

# Package: sbo (via r-universe)

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**Type** Package

**Title** Text Prediction via Stupid Back-Off N-Gram Models

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**Description** Utilities for training and evaluating text predictors based on Stupid Back-Off N-gram models (Brants et al., 2007, <<https://www.aclweb.org/anthology/D07-1090/>>).

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---

as_sbo_dictionary	<i>Coerce to dictionary</i>
-------------------	-----------------------------

---

## Description

Coerce objects to sbo\_dictionary class.

## Usage

```
as_sbo_dictionary(x, ...)
```

```
## S3 method for class 'character'
```

```
as_sbo_dictionary(x, .preprocess = identity, EOS = "", ...)
```

## Arguments

x	object to be coerced.
...	further arguments passed to or from other methods.
.preprocess	a function for corpus preprocessing.
EOS	a length one character vector listing all (single character) end-of-sentence tokens.

**Details**

This function is an S3 generic for coercing existing objects to `sbo_dictionary` class objects. Currently, only a method for character vectors is implemented, and this will be described below.

**Character vector input:** Calling `as_sbo_dictionary(x)` simply decorates the character vector `x` with the class `sbo_dictionary` attribute, and with customizable `.preprocess` and `EOS` attributes.

**Value**

A `sbo_dictionary` object.

**Author(s)**

Valerio Gherardi

**Examples**

```
dict <- as_sbo_dictionary(c("a","b","c"), .preprocess = tolower, EOS = ".")
```

---

babble	<i>Babble!</i>
--------	----------------

---

**Description**

Generate random text based on Stupid Back-off language model.

**Usage**

```
babble(model, input = NA, n_max = 100L, L = attr(model, "L"))
```

**Arguments**

model	a <code>sbo_predictor</code> object.
input	a length one character vector. Starting point for babbling! If NA, as by default, a random word is sampled from the model's dictionary.
n_max	a length one integer. Maximum number of words to generate.
L	a length one integer. Number of next-word suggestions from which to sample (see details).

**Details**

This function generates random text from a Stupid Back-off language model. `babble` randomly samples one of the top `L` next word predictions. Text generation stops when an End-Of-Sentence token is encountered, or when the number of generated words exceeds `n_max`.

**Value**

A character vector of length one.

**Author(s)**

Valerio Gherardi

**Examples**

```
# Babble!  
p <- sbo_predictor(twitter_predtable)  
set.seed(840) # Set seed for reproducibility  
babble(p)
```

---

eval\_sbo\_predictor      *Evaluate Stupid Back-off next-word predictions*

---

**Description**

Evaluate next-word predictions based on Stupid Back-off N-gram model on a test corpus.

**Usage**

```
eval_sbo_predictor(model, test, L = attr(model, "L"))
```

**Arguments**

model	a sbo_predictor object.
test	a character vector. Perform a single prediction on each entry of this vector (see details).
L	Maximum number of predictions for each input sentence (maximum allowed is attr(model, "L"))

**Details**

This function allows to obtain information on the quality of Stupid Back-off model predictions, such as next-word prediction accuracy, or the word-rank distribution of correct prediction, by direct test against a test set corpus. For a reasonable estimate of prediction accuracy, the different entries of the test vector should be uncorrelated documents (e.g. separate tweets, as in the [twitter\\_test](#) example dataset).

More in detail, eval\_sbo\_predictor performs the following operations:

1. Sample a single sentence from each entry of the character vector test.
2. Sample a single  $N$ -gram from each sentence obtained in the previous step.
3. Predict next words from the  $(N-1)$ -gram prefix.
4. Return all predictions, together with the true word completions.

**Value**

A tibble, containing the input  $(N-1)$ -grams, the true completions, the predicted completions and a column indicating whether one of the predictions were correct or not.

