Package ‘SentimentAnalysis’

February 18, 2021

Type Package

Title Dictionary-Based Sentiment Analysis

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Description Performs a sentiment analysis of textual contents in R. This implementation utilizes various existing dictionaries, such as Harvard IV, or finance-specific dictionaries. Furthermore, it can also create customized dictionaries. The latter uses LASSO regularization as a statistical approach to select relevant terms based on an exogenous response variable.

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URL https://github.com/sfeuerriegel/SentimentAnalysis

BugReports https://github.com/sfeuerriegel/SentimentAnalysis/issues

Depends R (>= 2.10)

Imports tm (>= 0.6), qdapDictionaries, ngramrr (>= 0.1), moments, stringdist, glmnet, spikeslab (>= 1.1), ggplot2

Suggests testthat, knitr, rmarkdown, SnowballC, XML, mgcv

LazyData true

RoxygenNote 7.1.0

VignetteBuilder knitr

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analyzeSentiment

Performs sentiment analysis of given object (vector of strings, document-term matrix, corpus).

Usage

```r
analyzeSentiment(
  x,
  language = "english",
  aggregate = NULL,
  rules = defaultSentimentRules(),
  removeStopwords = TRUE,
  stemming = TRUE,
  ...
)
```

## S3 method for class 'Corpus'
```r
analyzeSentiment(
  x,
  language = "english",
  aggregate = NULL,
  rules = defaultSentimentRules(),
  removeStopwords = TRUE,
  stemming = TRUE,
  ...
)
```

## S3 method for class 'character'
```r
analyzeSentiment(
  x,
  language = "english",
  aggregate = NULL,
  rules = defaultSentimentRules(),
  removeStopwords = TRUE,
  stemming = TRUE,
  ...
)
```
## S3 method for class 'data.frame'
analyzeSentiment(
  x,
  language = "english",
  aggregate = NULL,
  rules = defaultSentimentRules(),
  removeStopwords = TRUE,
  stemming = TRUE,
  ...
)

## S3 method for class 'TermDocumentMatrix'
analyzeSentiment(
  x,
  language = "english",
  aggregate = NULL,
  rules = defaultSentimentRules(),
  removeStopwords = TRUE,
  stemming = TRUE,
  ...
)

## S3 method for class 'DocumentTermMatrix'
analyzeSentiment(
  x,
  language = "english",
  aggregate = NULL,
  rules = defaultSentimentRules(),
  removeStopwords = TRUE,
  stemming = TRUE,
  ...
)

### Arguments

- **x**: A vector of characters, a data.frame, an object of type `Corpus`, `TermDocumentMatrix` or `DocumentTermMatrix`
- **language**: Language used for preprocessing operations (default: English)
- **aggregate**: A factor variable by which documents can be grouped. This helpful when joining e.g. news from the same day or move reviews by the same author
- **rules**: A named list containing individual sentiment metrics. Therefore, each entry consists itself of a list with first a method, followed by an optional dictionary.
- **removeStopwords**: Flag indicating whether to remove stopwords or not (default: yes)
- **stemming**: Perform stemming (default: TRUE)
- **...**: Additional parameters passed to function for e.g. preprocessing
analyzeSentiment

Details

This function returns a data.frame with continuous values. If one desires other formats, one needs to convert these. Common examples of such formats are binary response values (positive / negative) or tertiary (positive, neutral, negative). Hence, consider using the functions convertToBinaryResponse and convertToDirection, which can convert a vector of continuous sentiment scores into a factor object.

Value

Result is a matrix with sentiment values for each document across all defined rules

See Also

compareToResponse for evaluating the results, convertToBinaryResponse and convertToDirection for getting binary results, generateDictionary for dictionary generation, plotSentiment and plotSentimentResponse for visualization

Examples

## Not run:
library(tm)

# via vector of strings
corpus <- c("Positive text", "Neutral but uncertain text", "Negative text")
sentiment <- analyzeSentiment(corpus)
compareToResponse(sentiment, c(+1, 0, -2))

# via Corpus from tm package
data("crude")
sentiment <- analyzeSentiment(crude)

# via DocumentTermMatrix (with stemmed entries)
dtm <- DocumentTermMatrix(VCorpus(VectorSource(c("posit posit", "negat neutral"))))
sentiment <- analyzeSentiment(dtm)
compareToResponse(sentiment, convertToBinaryResponse(c(+1, -1)))

# By adapting the parameter rules, one can incorporate customized dictionaries
# e.g. in order to adapt to arbitrary languages
dictionaryAmplifiers <- SentimentDictionary(c("more", "much"))
sentiment <- analyzeSentiment(corpus,
    rules=list("Amplifiers"=list(ruleRatio,
        dictionaryAmplifiers)))

# On can also restrict the number of computed methods to the ones of interest
# in order to achieve performance optimizations
sentiment <- analyzeSentiment(corpus,
    rules=list("SentimentLM"=list(ruleSentiment,
        loadDictionaryLM())))
sentiment

## End(Not run)
compareDictionaries  
Compares two dictionaries

Description

Routine compares two dictionaries in terms of how similarities and differences. Among the calculated measures are the total of distinct words, the overlap between both dictionaries, etc.

Usage

compareDictionaries(d1, d2)

Arguments

- **d1** is the first sentiment dictionary of type `SentimentDictionaryWordlist`, `SentimentDictionaryBinary`, or `SentimentDictionaryWeighted`
- **d2** is the first sentiment dictionary of type `SentimentDictionaryWordlist`, `SentimentDictionaryBinary`, or `SentimentDictionaryWeighted`

Value

Returns list with different metrics depending on dictionary type

Note

Currently, this routine only supports the case where both dictionaries are of the same type

See Also

`SentimentDictionaryWordlist`, `SentimentDictionaryBinary`, `SentimentDictionaryWeighted` for the specific classes

Examples

```r
d1 <- SentimentDictionary(c("uncertain", "possible", "likely"))
d2 <- SentimentDictionary(c("rather", "intend", "likely"))
cmp <- compareDictionaries(d1, d2)

d1 <- SentimentDictionary(c("increase", "rise", "more"),
c("fall", "drop"))
d2 <- SentimentDictionary(c("positive", "rise", "more"),
c("negative", "drop"))
cmp <- compareDictionaries(d1, d2)

d1 <- SentimentDictionary(c("increase", "decrease", "exit"),
c(+1, -1, -10),
rep(NA, 3))
```
compareToResponse

```r
d2 <- SentimentDictionary(c("increase", "decrease", "drop", "neutral"),
  c(+2, -5, -1, 0),
  rep(NA, 4))
cmp <- compareDictionaries(d1, d2)
```

---

### compareToResponse

**Compare sentiment values to existing response variable**

**Description**

This function compares the calculated sentiment values with an external response variable. Examples of such an exogenous response are stock market movements or IMDb movie rating. Both usually reflect a "true" value that the sentiment should match.

