x)
## S3 method for class 'XMLSource'
getElem(x)
## S3 method for class 'SimpleSource'
length(x)
## S3 method for class 'SimpleSource'
open(con, ...)
## S3 method for class 'DataframeSource'
pGetElem(x)
## S3 method for class 'DirSource'
pGetElem(x)
## S3 method for class 'URISource'
pGetElem(x)
## S3 method for class 'VectorSource'
pGetElem(x)
## S3 method for class 'SimpleSource'
reader(x)
## S3 method for class 'SimpleSource'
```
stepNext(x)

Arguments

x A Source.
con A Source.
enencoding a character giving the encoding of the elements delivered by the source.
length a non-negative integer denoting the number of elements delivered by the source.
If the length is unknown in advance set it to 0.
position a numeric indicating the current position in the source.
reader a reader function (generator).
... For SimpleSource tag-value pairs for storing additional information; not used otherwise.
class a character vector giving additional classes to be used for the created source.

Details

Sources abstract input locations, like a directory, a connection, or simply an \texttt{R} vector, in order to acquire content in a uniform way. In packages which employ the infrastructure provided by package \texttt{tm}, such sources are represented via the virtual \texttt{S3} class Source: such packages then provide \texttt{S3} source classes extending the virtual base class (such as \texttt{DirSource} provided by package \texttt{tm} itself).

All extension classes must provide implementations for the functions \texttt{close}, \texttt{eoi}, \texttt{getElem}, \texttt{length}, \texttt{open}, \texttt{reader}, and \texttt{stepNext}. For parallel element access the (optional) function \texttt{pGetElem} must be provided as well. If document level metadata is available, the (optional) function \texttt{getMeta} must be implemented.

The functions \texttt{open} and \texttt{close} open and close the source, respectively. \texttt{eoi} indicates end of input. \texttt{getElem} fetches the element at the current position, whereas \texttt{pGetElem} retrieves all elements in parallel at once. The function \texttt{length} gives the number of elements. \texttt{reader} returns a default reader for processing elements. \texttt{stepNext} increases the position in the source to acquire the next element.

The function \texttt{SimpleSource} provides a simple reference implementation and can be used when creating custom sources.

Value

For \texttt{SimpleSource}, an object inheriting from \texttt{class}, \texttt{SimpleSource}, and \texttt{Source}.
For \texttt{getSources}, a character vector with sources provided by package \texttt{tm}.
open and \texttt{close} return the opened and closed source, respectively.
For \texttt{eoi}, a logical indicating if the end of input of the source is reached.
For \texttt{getElem} a named list with the components \texttt{content} holding the document and \texttt{uri} giving a uniform resource identifier (e.g., a file path or URL; \texttt{NULL} if not applicable or unavailable). For \texttt{pGetElem} a list of such named lists.
For \texttt{length}, an integer for the number of elements.
For \texttt{reader}, a function for the default reader.
stemCompletion

See Also

DataframeSource, DirSource, URISource, VectorSource, and XMLSource.

---

stemCompletion  Complete Stems

**Description**

Heuristically complete stemmed words.

**Usage**

```r
stemCompletion(x, dictionary, type = c("prevalent", "first", "longest", "none", "random", "shortest"))
```

**Arguments**

- `x` A character vector of stems to be completed.
- `dictionary` A `Corpus` or character vector to be searched for possible completions.
- `type` A character naming the heuristics to be used:
  - `prevalent` Default. Takes the most frequent match as completion.
  - `first` Takes the first found completion.
  - `longest` Takes the longest completion in terms of characters.
  - `none` Is the identity.
  - `random` Takes some completion.
  - `shortest` Takes the shortest completion in terms of characters.

**Value**

A character vector with completed words.

**References**


**Examples**

```r
data("crude")
stemCompletion(c("compan", "entit", "suppl"), crude)
```
stemDocument  Stem Words

Description

Stem words in a text document using Porter’s stemming algorithm.

Usage

```r
## S3 method for class 'character'
stemDocument(x, language = "english")
## S3 method for class 'PlainTextDocument'
stemDocument(x, language = meta(x, "language"))
```

Arguments

- `x` A character vector or text document.
- `language` A string giving the language for stemming.

Details

The argument `language` is passed over to `wordStem` as the name of the Snowball stemmer.

Examples