**Author(s)**

Valerio Gherardi

**Examples**

```
# Evaluating next-word predictions from a Stupid Back-off N-gram model
if (suppressMessages(require(dplyr) && require(ggplot2))) {
  p <- sbo_predictor(twitter_predtable)
  set.seed(840) # Set seed for reproducibility
  test <- sample(twitter_test, 500)
  eval <- eval_sbo_predictor(p, test)

  ## Compute three-word accuracies
  eval %>% summarise(accuracy = sum(correct)/n()) # Overall accuracy
  eval %>% # Accuracy for in-sentence predictions
    filter(true != "<EOS>") %>%
    summarise(accuracy = sum(correct) / n())

  ## Make histogram of word-rank distribution for correct predictions
  dict <- attr(twitter_predtable, "dict")
  eval %>%
    filter(correct, true != "<EOS>") %>%
    transmute(rank = match(true, table = dict)) %>%
    ggplot(aes(x = rank)) + geom_histogram(binwidth = 30)
}
```

kgram\_freqs

*k-gram frequency tables***Description**

Get k-gram frequency tables from a training corpus.

**Usage**

```
kgram_freqs(corpus, N, dict, .preprocess = identity, EOS = "")
```

```
sbo_kgram_freqs(corpus, N, dict, .preprocess = identity, EOS = "")
```

```
kgram_freqs_fast(corpus, N, dict, erase = "", lower_case = FALSE, EOS = "")
```

```
sbo_kgram_freqs_fast(corpus, N, dict, erase = "", lower_case = FALSE, EOS = "")
```

**Arguments**

corpus            a character vector. The training corpus from which to extract k-gram frequencies.

N	a length one integer. The maximum order of k-grams for which frequencies are to be extracted.
dict	either a sbo_dictionary object, a character vector, or a formula (see details). The language model dictionary.
.preprocess	a function to apply before k-gram tokenization.
EOS	a length one character vector listing all (single character) end-of-sentence tokens.
erase	a length one character vector. Regular expression matching parts of text to be erased from input. The default removes anything not alphanumeric, white space, apostrophes or punctuation characters (i.e. ".?!;").
lower_case	a length one logical vector. If TRUE, puts everything to lower case.

### Details

These functions extract all k-gram frequency tables from a text corpus up to a specified k-gram order N. These are the building blocks to train any N-gram model. The functions `sbo_kgram_freqs()` and `sbo_kgram_freqs_fast()` are aliases for `kgram_freqs()` and `kgram_freqs_fast()`, respectively.

The optimized version `kgram_freqs_fast(erase = x, lower_case = y)` is equivalent to `kgram_freqs(.preprocess = preprocess(erase = x, lower_case = y))`, but more efficient (both from the speed and memory point of view).

Both `kgram_freqs()` and `kgram_freqs_fast()` employ a fixed (user specified) dictionary: any out-of-vocabulary word gets effectively replaced by an "unknown word" token. This is specified through the argument `dict`, which accepts three types of arguments: a `sbo_dictionary` object, a character vector (containing the words of the dictionary) or a formula. In this last case, valid formulas can be either `max_size ~ V` or `target ~ f`, where `V` and `f` represent a dictionary size and a corpus word coverage fraction (of corpus), respectively. This usage of the `dict` argument allows to build the model dictionary 'on the fly'.

The return value is a "sbo\_kgram\_freqs" object, i.e. a list of N tibbles, storing frequency counts for each k-gram observed in the training corpus, for  $k = 1, 2, \dots, N$ . In these tables, words are represented by integer numbers corresponding to their position in the reference dictionary. The special codes `0`, `length(dictionary)+1` and `length(dictionary)+2` correspond to the "Begin-Of-Sentence", "End-Of-Sentence" and "Unknown word" tokens, respectively.

Furthermore, the returned object has the following attributes:

- `N`: The highest order of N-grams.
- `dict`: The reference dictionary, sorted by word frequency.
- `.preprocess`: The function used for text preprocessing.
- `EOS`: A length one character vector listing all (single character) end-of-sentence tokens employed in k-gram tokenization.

The `.preprocess` argument of `kgram_freqs` allows the user to apply a custom transformation to the training corpus, before kgram tokenization takes place.