**Usage**

```r
cmpToResponse(sentiment, response)
```

#### S3 method for class 'logical'

```r
cmpToResponse(sentiment, response)
```

#### S3 method for class 'factor'

```r
cmpToResponse(sentiment, response)
```

#### S3 method for class 'integer'

```r
cmpToResponse(sentiment, response)
```

#### S3 method for class 'data.frame'

```r
cmpToResponse(sentiment, response)
```

#### S3 method for class 'numeric'

```r
cmpToResponse(sentiment, response)
```

**Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sentiment</td>
<td>Matrix with sentiment scores for each document across several sentiment rules</td>
</tr>
<tr>
<td>response</td>
<td>Vector with &quot;true&quot; response. This vector can either be of a continuous numeric or binary values. In case of the latter, FALSE is matched to a negative sentiment value, while TRUE is matched to a non-negative one.</td>
</tr>
</tbody>
</table>

**Value**

Matrix with different performance metrics for all given sentiment rules
**Examples**

```r
sentiment <- matrix(c(5.5, 2.9, 0.9, -1),
                   dimnames=list(c("A", "B", "C", "D"), c("Sentiment")))

# continuous numeric response variable
response <- c(5, 3, 1, -1)
compareToResponse(sentiment, response)

# binary response variable
response <- c(TRUE, TRUE, FALSE, FALSE)
compareToResponse(sentiment, response)
```

---

**convertToBinaryResponse**

*Convert continuous sentiment to direction*

**Description**

This function converts continuous sentiment scores into a their corresponding binary sentiment class. As such, the result is a factor with two levels indicating positive and negative content. Neutral documents (with a sentiment score of 0) are counted as positive.

**Usage**

```r
convertToBinaryResponse(sentiment)
```

**Arguments**

- **sentiment** Vector, matrix or data.frame with sentiment scores.

**Details**

If a matrix or data.frame is provided, this routine does not touch all columns. In fact, it scans for those where the column name starts with "Sentiment" and changes these columns only. Hence, columns with pure negativity, positivity or ratios or word counts are ignored.

**Value**

If a vector is supplied, it returns a factor with two levels representing positive and negative content. Otherwise, it returns a data.frame with the corresponding columns being exchanged.

**See Also**

- `convertToDirection`
**convertToDirection**

**Examples**

```r
sentiment <- c(-1, -0.5, +1, 0.6, 0)
convertToBinaryResponse(sentiment)
convertToDirection(sentiment)

df <- data.frame(No=1:5, Sentiment=sentiment)
df
cvtColorToBinaryResponse(df)
cvtColorToDirection(df)
```

---

**convertToDirection**   *Convert continuous sentiment to direction*

**Description**

This function converts continuous sentiment scores into their corresponding sentiment direction. As such, the result is a factor with three levels indicating positive, neutral and negative content. In contrast to `convertToBinaryResponse`, neutral documents have their own category.

**Usage**

```r
cvtColorToDirection(sentiment)
```

**Arguments**

- `sentiment`: Vector, matrix or data.frame with sentiment scores.

**Details**

If a matrix or data.frame is provided, this routine does not touch all columns. In fact, it scans for those where the column name starts with "Sentiment" and changes these columns only. Hence, columns with pure negativity, positivity or ratios or word counts are ignored.

**Value**

If a vector is supplied, it returns a factor with three levels representing positive, neutral and negative content. Otherwise, it returns a data.frame with the corresponding columns being exchanged.

**See Also**

`convertToBinaryResponse`
Examples

```r
sentiment <- c(-1, -0.5, +1, 0.6, 0)
convertToBinaryResponse(sentiment)
convertToDirection(sentiment)

df <- data.frame(No=1:5, Sentiment=sentiment)
df
convertToBinaryResponse(df)
convertToDirection(df)
```

<table>
<thead>
<tr>
<th>countWords</th>
<th>Count words</th>
</tr>
</thead>
</table>

Description

Function counts the words in each document

Usage

```r
countWords(
  x,
  aggregate = NULL,
  removeStopwords = TRUE,
  language = "english",
  ...
)
```

## S3 method for class 'Corpus'
```r
countWords(
  x,
  aggregate = NULL,
  removeStopwords = TRUE,
  language = "english",
  ...
)
```

## S3 method for class 'character'
```r
countWords(
  x,
  aggregate = NULL,
  removeStopwords = TRUE,
  language = "english",
  ...
)
```

## S3 method for class 'data.frame'
```r
countWords(
```
countWords

x,
aggregate = NULL,
removeStopwords = TRUE,
language = "english",
...
)

## S3 method for class 'TermDocumentMatrix'
countWords(
  x,
  aggregate = NULL,
  removeStopwords = TRUE,
  language = "english",
  ...
)

## S3 method for class 'DocumentTermMatrix'
countWords(
  x,
  aggregate = NULL,
  removeStopwords = TRUE,
  language = "english",
  ...
)

Arguments

x A vector of characters, a data.frame, an object of type Corpus, TermDocumentMatrix or DocumentTermMatrix
aggregate A factor variable by which documents can be grouped. This helpful when joining e.g. news from the same day or move reviews by the same author
removeStopwords Flag indicating whether to remove stopwords or not (default: yes)
language Language used for preprocessing operations (default: English)
... Additional parameters passed to function for e.g. preprocessing

Value

Result is a matrix with word counts for each document across

Examples

documents <- c("This is a test", "an one more")

# count words (without stopwords)
countWords(documents)

# count all words (including stopwords)
countWords(documents, removeStopwords=FALSE)
DictionaryGI

**Dictionary with opinionated words from the Harvard-IV dictionary as used in the General Inquirer software**

**Description**

Dictionary with a list of positive and negative words according to the psychological Harvard-IV dictionary as used in the General Inquirer software. This is a general-purpose dictionary developed by the Harvard University.

**Usage**

data(DictionaryGI)

**Format**

A list with different terms according to Henry

**Note**

All words are in lower case and non-stemmed

**Source**

http://www.wjh.harvard.edu/~inquirer/

**Examples**

data(DictionaryGI)
summary(DictionaryGI)

DictionaryHE

**Dictionary with opinionated words from Henry’s Financial dictionary**

**Description**

Dictionary with a list of positive and negative words according to the Henry’s finance-specific dictionary. This dictionary was first presented in the *Journal of Business Communication* among one of the early adopters of text analysis in the finance discipline.