```r
data("crude")
inspect(crude[[1]])
inspect(stemDocument(crude[[1]]))
```

stopwords  Stopwords

Description

Return various kinds of stopwords with support for different languages.

Usage

```r
stopwords(kind = "en")
```

Arguments

- `kind` A character string identifying the desired stopword list.
Details

Available stopword lists are:

catalan  Catalan stopwords (obtained from http://latel.upf.edu/morgana/altres/pub/ca_stop.htm),

romanian Romanian stopwords (extracted from http://snowball.tartarus.org/otherapps/romanian/romanian1.tgz),

SMART  English stopwords from the SMART information retrieval system (as documented in Appendix 11 of https://jmlr.csail.mit.edu/papers/volume5/lewis04a/) (which coincides with the stopword list used by the MC toolkit (https://www.cs.utexas.edu/users/dml/software/mc/)),

and a set of stopword lists from the Snowball stemmer project in different languages (obtained from 'http://svn.tartarus.org/snowball/trunk/website/algorithms/*/stop.txt'). Supported languages are danish, dutch, english, finnish, french, german, hungarian, italian, norwegian, portuguese, russian, spanish, and swedish. Language names are case sensitive. Alternatively, their IETF language tags may be used.

Value

A character vector containing the requested stopwords. An error is raised if no stopwords are available for the requested kind.

Examples

```r
stopwords("en")
stopwords("SMART")
stopwords("german")
```

---

**stripWhitespace**  
**Strip Whitespace from a Text Document**

Description

Strip extra whitespace from a text document. Multiple whitespace characters are collapsed to a single blank.

Usage

```r
## S3 method for class 'PlainTextDocument'
stripWhitespace(x, ...)
```

Arguments

- `x`  
  A text document.

- `...`  
  Not used.
Value

The text document with multiple whitespace characters collapsed to a single blank.

See Also

getTransformations to list available transformation (mapping) functions.

Examples

data("crude")
crude[[1]]
stripWhitespace(crude[[1]])

TermDocumentMatrix  Term-Document Matrix

Description

Constructs or coerces to a term-document matrix or a document-term matrix.

Usage

TermDocumentMatrix(x, control = list())
DocumentTermMatrix(x, control = list())
as.TermDocumentMatrix(x, ...)
as.DocumentTermMatrix(x, ...)

Arguments

x

for the constructors, a corpus or an R object from which a corpus can be generated via Corpus(VectorSource(x)); for the coercing functions, either a term-document matrix or a document-term matrix or a simple triplet matrix (package slam) or a term frequency vector.

control

a named list of control options. There are local options which are evaluated for each document and global options which are evaluated once for the constructed matrix. Available local options are documented in termFreq and are internally delegated to a termFreq call.

This is different for a SimpleCorpus. In this case all options are processed in a fixed order in one pass to improve performance. It always uses the Boost (https://www.boost.org) Tokenizer (via Rcpp) and takes no custom functions as option arguments.

Available global options are:

bounds  A list with a tag global whose value must be an integer vector of length 2. Terms that appear in less documents than the lower bound bounds$global[1] or in more documents than the upper bound bounds$global[2] are discarded. Defaults to list(global = c(1, Inf)) (i.e., every term will be used).
weighting A weighting function capable of handling a TermDocumentMatrix. It defaults to weightTf for term frequency weighting. Available weighting functions shipped with the tm package are weightTf, weightTfIdf, weightBin, and weightSMART.

... the additional argument weighting (typically a WeightFunction) is allowed when coercing a simple triplet matrix to a term-document or document-term matrix.

Value

An object of class TermDocumentMatrix or class DocumentTermMatrix (both inheriting from a simple triplet matrix in package slam) containing a sparse term-document matrix or document-term matrix. The attribute weighting contains the weighting applied to the matrix.

See Also

termFreq for available local control options.

Examples

data("crude")