The algorithm for k-gram tokenization considers anything separated by (any number of) white spaces (i.e. " ") as a single word. Sentences are split according to end-of-sentence (single character) tokens, as specified by the `EOS` argument. Additionally text belonging to different entries of the preprocessed input vector which are understood to belong to different sentences.

*Nota Bene:* It is useful to keep in mind that the function passed through the `.preprocess` argument also captures its enclosing environment, which is by default the environment in which the former was defined. If, for instance, `.preprocess` was defined in the global environment, and the latter binds heavy objects, the resulting `sbo_kgram_freqs` will contain bindings to the same objects. If `sbo_kgram_freqs` is stored out of memory and recalled in another R session, these objects will also be reloaded in memory. For this reason, for non interactive use, it is advisable to avoid using pre-processing functions defined in the global environment (for instance, `base::identity` is preferred to `function(x) x`).

## Value

A `sbo_kgram_freqs` object, containing the k-gram frequency tables for  $k = 1, 2, \dots, N$ .

## Author(s)

Valerio Gherardi

## Examples

```
# Obtain k-gram frequency table from corpus
## Get k-gram frequencies, for k <= N = 3.
## The dictionary is built on the fly, using the most frequent 1000 words.
freqs <- kgram_freqs(corpus = twitter_train, N = 3, dict = max_size ~ 1000,
                    .preprocess = preprocess, EOS = ".?!:;")
freqs
## Using a predefined dictionary
freqs <- kgram_freqs_fast(twitter_train, N = 3, dict = twitter_dict,
                        erase = "[^.!?:;'\w\\s]", lower_case = TRUE,
                        EOS = ".?!:;")
freqs
## 2-grams, no preprocessing, use a dictionary covering 50% of corpus
freqs <- kgram_freqs(corpus = twitter_train, N = 2, dict = target ~ 0.5,
                    EOS = ".?!:;")
freqs

# Obtain k-gram frequency table from corpus
freqs <- kgram_freqs_fast(twitter_train, N = 3, dict = twitter_dict)
## Print result
freqs
```

---

plot.word\_coverage      *Plot method for word\_coverage objects*

---

## Description

Plot cumulative corpus coverage fraction of a dictionary.

**Usage**

```
## S3 method for class 'word_coverage'
plot(
  x,
  include_EOS = FALSE,
  show_limit = TRUE,
  type = "l",
  xlim = c(0, length(x)),
  ylim = c(0, 1),
  xticks = seq(from = 0, to = length(x), by = length(x)/5),
  yticks = seq(from = 0, to = 1, by = 0.25),
  xlab = "Rank",
  ylab = "Covered fraction",
  title = "Cumulative corpus coverage fraction of dictionary",
  subtitle = "_default_",
  ...
)
```

**Arguments**

<code>x</code>	a <code>word_coverage</code> object.
<code>include_EOS</code>	length one logical. Should End-Of-Sentence tokens be considered in the computation of coverage fraction?
<code>show_limit</code>	length one logical. If TRUE, plots an horizontal line corresponding to the total coverage fraction.
<code>type</code>	what type of plot should be drawn, as detailed in <code>?plot</code> .
<code>xlim</code>	length two numeric. Extremes of the x-range.
<code>ylim</code>	length two numeric. Extremes of the y-range.
<code>xticks</code>	numeric vector. position of the x-axis ticks.
<code>yticks</code>	numeric vector. position of the y-axis ticks.
<code>xlab</code>	length one character. The x-axis label.
<code>ylab</code>	length one character. The y-axis label.
<code>title</code>	length one character. Plot title.
<code>subtitle</code>	length one character. Plot subtitle; if " <i>default</i> ", prints dictionary length and total covered fraction.
<code>...</code>	further arguments passed to or from other methods.

**Details**

This function generates nice plots of cumulative corpus coverage fractions. The x coordinate in the resulting plot is the word rank in the underlying dictionary; the y coordinate at x is the cumulative coverage fraction for rank  $\leq x$ .