**Usage**

data(DictionaryHE)

**Format**

A list with different wordlists according to Henry
Note

All words are in lower case and non-stemmed

References


Examples

data(DictionaryLM)
summary(DictionaryLM)

DictionaryLM

Dictionary with opinionated words from Loughran-McDonald Financial dictionary

Description

Dictionary with a list of positive, negative and uncertainty words according to the Loughran-McDonald finance-specific dictionary. This dictionary was first presented in the Journal of Finance and has been widely used in the finance domain ever since.

Usage

data(DictionaryLM)

Format

A list with different terms according to Loughran-McDonald

Note

All words are in lower case and non-stemmed

Source

http://www3.nd.edu/~mcdonald/Word_Lists.html

References


Examples

data(DictionaryLM)
summary(DictionaryLM)
enetEstimation

Elastic net estimation

Description
Function estimates coefficients based on elastic net regularization.

Usage
enetEstimation(
  x,
  response,
  control = list(alpha = 0.5, s = "lambda.min", family = "gaussian", grouped = FALSE),
  ...
)

Arguments
x                   An object of type DocumentTermMatrix.
response            Response variable including the given gold standard.
control             (optional) A list of parameters defining the model as follows:
  • "alpha" Abstraction parameter for switching between LASSO and ridge regularization (with default alpha=0.5). Best option is to loop over this parameter and test different alternatives.
  • "s" Value of the parameter lambda at which the elastic net is evaluated. Default is s="lambda.1se" which takes the calculated minimum value for λ and then subtracts one standard error in order to avoid overfitting. This often results in a better performance than using the minimum value itself given by lambda="lambda.min".
  • "family" Distribution for response variable. Default is family="gaussian". For non-negative counts, use family="poisson". For binary variables family="binomial". See glmnet for further details.
  • "grouped" Determines whether grouped function is used (with default FALSE).
  ...

Additional parameters passed to function for glmnet.

Value
Result is a list with coefficients, coefficient names and the model intercept.
**extractWords**

*Extract words from dictionary*

**Description**

Returns all entries from a dictionary.

**Usage**

```r
extractWords(d)
```

**Arguments**

- `d` Dictionary of type `SentimentDictionaryWordlist`, `SentimentDictionaryBinary` or `SentimentDictionaryWeighted`

**Examples**

```r
extractWords(SentimentDictionary(c("uncertain", "possible", "likely"))) # returns 3
extractWords(SentimentDictionary(c("increase", "rise", "more"),
                                 c("fall", "drop"))) # returns 5
extractWords(SentimentDictionary(c("increase", "decrease", "exit"),
                                 c(+1, -1, -10),
                                 rep(NA, 3))) # returns 3
```

**generateDictionary**

*Generates dictionary of decisive terms*

**Description**

Routine applies method for dictionary generation (LASSO, ridge regularization, elastic net, ordinary least squares, generalized linear model or spike-and-slab regression) to the document-term matrix in order to extract decisive terms that have a statistically significant impact on the response variable.

**Usage**

```r
generateDictionary(
  x,
  response,
  language = "english",
  modelType = "lasso",
  filterTerms = NULL,
  control = list(),
  minWordLength = 3,
  sparsity = 0.9,
)```
weighting = function(x) tm::weightTfIdf(x, normalize = FALSE),
...
)

### S3 method for class 'Corpus'
generateDictionary(
x,
response,
language = "english",
modelType = "lasso",
filterTerms = NULL,
control = list(),
minWordLength = 3,
sparsity = 0.9,
weighting = function(x) tm::weightTfIdf(x, normalize = FALSE),
...
)

### S3 method for class 'character'
generateDictionary(
x,
response,
language = "english",
modelType = "lasso",
filterTerms = NULL,
control = list(),
minWordLength = 3,
sparsity = 0.9,
weighting = function(x) tm::weightTfIdf(x, normalize = FALSE),
...
)

### S3 method for class 'data.frame'
generateDictionary(
x,
response,
language = "english",
modelType = "lasso",
filterTerms = NULL,
control = list(),
minWordLength = 3,
sparsity = 0.9,
weighting = function(x) tm::weightTfIdf(x, normalize = FALSE),
...
)

### S3 method for class 'TermDocumentMatrix'
generateDictionary(
```r
x, response, language = "english", modelType = "lasso", filterTerms = NULL,
control = list(), minWordLength = 3, sparsity = 0.9,
weighting = function(x) tm::weightTfIdf(x, normalize = FALSE), ...
)

## S3 method for class 'DocumentTermMatrix'
genenerateDictionary(
  x, response, language = "english", modelType = "lasso",
  filterTerms = NULL, control = list(),
  minWordLength = 3, sparsity = 0.9,
  weighting = function(x) tm::weightTfIdf(x, normalize = FALSE), ...
)

Arguments

- **x**: A vector of characters, a `data.frame`, an object of type `Corpus`, `TermDocumentMatrix` or `DocumentTermMatrix`
- **response**: Response variable including the given gold standard.
- **language**: Language used for preprocessing operations (default: English).
- **modelType**: A string denoting the estimation method. Allowed values are `lasso`, `ridge`, `enet`, `lm` or `glm` or `spikeslab`.
- **filterTerms**: Optional vector of strings (default: NULL) to filter terms that are used for dictionary generation.
- **control**: (optional) A list of parameters defining the model used for dictionary generation. If `modelType=lasso` is selected, individual parameters are as follows:
  - "s" Value of the parameter lambda at which the LASSO is evaluated. Default is `s="lambda.1se"` which takes the calculated minimum value for lambda and then subtracts one standard error in order to avoid overfitting. This often results in a better performance than using the minimum value itself given by `lambda="lambda.min"`.
  - "family" Distribution for response variable. Default is `family="gaussian"`. For non-negative counts, use `family="poisson"`. For binary variables `family="binomial"`. See `glmnet` for further details.
  - "grouped" Determines whether grouped LASSO is used (with default FALSE).
If `modelType=ridge` is selected, individual parameters are as follows:

- "s" Value of the parameter lambda at which the ridge is evaluated. Default is \( s=\text{"lambda.1se"} \) which takes the calculated minimum value for \( \lambda \) and then subtracts one standard error in order to avoid overfitting. This often results in a better performance than using the minimum value itself given by \( \text{lambda}=\text{"lambda.min"} \).
- "family" Distribution for response variable. Default is \( \text{family="gaussian"} \). For non-negative counts, use \( \text{family="poisson"} \). For binary variables \( \text{family="binomial"} \). See \texttt{glmnet} for further details.
- "grouped" Determines whether grouped function is used (with default \text{FALSE}).