```r
tdm <- TermDocumentMatrix(crude,
        control = list(removePunctuation = TRUE,
                      stopwords = TRUE))
dtm <- DocumentTermMatrix(crude,
                      control = list(weighting =
                                     function(x)
                                       weightTfIdf(x, normalize =
                                          FALSE),
                                     stopwords = TRUE))

inspect(tdm[202:205, 1:5])
inspect(tdm[c("price", "prices", "texas"), c("127", "144", "191", "194")])
inspect(dtm[1:5, 273:276])

s <- SimpleCorpus(VectorSource(unlist(lapply(crude, as.character))))
m <- TermDocumentMatrix(s,
                             control = list(removeNumbers = TRUE,
                                            stopwords = TRUE,
                                            stemming = TRUE))

inspect(m[c("price", "texa"), c("127", "144", "191", "194")])
```

Term Frequency Vector

Generate a term frequency vector from a text document.
termFreq

Usage

termFreq(doc, control = list())

Arguments

doc An object inheriting from TextDocument or a character vector.
control A list of control options which override default settings.

First, following two options are processed.
tokenize A function tokenizing a TextDocument into single tokens, a Span_Tokenizer, Token_Tokenizer, or a string matching one of the predefined tokenization functions:
  "Boost" for Boost_tokenizer, or
  "MC" for MC_tokenizer, or
  "scan" for scan_tokenizer, or
  "words" for words.
  Defaults to words.
tolower Either a logical value indicating whether characters should be translated to lower case or a custom function converting characters to lower case. Defaults to tolower.

Next, a set of options which are sensitive to the order of occurrence in the control list. Options are processed in the same order as specified. User-specified options have precedence over the default ordering so that first all user-specified options and then all remaining options (with the default settings and in the order as listed below) are processed.

language A character giving the language (preferably as IETF language tags, see language in package NLP) to be used for stopwords and stemming if not provided by doc.
removePunctuation A logical value indicating whether punctuation characters should be removed from doc, a custom function which performs punctuation removal, or a list of arguments for removePunctuation. Defaults to FALSE.
removeNumbers A logical value indicating whether numbers should be removed from doc or a custom function for number removal. Defaults to FALSE.
stopwords Either a Boolean value indicating stopword removal using default language specific stopword lists shipped with this package, a character vector holding custom stopwords, or a custom function for stopword removal. Defaults to FALSE.
stemming Either a Boolean value indicating whether tokens should be stemmed or a custom stemming function. Defaults to FALSE.

Finally, following options are processed in the given order.
dictionary A character vector to be tabulated against. No other terms will be listed in the result. Defaults to NULL which means that all terms in doc are listed.
bounds A list with a tag local whose value must be an integer vector of length 2. Terms that appear less often in doc than the lower bound bounds$local[1] or more often than the upper bound bounds$local[2] are discarded. Defaults to list(local = c(1, Inf)) (i.e., every token will be used).

wordLengths An integer vector of length 2. Words shorter than the minimum word length wordLengths[1] or longer than the maximum word length wordLengths[2] are discarded. Defaults to c(3, Inf), i.e., a minimum word length of 3 characters.

Value

A table of class c("term_frequency", "integer") with term frequencies as values and tokens as names.

See Also

gTokenizers

Examples

data("crude")
termFreq(crude[[14]])
strsplit_space_tokenizer <- function(x)
  unlist(strsplit(as.character(x), "\[:space:\]+"))
ctrl <- list(tokenize = strsplit_space_tokenizer,
  removePunctuation = list(preserve_intra_word_dashes = TRUE),
  stopwords = c("reuter", "that"),
  stemming = TRUE,
  wordLengths = c(4, Inf))
termFreq(crude[[14]], control = ctrl)

TextDocument

Text Documents

Description

Representing and computing on text documents.

Details

Text documents are documents containing (natural language) text. The tm package employs the infrastructure provided by package NLP and represents text documents via the virtual S3 class TextDocument. Actual S3 text document classes then extend the virtual base class (such as PlainTextDocument).

All extension classes must provide an as.character method which extracts the natural language text in documents of the respective classes in a “suitable” (not necessarily structured) form, as well as content and meta methods for accessing the (possibly raw) document content and metadata.
See Also

`PlainTextDocument`, and `XMLTextDocument` for the text document classes provided by package `tm`.

`TextDocument` for text documents in package `NLP`.

---

### tm_combine

**Combine Corpora, Documents, Term-Document Matrices, and Term Frequency Vectors**

**Description**

Combine several corpora into a single one, combine multiple documents into a corpus, combine multiple term-document matrices into a single one, or combine multiple term frequency vectors into a single term-document matrix.

**Usage**