**Author(s)**

Valerio Gherardi



### Examples

```
c <- word_coverage(twitter_dict, twitter_test)
plot(c)
```

---

predict.sbo\_kgram\_freqs

*Predict method for k-gram frequency tables*

---

### Description

Predictive text based on Stupid Back-off N-gram model.

### Usage

```
## S3 method for class 'sbo_kgram_freqs'
predict(object, input, lambda = 0.4, ...)
```

### Arguments

object	a sbo_kgram_freqs object.
input	a length one character vector, containing the input for next-word prediction.
lambda	a numeric vector of length one. The back-off penalization in Stupid Back-off algorithm.
...	further arguments passed to or from other methods.

### Value

A tibble containing the next-word probabilities for all words in the dictionary.

### Author(s)

Valerio Gherardi

### Examples

```
predict(twitter_freqs, "i love")
```

---

predict.sbo\_predictor *Predict method for Stupid Back-off text predictor*

---

### Description

Predictive text based on Stupid Back-off N-gram model.

### Usage

```
## S3 method for class 'sbo_predictor'  
predict(object, input, ...)
```

### Arguments

object	a sbo_predictor object.
input	a character vector, containing the input for next-word prediction.
...	further arguments passed to or from other methods.

### Details

This method returns the top L next-word predictions from a text predictor trained with Stupid Back-Off.

Trying to predict from a sbo\_predtable results into an error. Instead, one should load a sbo\_predictor object and use this one to predict(), as shown in the example below.

### Value

A character vector if length(input) == 1, otherwise a character matrix.

### Author(s)

Valerio Gherardi

### Examples

```
p <- sbo_predictor(twitter_predtable)  
x <- predict(p, "i love")  
x  
x <- predict(p, "you love")  
x  
#N.B. the top predictions here are x[1], followed by x[2] and x[3].  
predict(p, c("i love", "you love")) # Behaviour with length(>1) input.
```

---

```
preprocess          Preprocess text corpus
```

---

**Description**

A simple text preprocessing utility.

**Usage**

```
preprocess(input, erase = "[^.?!:;'\w\\s]", lower_case = TRUE)
```

**Arguments**

input	a character vector.
erase	a length one character vector. Regular expression matching parts of text to be erased from input. The default removes anything not alphanumeric, white space, apostrophes or punctuation characters (i.e. ".?!:;").
lower_case	a length one logical vector. If TRUE, puts everything to lower case.

**Value**

a character vector containing the processed output.

**Author(s)**

Valerio Gherardi

**Examples**

```
preprocess("Hi @ there! I'm using `sbo`.")
```

---

```
prune              Prune k-gram objects
```

---

**Description**

Prune M-gram frequency tables or Stupid Back-Off prediction tables for an M-gram model to a smaller order N.

**Usage**

```
prune(object, N, ...)
```

```
## S3 method for class 'sbo_kgram_freqs'
```

```
prune(object, N, ...)
```

```
## S3 method for class 'sbo_predtable'
```

```
prune(object, N, ...)
```

**Arguments**

object	A <code>kgram_freqs</code> or a <code>sbo_predtable</code> class object.
N	a length one positive integer. N-gram order of the new object.
...	further arguments passed to or from other methods.

**Details**

This generic function provides a helper to prune M-gram frequency tables or M-gram models, represented by `sbo_kgram_freqs` and `sbo_predtable` objects respectively, to objects of a smaller N-gram order,  $N < M$ . For k-gram frequency objects, frequency tables for  $k > N$  are simply dropped. For `sbo_predtable`'s, the predictions coming from the nested N-gram model are instead retained. In both cases, all other other attributes besides k-gram order (such as the corpus preprocessing function, or the lambda penalty in Stupid Back-Off training) are left unchanged.

**Value**

an object of the same class of the input object.

**Author(s)**

Valerio Gherardi

**Examples**

```
# Drop k-gram frequencies for k > 2
freqs <- twitter_freqs
summary(freqs)
freqs <- prune(freqs, N = 2)
summary(freqs)
# Extract a 2-gram model from a larger 3-gram model
pt <- twitter_predtable
summary(pt)
pt <- prune(pt, N = 2)
summary(pt)
```

---

sbo\_dictionary

*Dictionaries*

---

**Description**

Build dictionary from training corpus.