If `modelType=enet` is selected, individual parameters are as follows:

- "alpha" Abstraction parameter for switching between LASSO (with \( \alpha=1 \)) and ridge regression (\( \alpha=0 \)). Default is \( \alpha=0.5 \). Recommended option is to test different values between 0 and 1.
- "s" Value of the parameter lambda at which the elastic net is evaluated. Default is \( s=\text{"lambda.1se"} \) which takes the calculated minimum value for \( \lambda \) and then subtracts one standard error in order to avoid overfitting. This often results in a better performance than using the minimum value itself given by \( \text{lambda}=\text{"lambda.min"} \).
- "family" Distribution for response variable. Default is \( \text{family="gaussian"} \). For non-negative counts, use \( \text{family="poisson"} \). For binary variables \( \text{family="binomial"} \). See \texttt{glmnet} for further details.
- "grouped" Determines whether grouped function is used (with default \text{FALSE}).

If `modelType=lm` is selected, no parameters are passed on.

If `modelType=glm` is selected, individual parameters are as follows:

- "family" Distribution for response variable. Default is \( \text{family="gaussian"} \). For non-negative counts, use \( \text{family="poisson"} \). For binary variables \( \text{family="binomial"} \). See \texttt{glm} for further details.

If `modelType=spikeslab` is selected, individual parameters are as follows:

- "n.iter1" Number of burn-in Gibbs sampled values (i.e., discarded values). Default is 500.
- "n.iter2" Number of Gibbs sampled values, following burn-in. Default is 500.

\begin{itemize}
  \item \texttt{minWordLength} Removes words given a specific minimum length (default: 3). This preprocessing is applied when the input is a character vector or a corpus and the document-term matrix is generated inside the routine.
  \item \texttt{sparsity} A numeric for removing sparse terms in the document-term matrix. The argument \texttt{sparsity} specifies the maximal allowed sparsity. Default is \texttt{sparsity=0.9}, however, this is only applied when the document-term matrix is calculated inside the routine.
  \item \texttt{weighting} Weights a document-term matrix by e.g. term frequency - inverse document frequency (default). Other variants can be used from \texttt{DocumentTermMatrix}.
  \item ... Additional parameters passed to function for e.g. preprocessing or \texttt{glmnet}.
\end{itemize}
Value

Result is a matrix which sentiment values for each document across all defined rules

Source

doi: 10.1371/journal.pone.0209323

References


See Also

analyzeSentiment, predict.SentimentDictionaryWeighted, plot.SentimentDictionaryWeighted and compareToResponse for advanced evaluations

Examples

# Create a vector of strings
documents <- c("This is a good thing!",
               "This is a very good thing!",
               "This is okay.",
               "This is a bad thing.",
               "This is a very bad thing.")
response <- c(1, 0.5, 0, -0.5, -1)

# Generate dictionary with LASSO regularization
dictionary <- generateDictionary(documents, response)

# Show dictionary
dictionary
summary(dictionary)
plot(dictionary)

# Compute in-sample performance
sentiment <- predict(dictionary, documents)
compareToResponse(sentiment, response)
plotSentimentResponse(sentiment, response)

# Generate new dictionary with spike-and-slab regression instead of LASSO regularization
library(spikeslab)
dictionary <- generateDictionary(documents, response, modelType="spikeslab")

# Generate new dictionary with tf weighting instead of tf-idf
library(tm)
dictionary <- generateDictionary(documents, response, weighting=weightTf)
sentiment <- predict(dictionary, documents)
compareToResponse(sentiment, response)

# Use instead lambda.min from the LASSO estimation
dictionary <- generateDictionary(documents, response, control=list(s="lambda.min"))
sentiment <- predict(dictionary, documents)
compareToResponse(sentiment, response)

# Use instead OLS as estimation method
dictionary <- generateDictionary(documents, response, modelType="lm")
sentiment <- predict(dictionary, documents)
sentiment
dictionary <- generateDictionary(documents, response, modelType="lm",
filterTerms = c("good", "bad"))
sentiment <- predict(dictionary, documents)
sentiment
dictionary <- generateDictionary(documents, response, modelType="lm",
filterTerms = extractWords(loadDictionaryGI()))
sentiment <- predict(dictionary, documents)
sentiment

# Generate dictionary without LASSO intercept
dictionary <- generateDictionary(documents, response, intercept=FALSE)
dictionary$intercept

## Not run:
imdb <- loadImdb()

# Generate Dictionary
dictionary_imdb <- generateDictionary(imdb$Corpus, imdb$Rating, family="poisson")
summary(dictionary_imdb)

compareDictionaries(dictionary_imdb, loadDictionaryGI())

# Show estimated coefficients with Kernel Density Estimation (KDE)
plot(dictionary_imdb)
plot(dictionary_imdb) + xlim(c(-0.1, 0.1))

# Compute in-sample performance
pred_sentiment <- predict(dict_imdb, imdb$Corpus)
compareToResponse(pred_sentiment, imdb$Rating)

# Test a different sparsity parameter
dictionary_imdb <- generateDictionary(imdb$Corpus, imdb$Rating, family="poisson", sparsity=0.99)
summary(dictionary_imdb)
pred_sentiment <- predict(dict_imdb, imdb$Corpus)
compareToResponse(pred_sentiment, imdb$Rating)

## End(Not run)
lassoEstimation

Description

Function estimates coefficients based on LASSO regularization.

Usage

lassoEstimation(
  x, response, control = list(alpha = 1, s = "lambda.min", family = "gaussian", grouped = FALSE), ...
)

Arguments

x An object of type `DocumentTermMatrix`.
response Response variable including the given gold standard.
control (optional) A list of parameters defining the LASSO model as follows:
  - "family"Distribution for response variable. Default is family="gaussian". For non-negative counts, use family="poisson". For binary variables family="binomial". See `glm` for further details.
... Additional parameters passed to function for `glm`.

Value

Result is a list with coefficients, coefficient names and the model intercept.

Result is a list with coefficients, coefficient names and the model intercept.
lmEstimation

- "s" Value of the parameter lambda at which the LASSO is evaluated. Default is \( s = \lambda^{\text{se}} \) which takes the calculated minimum value for \( \lambda \) and then subtracts one standard error in order to avoid overfitting. This often results in a better performance than using the minimum value itself given by \( \lambda = \lambda^{\text{min}} \).
- "family" Distribution for response variable. Default is \( \text{family} = \text{"gaussian"} \). For non-negative counts, use \( \text{family} = \text{"poisson"} \). For binary variables \( \text{family} = \text{"binomial"} \). See \text{glmnet} for further details.
- "grouped" Determines whether grouped LASSO is used (with default FALSE).