```r
## S3 method for class 'VCorpus'
c(..., recursive = FALSE)
## S3 method for class 'TextDocument'
c(..., recursive = FALSE)
## S3 method for class 'TermDocumentMatrix'
c(..., recursive = FALSE)
## S3 method for class 'term_frequency'
c(..., recursive = FALSE)
```

**Arguments**

- `...` Corpora, text documents, term-document matrices, or term frequency vectors.
- `recursive` Not used.

**See Also**

`VCorpus`, `TextDocument`, `TermDocumentMatrix`, and `termFreq`.

**Examples**

```r
data("acq")
data("crude")
meta(acq, "comment", type = "corpus") <- "Acquisitions"
meta(crude, "comment", type = "corpus") <- "Crude oil"
meta(acq, "acqLabels") <- 1:50
meta(acq, "jointLabels") <- 1:50
meta(crude, "crudeLabels") <- letters[1:20]
meta(crude, "jointLabels") <- 1:20
c(acq, crude)
meta(c(acq, crude), type = "corpus")
```
tm_filter

meta(c(acq, crude))
c(acq[[30]], crude[[10]])
c(TermDocumentMatrix(acq), TermDocumentMatrix(crude))

Description

Interface to apply filter and index functions to corpora.

Usage

## S3 method for class 'PCorpus'
tm_filter(x, FUN, ...)
## S3 method for class 'SimpleCorpus'
 tm_filter(x, FUN, ...)
## S3 method for class 'VCorpus'
 tm_filter(x, FUN, ...)
## S3 method for class 'PCorpus'
 tm_index(x, FUN, ...)
## S3 method for class 'SimpleCorpus'
 tm_index(x, FUN, ...)
## S3 method for class 'VCorpus'
 tm_index(x, FUN, ...)

Arguments

x            A corpus.
FUN           a filter function taking a text document or a string (if x is a SimpleCorpus) as input and returning the logical value TRUE or FALSE.
...           arguments to FUN.

Value

tm_filter returns a corpus containing documents where FUN matches, whereas tm_index only returns the corresponding indices.

Examples

data("crude")
# Full-text search
tm_filter(crude, FUN = function(x) any(grep("co[m]?pany", content(x)))))
tm_map  Transformations on Corpora

Description

Interface to apply transformation functions (also denoted as mappings) to corpora.

Usage

```r
## S3 method for class 'PCorpus'
tm_map(x, FUN, ...)
## S3 method for class 'SimpleCorpus'
 tm_map(x, FUN, ...)
## S3 method for class 'VCorpus'
 tm_map(x, FUN, ..., lazy = FALSE)
```

Arguments

- `x` A corpus.
- `FUN` a transformation function taking a text document (a character vector when `x` is a `SimpleCorpus`) as input and returning a text document (a character vector of the same length as the input vector for `SimpleCorpus`). The function `content_transformer` can be used to create a wrapper to get and set the content of text documents.
- `...` arguments to `FUN`.
- `lazy` a logical. Lazy mappings are mappings which are delayed until the content is accessed. It is useful for large corpora if only few documents will be accessed. In such a case it avoids the computationally expensive application of the mapping to all elements in the corpus.

Value

A corpus with `FUN` applied to each document in `x`. In case of lazy mappings only internal flags are set. Access of individual documents triggers the execution of the corresponding transformation function.

Note

Lazy transformations change R’s standard evaluation semantics.

See Also

- `getTransformations` for available transformations.
Examples

```r
data("crude")
## Document access triggers the stemming function
## (i.e., all other documents are not stemmed yet)
tm_map(crude, stemDocument, lazy = TRUE)[[1]]
## Use wrapper to apply character processing function
tm_map(crude, content_transformer(tolower))
## Generate a custom transformation function which takes the heading as new content
headings <- function(x)
  PlainTextDocument(meta(x, "heading"),
    id = meta(x, "id"),
    language = meta(x, "language"))
inspect(tm_map(crude, headings))
```

---

**tm_reduce**

Combine Transformations

**Description**

Fold multiple transformations (mappings) into a single one.

**Usage**

```r
tm_reduce(x, tmFuns, ...)
```

**Arguments**

- `x`: A corpus.
- `tmFuns`: A list of `tm` transformations.
- `...`: Arguments to the individual transformations.

**Value**

A single `tm` transformation function obtained by folding `tmFuns` from right to left (via `Reduce(..., right = TRUE)`).

**See Also**

`Reduce` for R's internal folding/accumulation mechanism, and `getTransformations` to list available transformation (mapping) functions.
Examples