**Usage**

```
sbo_dictionary(
  corpus,
  max_size = Inf,
  target = 1,
  .preprocess = identity,
  EOS = ""
)
```

```
dictionary(
  corpus,
  max_size = Inf,
  target = 1,
  .preprocess = identity,
  EOS = ""
)
```

**Arguments**

corpus	a character vector. The training corpus from which to extract the dictionary.
max_size	a length one numeric. If less than Inf, only the most frequent max_size words are retained in the dictionary.
target	a length one numeric between 0 and 1. If less than one, retains only as many words as needed to cover a fraction target of the training corpus.
.preprocess	a function for corpus preprocessing. Takes a character vector as input and returns a character vector.
EOS	a length one character vector listing all (single character) end-of-sentence tokens.

**Details**

The function `dictionary()` is an alias for `sbo_dictionary()`.

This function builds a dictionary using the most frequent words in a training corpus. Two pruning criteria can be applied:

1. Dictionary size, as implemented by the `max_size` argument.
2. Target coverage fraction, as implemented by the `target` argument.

If both these criteria imply non-trivial cuts, the most restrictive criterion applies.

The `.preprocess` argument allows the user to apply a custom transformation to the training corpus, before word tokenization. The `EOS` argument allows to specify a set of characters to be identified as End-Of-Sentence tokens (and thus not part of words).

The returned object is a `sbo_dictionary` object, which is a character vector containing words sorted by decreasing corpus frequency. Furthermore, the object stores as attributes the original values of `.preprocess` and `EOS` (i.e. the function used in corpus preprocessing and the End-Of-Sentence characters for sentence tokenization).

**Value**

A sbo\_dictionary object.

**Author(s)**

Valerio Gherardi

**Examples**

```
# Extract dictionary from `twitter_train` corpus (all words)
dict <- sbo_dictionary(twitter_train)
# Extract dictionary from `twitter_train` corpus (top 1000 words)
dict <- sbo_dictionary(twitter_train, max_size = 1000)
# Extract dictionary from `twitter_train` corpus (coverage target = 50%)
dict <- sbo_dictionary(twitter_train, target = 0.5)
```

---

sbo\_predictions

*Stupid Back-off text predictions*

---

**Description**

Train a text predictor via Stupid Back-off

**Usage**

```
sbo_predictor(object, ...)
```

```
predictor(object, ...)
```

```
## S3 method for class 'character'
```

```
sbo_predictor(
  object,
  N,
  dict,
  .preprocess = identity,
  EOS = "",
  lambda = 0.4,
  L = 3L,
  filtered = "<UNK>",
  ...
)
```

```
## S3 method for class 'sbo_kgram_freqs'
```

```
sbo_predictor(object, lambda = 0.4, L = 3L, filtered = "<UNK>", ...)
```

```
## S3 method for class 'sbo_predtable'
```

```

sbo_predictor(object, ...)

sbo_predtable(object, lambda = 0.4, L = 3L, filtered = "<UNK>", ...)

predtable(object, lambda = 0.4, L = 3L, filtered = "<UNK>", ...)

## S3 method for class 'character'
sbo_predtable(
  object,
  lambda = 0.4,
  L = 3L,
  filtered = "<UNK>",
  N,
  dict,
  .preprocess = identity,
  EOS = "",
  ...
)

## S3 method for class 'sbo_kgram_freqs'
sbo_predtable(object, lambda = 0.4, L = 3L, filtered = "<UNK>", ...)