Additional parameters passed to function for \text{glmnet}.

Value

Result is a list with coefficients, coefficient names and the model intercept.

Description

Function estimates coefficients based on ordinary least squares.

Usage

\[
\text{lmEstimation}(x, \text{response}, \text{control} = \text{list()}, \ldots)
\]

Arguments

- \( x \) An object of type \text{DocumentTermMatrix}.
- \( \text{response} \) Response variable including the given gold standard.
- \( \text{control} \) (optional) A list of parameters (not used).
- \( \ldots \) Additional parameters (not used).

Value

Result is a list with coefficients, coefficient names and the model intercept.
loadDictionaryGI

**Loads Harvard-IV dictionary into object**

**Description**

Loads Harvard-IV dictionary (as used in General Inquirer) into a standardized dictionary object

**Usage**

```r
loadDictionaryGI()
```

**Value**

object of class `SentimentDictionary`

**Note**

Result is a list of stemmed words in lower case

---

loadDictionaryHE

**Loads Henry’s finance-specific dictionary into object**

**Description**

Loads Henry’s finance-specific dictionary into a standardized dictionary object

**Usage**

```r
loadDictionaryHE()
```

**Value**

object of class `SentimentDictionary`

**Note**

Result is a list of stemmed words in lower case
loadDictionaryLM  
*Loads Loughran-McDonald dictionary into object*

**Description**

Loads Loughran-McDonald financial dictionary into a standardized dictionary object (here, categories positive and negative are considered)

**Usage**

loadDictionaryLM()

**Value**

object of class `SentimentDictionary`

**Note**

Result is a list of stemmed words in lower case

---

loadDictionaryLM_Uncertainty  
*Loads uncertainty words from Loughran-McDonald into object*

**Description**

Loads uncertainty words from Loughran-McDonald into a standardized dictionary object

**Usage**

loadDictionaryLM_Uncertainty()

**Value**

object of class `SentimentDictionary`

**Note**

Result is a list of stemmed words in lower case
loadDictionaryQDAP

Description

Loads polarity words from qdap package into object

Usage

loadDictionaryQDAP()

Value

object of class SentimentDictionary

Note

Result is a list of stemmed words in lower case

Source

https://www.cs.uic.edu/~liub/FBS/sentiment-analysis.html

References


loadImdb

Retrieves IMDb dataset

Description

Function downloads IMDb dataset and prepares corresponding user ratings for easy usage.

Usage

loadImdb()

Value

Returns a list where entry named Corpus contains the IMDb reviews, and Rating is the corresponding scaled rating.
References


Examples

```r
## Not run:
imdb <- loadImdb()
dictionary <- generateDictionary(imdb$Corpus, imdb$Rating)
## End(Not run)
```

lookupEstimationMethod

*Estimation method*

Description

Decides upon a estimation method for dictionary generation. Input is a name for the estimation method, output is the corresponding function object.

Usage

`lookupEstimationMethod(type)`

Arguments

- `type` A string denoting the estimation method. Allowed values are `lasso`, `ridge`, `enet`, `lm`, `glm` or `spikeslab`.

Value

Function that implements the specific estimation method.

ngram_tokenize

*N-gram tokenizer*

Description

A tokenizer for use with a document-term matrix from the tm package. Supports both character and word ngrams, including own wrapper to handle non-Latin encodings.

Usage

`ngram_tokenize(x, char = FALSE, ngmin = 1, ngmax = 3)`
### numEntries

**Arguments**

- `x` input string
- `char` boolean value specifying whether to use character (char = TRUE) or word n-grams (char = FALSE, default)
- `ngmin` integer giving the minimum order of n-gram (default: 1)
- `ngmax` integer giving the maximum order of n-gram (default: 3)

**Examples**

```r
library(tm)
en <- c("Romeo loves Juliet", "Romeo loves a girl")
en.corpus <- VCorpus(VectorSource(en))
tdm <- TermDocumentMatrix(en.corpus,
  control=list(wordLengths=c(1,Inf),
    tokenize=function(x) ngram_tokenize(x, char=TRUE, ngmin=3, ngmax=3)))
inspect(tdm)

ch <- c("abab", "aabb")
ch.corpus <- VCorpus(VectorSource(ch))
tdm <- TermDocumentMatrix(ch.corpus,
  control=list(wordLengths=c(1,Inf),
    tokenize=function(x) ngram_tokenize(x, char=TRUE, ngmin=1, ngmax=2)))
inspect(tdm)
```

<table>
<thead>
<tr>
<th>numEntries</th>
<th>Number of words in dictionary</th>
</tr>
</thead>
</table>

**Description**

Counts total number of entries in dictionary.

**Usage**

`numEntries(d)`

**Arguments**

- `d` Dictionary of type `SentimentDictionaryWordlist`, `SentimentDictionaryBinary` or `SentimentDictionaryWeighted`

**See Also**

`numPositiveEntries` and `numNegativeEntries` for more option to count the number of entries
Examples

numEntries(SentimentDictionary(c("uncertain", "possible", "likely"))) # returns 3
numEntries(SentimentDictionary(c("increase", "rise", "more"),
   c("fall", "drop"))) # returns 5
numEntries(SentimentDictionary(c("increase", "decrease", "exit"),
   c(+1, -1, -10),
   rep(NA, 3))) # returns 3

numNegativeEntries Number of negative words in dictionary

Description

Counts total number of negative entries in dictionary.

Usage

numNegativeEntries(d)

Arguments

d is a dictionary of type SentimentDictionaryBinary or SentimentDictionaryWeighted

Note

Entries in SentimentDictionaryWeighted with a weight of 0 are not counted here

See Also

numEntries and numPositiveEntries for more option to count the number of entries

Examples

numNegativeEntries(SentimentDictionary(c("increase", "rise", "more"),
   c("fall", "drop"))) # returns 2
numNegativeEntries(SentimentDictionary(c("increase", "decrease", "exit"),
   c(+1, -1, -10),
   rep(NA, 3))) # returns 2
numPositiveEntries

numPositiveEntries  Number of positive words in dictionary

Description
Counts total number of positive entries in dictionary.

Usage
numPositiveEntries(d)

Arguments
d is a dictionary of type SentimentDictionaryBinary or SentimentDictionaryWeighted

Note
Entries in SentimentDictionaryWeighted with a weight of 0 are not counted here

See Also
numEntries and numNegativeEntries for more option to count the number of entries

Examples
numPositiveEntries(SentimentDictionary(c("increase", "rise", "more"),
  c("fall", "drop")))  # returns 3
numPositiveEntries(SentimentDictionary(c("increase", "decrease", "exit"),
  c(+1, -1, -10),
  rep(NA, 3)))  # returns 1

plot.SentimentDictionaryWeighted
  KDE plot of estimated coefficients

Description
Function performs a Kernel Density Estimation (KDE) of the coefficients and then plot these using
ggplot. This type of plot allows to inspect whether the distribution of coefficients is skew. This can reveal if there are more positive terms than negative or vice versa.