```r
data(crude)
crude[[1]]
skipWords <- function(x) removeWords(x, c("it", "the"))
funs <- list(stripWhitespace,
           skipWords,
           removePunctuation,
           content_transformer(tolower))
tm_map(crude, FUN = tm_reduce, tmFuns = funs)[[1]]
```

---

**tm_term_score**  
*Compute Score for Matching Terms*

**Description**

Compute a score based on the number of matching terms.

**Usage**

```r
## S3 method for class 'DocumentTermMatrix'
tm_term_score(x, terms, FUN = row_sums)
## S3 method for class 'PlainTextDocument'
tm_term_score(x, terms, FUN = function(x) sum(x, na.rm = TRUE))
## S3 method for class 'term_frequency'
tm_term_score(x, terms, FUN = function(x) sum(x, na.rm = TRUE))
## S3 method for class 'TermDocumentMatrix'
tm_term_score(x, terms, FUN = col_sums)
```

**Arguments**

- `x`  
  Either a `PlainTextDocument`, a term frequency as returned by `termFreq`, or a `TermDocumentMatrix`.

- `terms`  
  A character vector of terms to be matched.

- `FUN`  
  A function computing a score from the number of matching terms in `x`.

**Value**

A score as computed by `FUN` from the number of matching terms in `x`.

**Examples**

```r
data("acq")
tm_term_score(acq[[1]], c("company", "change"))
## Not run: ## Test for positive and negative sentiments
## install.packages("tm.lexicon.GeneralInquirer", repos="http://datacube.wu.ac.at", type="source")
require("tm.lexicon.GeneralInquirer")
sapply(acq[1:10], tm_term_score, terms_in_General_Inquirer_categories("Positiv"))
sapply(acq[1:10], tm_term_score, terms_in_General_Inquirer_categories("Negativ"))
```
tokenizer

```r
tm_term_score(TermDocumentMatrix(acq[1:10],
    control = list(removePunctuation = TRUE)),
    terms_in_General_Inquirer_categories("Positiv"))
    ## End(Not run)
```

tokenizer  

**Description**

Tokenize a document or character vector.

**Usage**

- `Boost_tokenizer(x)`
- `MC_tokenizer(x)`
- `scan_tokenizer(x)`

**Arguments**

- `x` A character vector, or an object that can be coerced to character by `as.character`.

**Details**

The quality and correctness of a tokenization algorithm highly depends on the context and application scenario. Relevant factors are the language of the underlying text and the notions of whitespace (which can vary with the used encoding and the language) and punctuation marks. Consequently, for superior results you probably need a custom tokenization function.

- **Boost_tokenizer** Uses the Boost ([https://www.boost.org](https://www.boost.org)) Tokenizer (via Rcpp).
- **MC_tokenizer** Implements the functionality of the tokenizer in the MC toolkit ([https://www.cs.utexas.edu/users/dml/software/mc/](https://www.cs.utexas.edu/users/dml/software/mc/)).
- **scan_tokenizer** Simulates `scan(..., what = "character")`.

**Value**

A character vector consisting of tokens obtained by tokenization of `x`.

**See Also**

- `getTokenizers` to list tokenizers provided by package `tm`.
- `Regexp_Tokenizer` for tokenizers using regular expressions provided by package `NLP`.
- `tokenize` for a simple regular expression based tokenizer provided by package `tau`.
- `tokenizers` for a collection of tokenizers provided by package `tokenizers`. 
Examples

data("crude")
Boost_tokenizer(crude[[1]])
MC_tokenizer(crude[[1]])
scan_tokenizer(crude[[1]])
strsplit_space_tokenizer <- function(x)
  unlist(strsplit(as.character(x), "[[:space:]]+"))
strsplit_space_tokenizer(crude[[1]])

---

**URISource**

*Uniform Resource Identifier Source*

Description

Create a uniform resource identifier source.

Usage

URISource(x, encoding = "", mode = "text")

Arguments

- **x**: A character vector of uniform resource identifiers (URIs).
- **encoding**: A character string describing the current encoding. It is passed to `iconv` to convert the input to UTF-8.
- **mode**: A character string specifying if and how URIs should be read in. Available modes are:
  - "" for no read. In this case `getElem` and `pGetElem` only deliver URIs.
  - "binary" for URIs read in binary raw mode (via `readBin`).
  - "text" for URIs read as text (via `readLines`).

Details

A *uniform resource identifier source* interprets each URI as a document.

Value

An object inheriting from URISource, SimpleSource, and Source.

See Also

Source for basic information on the source infrastructure employed by package tm.
Encoding and iconv on encodings.
**VCorpus**

Examples