```

### Arguments

object	either a character vector or an object inheriting from classes <code>sbo_kgram_freqs</code> or <code>sbo_predtable</code> . Defines the method to use for training.
...	further arguments passed to or from other methods.
N	a length one integer. Order 'N' of the N-gram model.
dict	a <code>sbo_dictionary</code> , a character vector or a formula. For more details see <a href="#">kgram_freqs</a> .
.preprocess	a function for corpus preprocessing. For more details see <a href="#">kgram_freqs</a> .
EOS	a length one character vector. String listing End-Of-Sentence characters. For more details see <a href="#">kgram_freqs</a> .
lambda	a length one numeric. Penalization in the Stupid Back-off algorithm.
L	a length one integer. Maximum number of next-word predictions for a given input (top scoring predictions are retained).
filtered	a character vector. Words to exclude from next-word predictions. The strings '<UNK>' and '<EOS>' are reserved keywords referring to the Unknown-Word and End-Of-Sentence tokens, respectively.

### Details

These functions are generics used to train a text predictor with Stupid Back-Off. The functions `predictor()` and `predtable()` are aliases for `sbo_predictor()` and `sbo_predtable()`, respectively.

The `sbo_predictor` data structure carries all information required for prediction in a compact and efficient (upon retrieval) way, by directly storing the top L next-word predictions for each k-gram prefix observed in the training corpus.

The `sbo_predictor` objects are for interactive use. If the training process is computationally heavy, one can store a "raw" version of the text predictor in a `sbo_predtable` class object, which can be safely saved out of memory (with e.g. `save()`). The resulting object can be restored in another R session, and the corresponding `sbo_predictor` object can be loaded rapidly using again the generic constructor `sbo_predictor()` (see example below).

The returned objects are a `sbo_predictor` and a `sbo_predtable` objects. The latter contains Stupid Back-Off prediction tables, storing next-word prediction for each k-gram prefix observed in the text, whereas the former is an external pointer to an equivalent (but processed) C++ structure.

Both objects have the following attributes:

- `N`: The order of the underlying N-gram model, "N".
- `dict`: The model dictionary.
- `lambda`: The penalization used in the Stupid Back-Off algorithm.
- `L`: The maximum number of next-word predictions for a given text input.
- `.preprocess`: The function used for text preprocessing.
- `EOS`: A length one character vector listing all (single character) end-of-sentence tokens.

### Value

A `sbo_predictor` object for `sbo_predictor()`, a `sbo_predtable` object for `sbo_predtable()`.

### Author(s)

Valerio Gherardi

### See Also

[predict.sbo\\_predictor](#)

### Examples

```
# Train a text predictor directly from corpus
p <- sbo_predictor(twitter_train, N = 3, dict = max_size ~ 1000,
                  .preprocess = preprocess, EOS = ".?!:;")

# Train a text predictor from previously computed 'kgram_freqs' object
p <- sbo_predictor(twitter_freqs)

# Load a text predictor from a Stupid Back-Off prediction table
p <- sbo_predictor(twitter_predtable)

# Predict from Stupid Back-Off text predictor
p <- sbo_predictor(twitter_predtable)
predict(p, "i love")
```



```
# Build Stupid Back-Off prediction tables directly from corpus
t <- sbo_predtable(twitter_train, N = 3, dict = max_size ~ 1000,
                  .preprocess = preprocess, EOS = ".?!:;")

# Build Stupid Back-Off prediction tables from kgram_freqs object
t <- sbo_predtable(twitter_freqs)

## Not run:
# Save and reload a 'sbo_predtable' object with base::save()
save(t)
load("t.rda")

## End(Not run)
```

---

tokenize\_sentences      *Sentence tokenizer*

---

## Description

Get sentence tokens from text

## Usage

```
tokenize_sentences(input, EOS = ".?!:;")
```

## Arguments

input	a character vector.
EOS	a length one character vector listing all (single character) end-of-sentence tokens.

## Value

a character vector, each entry of which corresponds to a single sentence.

## Author(s)

Valerio Gherardi

## Examples

```
tokenize_sentences("Hi there! I'm using `sbo`.")
```

---

twitter_dict	<i>Top 1000 dictionary from Twitter training set</i>
--------------	--

---

**Description**

Top 1000 dictionary from Twitter training set

**Usage**

```
twitter_dict
```

**Format**

A character vector. Contains the 1000 most frequent words from the example training set [twitter\\_train](#), sorted by word rank.