Usage
## S3 method for class 'SentimentDictionaryWeighted'
plot(x, color = "gray60", theme = ggplot2::theme_bw(), ...)

plotSentiment

Arguments

x 	Dictionary of class SentimentDictionaryWeighted
color 	Color for filling the density plot (default: gray color)
theme 	Visualization theme for ggplot (default: is a black-white theme)
... 	Additional parameters passed to function.

Value

Returns a plot of class ggplot

See Also

plotSentiment and plotSentimentResponse for further plotting options

Examples

d <- SentimentDictionaryWeighted(paste0(character(100), 1:100), rnorm(100), numeric(100))
plot(d)

# Change color in plot
plot(d, color="red")

library(ggplot2)
# Extend plot with additional layout options
plot(d) + ggtitle("KDE plot")
plot(d) + theme_void()

plotSentiment 	Line plot with sentiment scores

Description

Simple line plot to visualize the evolvement of sentiment scores. This is especially helpful when studying a time series of sentiment scores.

Usage

plotSentiment(
  sentiment,
  x = NULL,
  cumsum = FALSE,
  xlab = "",
  ylab = "Sentiment"
)
plotSentimentResponse  Scatterplot with trend line between sentiment and response

Description

Generates a scatterplot where points pairs of sentiment and the response variable. In addition, the plot adds a trend line in the form of a generalized additive model (GAM). Other smoothing variables are possible based on `geom_smooth`. This function is helpful for visualization the relationship between computed sentiment scores and the gold standard.

Usage

```r
plotSentimentResponse(
  sentiment,
  response,
  smoothing = "gam",
  xlab = "Sentiment",
  ylab = "Response"
)
```
Arguments

sentiment  data.frame with sentiment scores
response   Vector with response variables of the same length
smoothing  Smoothing functionality. Default is smoothing="gam" to utilize a generalized
           additive model (GAM). Other options can be e.g. a linear trend line (smoothing="lm");
           see geom_smooth for a full list of options.
xlab       Description on x-axis (default: "Sentiment").
ylab       Description on y-axis (default: "Sentiment").

Value

Returns a plot of class ggplot

See Also

plotSentiment and plot.SentimentDictionaryWeighted for further plotting options

Examples

```r
sentiment <- data.frame(Dictionary=runif(10))
response <- sentiment[[1]] + rnorm(10)
plotSentimentResponse(sentiment, response)

# Change x-axis
plotSentimentResponse(sentiment, response, xlab="Tone")

library(ggplot2)
# Extend plot with additional layout options
plotSentimentResponse(sentiment, response) + ggtitle("Scatterplot")
plotSentimentResponse(sentiment, response) + theme_void()
```

predict.SentimentDictionaryWeighted

*Prediction for given dictionary*

Description

Function takes a dictionary of class SentimentDictionaryWeighted with weights as input. It then applies this dictionary to textual contents in order to calculate a sentiment score.
Usage

```r
# S3 method for class 'SentimentDictionaryWeighted'
predict(
  object,
  newdata = NULL,
  language = "english",
  weighting = function(x) tm::weightTfIdf(x, normalize = FALSE),
  ...
)
```

Arguments

- `object`: Dictionary of class `SentimentDictionaryWeighted`.
- `newdata`: A vector of characters, a `data.frame`, an object of type `Corpus`, `TermDocumentMatrix` or `DocumentTermMatrix`.
- `language`: Language used for preprocessing operations (default: English).
- `weighting`: Function used for weighting of words; default is a link to the tf-idf scheme.
- `...`: Additional parameters passed to function for e.g. preprocessing.

Value

data.frame with predicted sentiment scores.

See Also

- `SentimentDictionaryWeighted`, `generateDictionary` and `compareToResponse` for default dictionary generations

Examples

```r
#' # Create a vector of strings
documents <- c("This is a good thing!",
               "This is a very good thing!",
               "This is okay.",
               "This is a bad thing.",
               "This is a very bad thing.")
response <- c(1, 0.5, 0, -0.5, -1)

# Generate dictionary with LASSO regularization
dictionary <- generateDictionary(documents, response)

# Compute in-sample performance
sentiment <- predict(dictionary, documents)
compareToResponse(sentiment, response)
```
**preprocessCorpus**  
*Default preprocessing of corpus*

**Description**

Preprocess existing corpus of type Corpus according to default operations. This helper function groups all standard preprocessing steps such that the usage of the package is more convenient.

**Usage**

```r
code
preprocessCorpus(  
  corpus,  
  language = "english",  
  stemming = TRUE,  
  verbose = FALSE,  
  removeStopwords = TRUE
)
```

**Arguments**

- **corpus**  
  Corpus object which should be processed
- **language**  
  Default language used for preprocessing (i.e. stop word removal and stemming)
- **stemming**  
  Perform stemming (default: TRUE)
- **verbose**  
  Print preprocessing status information
- **removeStopwords**  
  Flag indicating whether to remove stopwords or not (default: yes)

**Value**

Object of Corpus

**print.SentimentDictionaryWordlist**

*Output content of sentiment dictionary*

**Description**

Prints entries of sentiment dictionary to the screen
Usage

## S3 method for class 'SentimentDictionaryWordlist'
print(x, ...)

## S3 method for class 'SentimentDictionaryBinary'
print(x, ...)

## S3 method for class 'SentimentDictionaryWeighted'
print(x, ...)

Arguments

x  Sentiment dictionary of type `SentimentDictionaryWordlist`, `SentimentDictionaryBinary` or `SentimentDictionaryWeighted`

...  Additional parameters passed to specific sub-routines

See Also

`summary` for showing a brief summary

Examples

print(SentimentDictionary(c("uncertain", "possible", "likely")));
print(SentimentDictionary(c("increase", "rise", "more"),
                          c("fall", "drop")));
print(SentimentDictionary(c("increase", "decrease", "exit"),
                          c(+1, -1, -10),
                          rep(NA, 3)))

---

read  Read dictionary from text file

Description

This routine reads a sentiment dictionary from a text file. Such a text file can be created e.g. via `write`. The dictionary type is recognized according to the internal format of the file.