```r
loremipsum <- system.file("texts", "loremipsum.txt", package = "tm")
ovid <- system.file("texts", "txt", "ovid_1.txt", package = "tm")
us <- URISource(sprintf("file://%s", c(loremipsum, ovid)))
inspect(VCorpus(us))
```

---

### Description

Create volatile corpora.

### Usage

```r
VCorpus(x, readerControl = list(reader = reader(x), language = "en"))
as.VCorpus(x)
```

### Arguments

- `x`: For `VCorpus` a `Source` object, and for `as.VCorpus` an `R` object.
- `readerControl`: a named list of control parameters for reading in content from `x`.
  - `reader`: a function capable of reading in and processing the format delivered by `x`.
  - `language`: a character giving the language (preferably as IETF language tags, see `language` in package `NLP`). The default language is assumed to be English ("en").

### Details

A *volatile corpus* is fully kept in memory and thus all changes only affect the corresponding `R` object.

### Value

An object inheriting from `VCorpus` and `Corpus`.

### See Also

- `Corpus` for basic information on the corpus infrastructure employed by package `tm`.
- `PCorpus` provides an implementation with permanent storage semantics.

### Examples

```r
reut21578 <- system.file("texts", "crude", package = "tm")
VCorpus(DirSource(reut21578, mode = "binary"),
        list(reader = readReut21578XMLasPlain))
```
VectorSource  Vector Source

Description

Create a vector source.

Usage

VectorSource(x)

Arguments

x  A vector giving the texts.

Details

A vector source interprets each element of the vector x as a document.

Value

An object inheriting from VectorSource, SimpleSource, and Source.

See Also

Source for basic information on the source infrastructure employed by package tm.

Examples

docs <- c("This is a text.", "This another one.")
(vs <- VectorSource(docs))
inspect(VCorpus(vs))

weightBin  Weight Binary

Description

Binary weight a term-document matrix.

Usage

weightBin(m)

Arguments

m  A TermDocumentMatrix in term frequency format.
WeightFunction

Details

Formally this function is of class WeightingFunction with the additional attributes name and acronym.

Value

The weighted matrix.

<table>
<thead>
<tr>
<th>WeightFunction</th>
<th>Weighting Function</th>
</tr>
</thead>
</table>

Description

Construct a weighting function for term-document matrices.

Usage

WeightFunction(x, name, acronym)

Arguments

x A function which takes a TermDocumentMatrix with term frequencies as input, weights the elements, and returns the weighted matrix.

name A character naming the weighting function.

acronym A character giving an acronym for the name of the weighting function.

Value

An object of class WeightFunction which extends the class function representing a weighting function.

Examples

weightCutBin <- WeightFunction(function(m, cutoff) m > cutoff, "binary with cutoff", "bincut")
**weightSMART**  

**SMART Weightings**  

**Description**  

Weight a term-document matrix according to a combination of weights specified in SMART notation.

**Usage**  