**See Also**

[twitter\\_train](#)

**Examples**

```
head(twitter_dict, 10)
```

---

twitter_freqs	<i>k-gram frequencies from Twitter training set</i>
---------------	---

---

**Description**

k-gram frequencies from Twitter training set

**Usage**

```
twitter_freqs
```

**Format**

A sbo\_kgram\_freqs object. Contains k-gram frequencies from the example training set [twitter\\_train](#).

**See Also**

[twitter\\_train](#)

---

twitter_predtable	<i>Next-word prediction tables from 3-gram model trained on Twitter training set</i>
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---

**Description**

Next-word prediction tables from 3-gram model trained on Twitter training set

**Usage**

```
twitter_predtable
```

**Format**

A sbo\_predtable object. Contains prediction tables of a 3-gram Stupid Back-off model trained on the example training set [twitter\\_train](#).

**See Also**

[twitter\\_train](#)

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twitter_test	<i>Twitter test set</i>
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**Description**

Twitter test set

**Usage**

```
twitter_test
```

**Format**

A collection of 10'000 Twitter posts in English.

**Source**

<https://www.kaggle.com/crmercado/tweets-blogs-news-swiftkey-dataset-4million>

**See Also**

[twitter\\_train](#)

**Examples**

```
head(twitter_test)
```

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twitter_train	<i>Twitter training set</i>
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**Description**

Twitter training set

**Usage**

```
twitter_train
```

**Format**

A collection of 50'000 Twitter posts in English.

**Source**

<https://www.kaggle.com/crmercado/tweets-blogs-news-swiftkey-dataset-4million>

**See Also**

[twitter\\_test](#), [twitter\\_dict](#), [twitter\\_freqs](#), [twitter\\_predtable](#)

**Examples**

```
head(twitter_train)
```

---

word_coverage	<i>Word coverage fraction</i>
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---

**Description**

Compute total and cumulative corpus coverage fraction of a dictionary.

**Usage**

```
word_coverage(object, corpus, ...)
```

```
## S3 method for class 'sbo_dictionary'
```

```
word_coverage(object, corpus, ...)
```

```
## S3 method for class 'character'
```

```
word_coverage(object, corpus, .preprocess = identity, EOS = "", ...)
```

```
## S3 method for class 'sbo_kgram_freqs'
```

```
word_coverage(object, corpus, ...)
```

```
## S3 method for class 'sbo_predictions'
word_coverage(object, corpus, ...)
```

### Arguments

object	either a character vector, or an object inheriting from one of the classes <code>sbo_dictionary</code> , <code>sbo_kgram_freqs</code> , <code>sbo_predtable</code> or <code>sbo_predictor</code> . The object storing the dictionary for which corpus coverage is to be computed.
corpus	a character vector.
...	further arguments passed to or from other methods.
.preprocess	preprocessing function for training corpus. See <a href="#">kgram_freqs</a> and <a href="#">sbo_dictionary</a> for further details.
EOS	a length one character vector. String containing End-Of-Sentence characters, see <a href="#">kgram_freqs</a> and <a href="#">sbo_dictionary</a> for further details.

### Details

This function computes the corpus coverage fraction of a dictionary, that is the fraction of words appearing in corpus which are contained in the original dictionary.

This function is a generic, accepting as object argument any object storing a dictionary, along with a preprocessing function and a list of End-Of-Sentence characters. This includes all sbo main classes: `sbo_dictionary`, `sbo_kgram_freqs`, `sbo_predtable` and `sbo_predictor`. When object is a character vector, the preprocessing function and the End-Of-Sentence characters must be specified explicitly.

The coverage fraction is computed cumulatively, and the dependence of coverage with respect to maximal rank can be explored through `plot()` (see examples below)

### Value

a `word_coverage` object.

### Author(s)

Valerio Gherardi

### See Also

[predict.sbo\\_predictor](#)

### Examples

```
c <- word_coverage(twitter_dict, twitter_train)
print(c)
summary(c)
# Plot coverage fraction, including the End-Of-Sentence in word counts.
plot(c, include_EOS = TRUE)
```

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