Usage

read(file)

Arguments

file  File name pointing to text file

Value

Dictionary of type `SentimentDictionaryWordlist`, `SentimentDictionaryBinary` or `SentimentDictionaryWeighted`
Ridge estimation

Function estimates coefficients based on ridge regularization.

Usage

ridgeEstimation(
  x,  
  response,  
  control = list(s = "lambda.min", family = "gaussian", grouped = FALSE),  
  ...  
)

Arguments

x An object of type DocumentTermMatrix.
response Response variable including the given gold standard.
control (optional) A list of parameters defining the model as follows:
• "s" Value of the parameter lambda at which the ridge is evaluated. Default is s="lambda.1se" which takes the calculated minimum value for \( \lambda \) and then subtracts one standard error in order to avoid overfitting. This often results in a better performance than using the minimum value itself given by lambda="lambda.min".

• "family" Distribution for response variable. Default is family="gaussian". For non-negative counts, use family="poisson". For binary variables family="binomial". See \texttt{glmnet} for further details.

• "grouped" Determines whether grouped function is used (with default FALSE).

... Additional parameters passed to function for \texttt{glmnet}.

Value

Result is a list with coefficients, coefficient names and the model intercept.

---

**ruleLinearModel**  
*Sentiment based on linear model*

Description

Sentiment score as denoted by a linear model.

Usage

\texttt{ruleLinearModel(dtm, d)}

Arguments

- \texttt{dtm} Document-term matrix  
- \texttt{d} Dictionary of type \texttt{SentimentDictionaryWeighted}

Value

Continuous sentiment score
### ruleNegativity

**Ratio of negative words**

**Description**

Ratio of words labeled as negative in that dictionary compared to the total number of words in the document. Here, it uses the entry negativeWords of the `SentimentDictionaryBinary`.

**Usage**

```r
ruleNegativity(dtm, d)
```

**Arguments**

- `dtm`: Document-term matrix
- `d`: Dictionary of type `SentimentDictionaryBinary`

**Value**

Ratio of negative words compared to all

### rulePositivity

**Ratio of positive words**

**Description**

Ratio of words labeled as positive in that dictionary compared to the total number of words in the document. Here, it uses the entry positiveWords of the `SentimentDictionaryBinary`.

**Usage**

```r
rulePositivity(dtm, d)
```

**Arguments**

- `dtm`: Document-term matrix
- `d`: Dictionary of type `SentimentDictionaryBinary`

**Value**

Ratio of positive words compared to all
ruleRatio

Ratio of dictionary words

Description
Ratio of words in that dictionary compared to the total number of words in the document

Usage
ruleRatio(dtm, d)

Arguments
- dtm: Document-term matrix
- d: Dictionary of type SentimentDictionaryWordlist with words belonging to a single category

Value
Ratio of dictionary words compared to all

ruleSentiment

Sentiment score

Description
Sentiment score defined as the difference between positive and negative word counts divided by the total number of words.

Usage
ruleSentiment(dtm, d)

Arguments
- dtm: Document-term matrix
- d: Dictionary of type SentimentDictionaryBinary

Details
Given the number of positive words $P$ and the number of negative words $N$. Further, let $T$ denote the total number of words in that document. Then, the sentiment ratio is defined as

$$ \frac{P - N}{T} $$

. Here, it uses the entries negativeWords and positiveWords of the SentimentDictionaryBinary.
Value
Sentiment score in the range of -1 to 1.

---

**ruleSentimentPolarity  Sentiment polarity score**

**Description**
Sentiment score defined as the difference between positive and negative word counts divided by the sum of positive and negative words.

**Usage**
`ruleSentimentPolarity(dtm, d)`

**Arguments**
- `dtm`  Document-term matrix
- `d` Dictionary of type `SentimentDictionaryBinary`

**Details**
Given the number of positive words $P$ and the number of negative words $N$. Then, the sentiment ratio is defined as
$$\frac{P - N}{P + N}.$$ Here, it uses the entries `negativeWords` and `positiveWords` of the `SentimentDictionaryBinary`.

**Value**
Sentiment score in the range of -1 to 1.

---

**ruleWordCount  Counts word frequencies**

**Description**
Counts total word frequencies in each document.

**Usage**
`ruleWordCount(dtm)`

**Arguments**
- `dtm` Document-term matrix
**Value**

Total number of words

---

**SentimentAnalysis**  
*SentimentAnalysis: A package for analyzing sentiment of texts*

---

**Description**

The `SentimentAnalysis` package provides routines to quickly measure the sentiment of written materials. It ships a dedicated class `SentimentDictionary` to store different variants of dictionaries (including pre-built ones that are ready to go) and helps the user with routines for constructing domain-specific dictionaries and evaluating the performance of common rules for analyzing sentiment.

---

**SentimentDictionary**  
*Create new sentiment dictionary based on input*

---

**Description**

Depending on the input, this function creates a new sentiment dictionary of different type.

**Usage**

```r
SentimentDictionary(...)  
```

**Arguments**

```r
...  
Arguments as passed to one of the three functions `SentimentDictionaryWordlist`, `SentimentDictionaryBinary` or `SentimentDictionaryWeighted`
```

**See Also**

`SentimentDictionaryWordlist`, `SentimentDictionaryBinary`, `SentimentDictionaryWeighted`
SentimentDictionaryBinary

*Create a sentiment dictionary of positive and negative words*

**Description**

This routine creates a new object of type **SentimentDictionaryBinary** that stores two separate vectors of negative and positive words.

**Usage**

```r
SentimentDictionaryBinary(positiveWords, negativeWords)
```

**Arguments**

- `positiveWords` is a vector containing the entries labeled as positive
- `negativeWords` is a vector containing the entries labeled as negative

**Value**

Returns a new object of type **SentimentDictionaryBinary**

**See Also**

**SentimentDictionary**

**Examples**

```r
# generate a dictionary with positive and negative words
d <- SentimentDictionaryBinary(c("increase", "rise", "more"),
                                 c("fall", "drop"))
summary(d)
# alternative call
d <- SentimentDictionary(c("increase", "rise", "more"),
                          c("fall", "drop"))
summary(d)
```

SentimentDictionaryWeighted

*Create a sentiment dictionary of words linked to a score*

**Description**

This routine creates a new object of type **SentimentDictionaryWeighted** that contains a number of words, each linked to a continuous score (i.e. weight) for specifying its polarity. The scores can later be interpreted as a linear model.
**SentimentDictionaryWeighted**

**Usage**

\[
\text{SentimentDictionaryWeighted(}
\begin{align*}
\text{words}, \\
\text{scores,} \\
\text{idf = rep(1, length(words)),} \\
\text{intercept = 0}
\end{align*}
\]

**Arguments**

- **words** is collection (vector) of different words as strings
- **scores** are the corresponding scores or weights denoting the word's polarity
- **idf** provide further details on the frequency of words in the corpus as an additional source for normalization
- **intercept** is an optional parameter for shifting the zero level (default: 0)

**Value**

Returns a new object of type `SentimentDictionaryWordlist`

**Note**

The intercept is useful when the mean or median of a response variable is not exactly located at zero. For instance, stock market returns have slight positive bias.