```
weightSMART(m, spec = "nnn", control = list())
```

**Arguments**  

- **m**: A `TermDocumentMatrix` in term frequency format.
- **spec**: a character string consisting of three characters. The first letter specifies a term frequency schema, the second a document frequency schema, and the third a normalization schema. See Details for available built-in schemata.
- **control**: a list of control parameters. See Details.

**Details**  

Formally this function is of class `WeightingFunction` with the additional attributes `name` and `acronym`.

The first letter of `spec` specifies a weighting schema for term frequencies of `m`:

- "n" (natural) $tf_{i,j}$ counts the number of occurrences $n_{i,j}$ of a term $t_i$ in a document $d_j$. The input term-document matrix `m` is assumed to be in this standard term frequency format already.
- "l" (logarithm) is defined as $1 + \log_2(tf_{i,j})$.
- "a" (augmented) is defined as $0.5 + \frac{0.5 + tf_{i,j}}{\text{max}_i \{tf_{i,j}\}}$.
- "b" (boolean) is defined as 1 if $tf_{i,j} > 0$ and 0 otherwise.
- "L" (log average) is defined as $\frac{1 + \log_2(tf_{i,j})}{1 + \log_2(\text{ave}_{i \in d_j} \{tf_{i,j}\})}$.

The second letter of `spec` specifies a weighting schema of document frequencies for `m`:

- "n" (no) is defined as 1.
- "t" (idf) is defined as $\log_2 \frac{N}{df_t}$ where $df_t$ denotes how often term $t$ occurs in all documents.
- "p" (prob idf) is defined as $\max(0, \log_2(\frac{N - df_t}{df_t}))$.

The third letter of `spec` specifies a schema for normalization of `m`:

- "n" (none) is defined as 1.
- "c" (cosine) is defined as $\sqrt{\text{col_sums}(m^2)}$. 

"u" (pivoted unique) is defined as \( \text{slope} \cdot \sqrt{\text{col}_\text{sums}(m^2)} + (1 - \text{slope}) \cdot \text{pivot} \) where both \( \text{slope} \) and \( \text{pivot} \) must be set via named tags in the control list.

"b" (byte size) is defined as \( \frac{1}{\text{CharLength}} \). The parameter \( \alpha \) must be set via the named tag \( \text{alpha} \) in the control list.

The final result is defined by multiplication of the chosen term frequency component with the chosen document frequency component with the chosen normalization component.

Value

The weighted matrix.

References


Examples

data("crude")
TermDocumentMatrix(crude,
    control = list(removePunctuation = TRUE,
                   stopwords = TRUE,
                   weighting = function(x)
                   weightSMART(x, spec = "ntc")))

weightTf  Weight by Term Frequency

Description

Weight a term-document matrix by term frequency.

Usage

weightTf(m)

Arguments

m  A TermDocumentMatrix in term frequency format.

Details

Formally this function is of class WeightingFunction with the additional attributes name and acronym.

This function acts as the identity function since the input matrix is already in term frequency format.

Value

The weighted matrix.
weightTfIdf  Weight by Term Frequency - Inverse Document Frequency

Description

Weight a term-document matrix by term frequency - inverse document frequency.

Usage

weightTfIdf(m, normalize = TRUE)

Arguments

- **m**: A `TermDocumentMatrix` in term frequency format.
- **normalize**: A Boolean value indicating whether the term frequencies should be normalized.

Details

Formally this function is of class `WeightingFunction` with the additional attributes name and acronym.

Term frequency \( tf_{i,j} \) counts the number of occurrences \( n_{i,j} \) of a term \( t_i \) in a document \( d_j \). In the case of normalization, the term frequency \( tf_{i,j} \) is divided by \( \sum_k n_{k,j} \).

Inverse document frequency for a term \( t_i \) is defined as

\[
idf_i = \log_2 \frac{|D|}{|\{d \mid t_i \in d\}|}
\]

where \( |D| \) denotes the total number of documents and where \( |\{d \mid t_i \in d\}| \) is the number of documents where the term \( t_i \) appears.

Term frequency - inverse document frequency is now defined as \( tf_{i,j} \cdot idf_i \).

Value

The weighted matrix.

References

writeCorpus

### Description
Write a plain text representation of a corpus to multiple files on disk corresponding to the individual documents in the corpus.

### Usage
```
writeCorpus(x, path = ".", filenames = NULL)
```

### Arguments
- **x**: A corpus.
- **path**: A character listing the directory to be written into.
- **filenames**: Either NULL or a character vector. In case no filenames are provided, filenames are automatically generated by using the documents’ identifiers in `x`.

### Details
The plain text representation of the corpus is obtained by calling `as.character` on each document.

### Examples
```
data("crude")
## Not run: writeCorpus(crude, path = ".", filenames = paste(seq_along(crude), ".txt", sep = ""))
## End(Not run)
```

---

XMLSource

### Description
Create an XML source.

### Usage
```
XMLSource(x, parser = xml_contents, reader)
```
XMLTextDocument

Arguments

x a character giving a uniform resource identifier.

parser a function accepting an XML document (as delivered by read_xml in package xml2) as input and returning XML elements/nodes.

reader a function capable of turning XML elements/nodes as returned by parser into a subclass of TextDocument.

Value

An object inheriting from XMLSource, SimpleSource, and Source.

See Also

Source for basic information on the source infrastructure employed by package tm.

Vignette 'Extensions: How to Handle Custom File Formats', and readXML.

XMLTextDocument XML Text Documents

Description

Create XML text documents.

Usage

XMLTextDocument(x = xml_missing(),
  author = character(0),
  datetimestamp = as.POSIXlt(Sys.time(), tz = "GMT"),
  description = character(0),
  heading = character(0),
  id = character(0),
  language = character(0),
  origin = character(0),
  ..., 
  meta = NULL)

Arguments

x An XMLDocument.

author a character or an object of class person giving the author names.

datetimestamp an object of class POSIXt or a character string giving the creation date/time information. If a character string, exactly one of the ISO 8601 formats defined by https://www.w3.org/TR/NOTE-datetime should be used. See parse_ISO_8601_datetime in package NLP for processing such date/time information.

description a character giving a description.
Zipf_n_Heaps

heading a character giving the title or a short heading.
id a character giving a unique identifier.
language a character giving the language (preferably as IETF language tags, see language in package NLP).
origin a character giving information on the source and origin.
... user-defined document metadata tag-value pairs.
meta a named list or NULL (default) giving all metadata. If set all other metadata arguments are ignored.

Value
An object inheriting from XMLTextDocument and TextDocument.

See Also
TextDocument for basic information on the text document infrastructure employed by package tm.

Examples
```
xml <- system.file("extdata", "order-doc.xml", package = "xml2")
(xtd <- XMLTextDocument(xml2::read_xml(xml),
  heading = "XML text document",
  id = xml,
  language = "en"))

content(xtd)
meta(xtd)
```

---

**Zipf_n_Heaps**

*Explore Corpus Term Frequency Characteristics*

**Description**
Explore Zipf’s law and Heaps’ law, two empirical laws in linguistics describing commonly observed characteristics of term frequency distributions in corpora.

**Usage**
```
Zipf_plot(x, type = "l", ...)
Heaps_plot(x, type = "l", ...)
```

**Arguments**
```
x a document-term matrix or term-document matrix with unweighted term frequencies.
type a character string indicating the type of plot to be drawn, see plot.
... further graphical parameters to be used for plotting.
```
Details

Zipf's law (e.g., https://en.wikipedia.org/wiki/Zipf%27s_law) states that given some corpus of natural language utterances, the frequency of any word is inversely proportional to its rank in the frequency table, or, more generally, that the pmf of the term frequencies is of the form \(ck^{-\beta}\), where \(k\) is the rank of the term (taken from the most to the least frequent one). We can conveniently explore the degree to which the law holds by plotting the logarithm of the frequency against the logarithm of the rank, and inspecting the goodness of fit of a linear model.

Heaps' law (e.g., https://en.wikipedia.org/wiki/Heaps%27_law) states that the vocabulary size \(V\) (i.e., the number of different terms employed) grows polynomially with the text size \(T\) (the total number of terms in the texts), so that \(V = cT^\beta\). We can conveniently explore the degree to which the law holds by plotting \(\log(V)\) against \(\log(T)\), and inspecting the goodness of fit of a linear model.

Value

The coefficients of the fitted linear model. As a side effect, the corresponding plot is produced.

Examples

```r
data("acq")
m <- DocumentTermMatrix(acq)
Zipf_plot(m)
Heaps_plot(m)
```

---

ZipSource

ZIP File Source

Description

Create a ZIP file source.

Usage

```r
ZipSource(zipfile, 
  pattern = NULL, 
  recursive = FALSE, 
  ignore.case = FALSE, 
  mode = "text")
```

Arguments

- **zipfile**: A character string with the full path name of a ZIP file.
- **pattern**: an optional regular expression. Only file names in the ZIP file which match the regular expression will be returned.
- **recursive**: logical. Should the listing recurse into directories?
- **ignore.case**: logical. Should pattern-matching be case-insensitive?
mode a character string specifying if and how files should be read in. Available modes are:
   "" No read. In this case getElem and pGetElem only deliver URIs.
   "binary" Files are read in binary raw mode (via readBin).
   "text" Files are read as text (via readLines).

Details
A ZIP file source extracts a compressed ZIP file via unzip and interprets each file as a document.

Value
An object inheriting from ZipSource, SimpleSource, and Source.

See Also
Source for basic information on the source infrastructure employed by package tm.

Examples
```r
zipfile <- tempfile()
files <- Sys.glob(file.path(system.file("texts", "txt", package = "tm"), "*"))
zip(zipfile, files)
zipfile <- paste0(zipfile, ".zip")
Corpus(ZipSource(zipfile, recursive = TRUE))[[1]]
file.remove(zipfile)
```
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