**Source**

doi: 10.1371/journal.pone.0209323

**References**


**See Also**

`SentimentDictionary`

**Examples**

# generate dictionary (based on linear model)
\[
d <- \text{SentimentDictionaryWeighted(c("increase", "decrease", "exit"),}
\begin{align*}
c(+1, -1, -10), \\
\text{rep(NA, 3))}
\end{align*}
\]

\[
\text{summary(d)}
\]

# alternative call
\[
d <- \text{SentimentDictionaryWeighted(c("increase", "decrease", "exit"),}
\begin{align*}
c(+1, -1, -10))
\end{align*}
\]

\[
\text{summary(d)}
\]
# alternative call
d <- SentimentDictionary(c("increase", "decrease", "exit"),
    c(+1, -1, -10),
    rep(NA, 3))
summary(d)

SentimentDictionaryWordlist

Create a sentiment dictionary consisting of a simple wordlist

Description

This routine creates a new object of type SentimentDictionaryWordlist

Usage

SentimentDictionaryWordlist(wordlist)

Arguments

wordlist is a vector containing the individual entries as strings

Value

Returns a new object of type SentimentDictionaryWordlist

See Also

SentimentDictionary

Examples

# generate a dictionary with "uncertainty" words
d <- SentimentDictionaryWordlist(c("uncertain", "possible", "likely"))
summary(d)
# alternative call
d <- SentimentDictionary(c("uncertain", "possible", "likely"))
summary(d)
spikeslabEstimation  

Spike-and-slab estimation

Description

Function estimates coefficients based on spike-and-slab regression.

Usage

spikeslabEstimation(
  x,
  response,
  control = list(n.iter1 = 500, n.iter2 = 500),
  ...
)

Arguments

x
  An object of type DocumentTermMatrix.
response
  Response variable including the given gold standard.
control
  (optional) A list of parameters defining the LASSO model. Default is n.iter1=500 and n.iter2=500. See spikeslab for details.
...
  Additional parameters passed to function for spikeslab.

Value

Result is a list with coefficients, coefficient names and the model intercept.

summary.SentimentDictionaryWordlist

Output summary information on sentiment dictionary

Description

Output summary information on sentiment dictionary

Usage

## S3 method for class 'SentimentDictionaryWordlist'
summary(object, ...)

## S3 method for class 'SentimentDictionaryBinary'
summary(object, ...)

## S3 method for class 'SentimentDictionaryWeighted'
summary(object, ...)
Arguments

object Sentiment dictionary of type `SentimentDictionaryWordlist`, `SentimentDictionaryBinary` or `SentimentDictionaryWeighted`
...
Additional parameters passed to specific sub-routines

See Also

`print` for output the entries of a dictionary

Examples

summary(SentimentDictionary(c("uncertain", "possible", "likely")))
summary(SentimentDictionary(c("increase", "rise", "more"),
                           c("fall", "drop")))
summary(SentimentDictionary(c("increase", "decrease", "exit"),
                            c(+1, -1, -10),
                            rep(NA, 3)))

Description

Preprocess existing corpus of type `Corpus` according to default operations. This helper function groups all standard preprocessing steps such that the usage of the package is more convenient. The result is a document-term matrix.

Usage

toDocumentTermMatrix(
  x,
  language = "english",
  minWordLength = 3,
  sparsity = NULL,
  removeStopwords = TRUE,
  stemming = TRUE,
  weighting = function(x) tm::weightTfIdf(x, normalize = FALSE)
)

Arguments

x `Corpus` object which should be processed
language Default language used for preprocessing (i.e. stop word removal and stemming)
minWordLength Minimum length of words used for cut-off; i.e. shorter words are removed. Default is 3.
sparsity: A numeric for the maximal allowed sparsity in the range from bigger zero to smaller one. Default is NULL in order suppress this functionality.

removeStopwords: Flag indicating whether to remove stopwords or not (default: yes)

stemming: Perform stemming (default: TRUE)

weighting: Function used for weighting of words; default is a link to the tf-idf scheme.

Value: Object of DocumentTermMatrix

See Also: DocumentTermMatrix for the underlying class

transformIntoCorpus: Transforms the input into a Corpus object

Description: Takes the given input of characters and transforms it into a Corpus. The input is checked to match the expected class and format.

Usage: transformIntoCorpus(x)

Arguments: x: A list, data.frame or vector consisting of characters

Value: The generated Corpus

Note: Factors are automatically casted into characters but with printing a warning

See Also: preprocessCorpus for further preprocessing, analyzeSentiment for subsequent sentiment analysis

Examples:

transformIntoCorpus(c("Document 1", "Document 2", "Document 3"))
transformIntoCorpus(list("Document 1", "Document 2", "Document 3"))
transformIntoCorpus(data.frame("Document 1", "Document 2", "Document 3"))
Write dictionary to text file

**Description**

This routine exports a sentiment dictionary to a text file which can be the source for additional problems or controlling the output.

**Usage**

```r
write(d, file)
```

## S3 method for class 'SentimentDictionaryWordlist'
```r
write(d, file)
```

## S3 method for class 'SentimentDictionaryBinary'
```r
write(d, file)
```

## S3 method for class 'SentimentDictionaryWeighted'
```r
write(d, file)
```

**Arguments**

- `d` Dictionary of type `SentimentDictionaryWordlist`, `SentimentDictionaryBinary` or `SentimentDictionaryWeighted`
- `file` File to which the dictionary should be exported

**See Also**

`read` for later access

**Examples**

```r
d.out <- SentimentDictionary(c("uncertain", "possible", "likely"))
write(d.out, "example.dict")
d.in <- read("example.dict")
print(d.in)

d.out <- SentimentDictionary(c("increase", "rise", "more"),
                           c("fall", "drop"))
write(d.out, "example.dict")
d.in <- read("example.dict")
print(d.in)

d.out <- SentimentDictionary(c("increase", "decrease", "exit"),
                          c(+1, -1, -10),
                          rep(NA, 3),
                          intercept=5)
```
write(d.out, "example.dict")

# Read from disk

d.in <- read("example.dict")

# Print

print(d.in)

# Unlink

unlink("example.dict")
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