Package 'RcppCWB'

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Type Package

Title 'Rcpp' Bindings for the 'Corpus Workbench' ('CWB')

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Description 'Rcpp' Bindings for the C code of the 'Corpus Workbench' ('CWB'), an indexing and query engine to efficiently analyze large corpora (<http://cwb.sourceforge.net>). 'RcppCWB' is licensed under the GNU GPL-3, in line with the GPL-3 license of the 'CWB' (<https://www.r-project.org/Licenses/GPL-3>). The 'CWB' relies on 'pcre' (BSD license, see <https://www.pcre.org/licence.txt>) and 'GLib' (LGPL license, see <https://www.gnu.org/licenses/lgpl-3.0.en.html>). See the file LICENSE.note for further information. The package includes modified code of the 'rcqp' package (GPL-2, see <https://cran.r-project.org/package=rcqp>). The original work of the authors of the 'rcqp' package is acknowledged with great respect, and they are listed as authors of this package. To achieve cross-platform portability (including Windows), using 'Rcpp' for wrapper code is the approach used by 'RcppCWB'.

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Encoding UTF-8

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NeedsCompilation yes

SystemRequirements GNU make, pcre (>= 7), GLib (>= 2.0.0). On Windows, no prior installations are necessary, as pre-built (i.e. cross-compiled) binaries of required libraries are downloaded

from a GitHub repository (<https://github.com/PolMine/libcl>) during installation. On macOS, static libraries of Glib are downloaded (<https://github.com/PolMine/libglib>) if Glib is not present.

Imports Rcpp (>= 0.12.6)

Suggests knitr, testthat

LinkingTo Rcpp

Biarch true

URL https://www.github.com/PolMine/RcppCWB

BugReports https://github.com/PolMine/RcppCWB/issues

RoxygenNote 6.1.1

Collate 'RcppCWB_package.R' 'cl.R' 'cqp.R' 'cwb.R' 'checks.R' 'count.R' 'RcppExports.R' 'decode.R' 'cbow.R' 'region_matrix.R' 'misc.R' 'zzz.R'

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R topics documented:

RcppCWB-package *Rcpp Bindings for the Corpus Workbench (CWB).*

Description

The RcppCWB package is a wrapper library to expose core functions of the Open Corpus Workbench (CWB). This includes the low-level functionality of the Corpus Library (CL) as well as capacities to use the query syntax of the Corpus Query Processor (CQP).

The Idea Behind RcppCWB

The Open Corpus Workbench (CWB) is an indexing and querying engine popular in corpus-assisted research. Its core aim is to support working efficiently with large, structurally and linguistically annotated corpora. First of all, the CWB includes tools to index and compress corpora. Second, the Corpus Library (CL) offers low-level functionality to retrieve information from CWB indexed corpora. Third, the Corpus Query Processor (CQP) offers a syntax that allows to perform anything from simple to complex queries, using different annotation layers of corpora.

The CWB is a classical tool which has inspired a set of developments. A persisting advantage of the CWB is its mature, open source code base that is actively maintained by a community of developers. It is used as a robust and efficient backend for widely used tools such as TXM (http://textometrie.ens-lyon.fr) or CQPweb (http://cwb.sourceforge.net/cqpweb.php). Its uncompromising C implementation guarantees speed and makes it well suited to be integrated with R at the same time.

The package RcppCWB is a follow-up on the rcqp package that has pioneered to expose CWB functionality from within R. Indeed, the rcqp package, published at CRAN in 2015, offers robust access to CWB functionality. However, the "pure C" implementation of the rcqp package creates difficulties to make the package portable to Windows. The primary purpose of the RcppCWB package is to reimplement a wrapper library for the CWB using a design that makes it easier to achieve cross-platform portability.

Even though RcppCWB functions may be used directly, the package is designed to serve as an interface to CWB indexed corpora in packages with higher-level functionality. In this regard, RcppCWB is the backend of the polmineR package. It is deliberately open to be used in other contexts. The package may stimulate using linguistically annotated, indexed and compressed corpora on all platforms. The paradigm of working with text as linguistic data may benefit from RcppCWB.

Implementation

When building the package, the first step is to compile the relevant parts of the CWB on Linux and macOS machines. On Windows, cross-compiled binaries are downloaded from a GitHub repository of the PolMine Project (https://github.com/PolMine/libcl). Second, Rcpp wrappers are compiled and make the relevant functions of the Corpus Library and CQP accessible. In addition to genuine CWB functions, RcppCWB offers a set of higher level functions implemented using Rcpp for common performance critical tasks.

Getting Started with RcppCWB

To understand the data storage model of the CWB, in particular the notions of positional and structural attributes (s- and p-attributes), the vignette of the `rcqp` package is a very good starting point (see references).

The CWB 'Corpus Encoding Tutorial' explains how to create your own corpus, the 'CQP Query Language Tutorial' introduces the syntax of CQP (see references).

The `RcppCWB` package includes a sample corpus (REUTERS, the data also included in the `tm` package). The examples in the documentation of the functions may be a good starting point to understand how to use `RcppCWB`.

Digging Deeper

The original paper of Christ (1994) explains the design choices of the CWB. The indexing and compression techniques of the CWB (Huffman coding) are explained in Witten et al. (1999).

Acknowledgements

The work of the all developers of the CWB is gratefully acknowledged. There is a particular intellectual debt to Bernard Desgraupes and Sylvain Loiseau, and the `rcqp` package they developed as the original R wrapper to expose the functionality of the CWB.

Author(s)

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References

Christ, O. 1994. "A modular and flexible architecture for an integrated corpus query system", in: Proceedings of COMPLEX '94, pp. 23-32. Budapest. Available online at http://cwb.sourceforge.net/files/Christ1994.pdf

Desgraupes, B.; Loiseau, S. 2012. Introduction to the rcqp package. Vignette of the rcqp package. Available at the CRAN archive at https://cran.r-project.org/src/contrib/Archive/rcqp/

Evert, S. 2005. The CQP Query Language Tutorial. Available online at http://cwb.sourceforge.net/files/CWB_Encoding_Tutorial.pdf

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Open Corpus Workbench (http://cwb.sourceforge.net)

Witten, I.H.; Moffat, A.; Bell, T.C. (1999). Managing Gigabytes. Morgan Kaufmann Publishing, San Francisco, 2nd edition.

Examples

```
# functions of the corpus library (starting with cl) expose the low-level
# access to the CWB corpus library (CL)

# registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()
registry <- use_tmp_registry()
```

```
print(registry)
ids <- cl_cpos2id("REUTERS", cpos = 1:20, p_attribute = "word", registry = registry)
tokens <- cl_id2str("REUTERS", id = ids, p_attribute = "word", registry = registry)
print(paste(tokens, collapse = " "))

# To use the corpus query processor (CQP) and its syntax, it is necessary first
# to initialize CQP (example: get concordances of 'oil')

cqp_initialize(registry)
cqp_query("REUTERS", query = '[]{5} "oil" []{5}')
cpos_matrix <- cqp_dump_subcorpus("REUTERS")
concordances_oil <- apply(
  cpos_matrix, 1,
  function(row){
    ids <- cl_cpos2id("REUTERS", p_attribute = "word", cpos = row[1]:row[2])
    tokens <- cl_id2str("REUTERS", p_attribute = "word", id = ids)
    paste(tokens, collapse = " ")
  }
 )
```

---

check *Check Input to Rcpp Functions.*

Description

A set of functions to check whether the input values to the Rcpp wrappers for the C functions of the Corpus Workbench potentially causing crashes are valid. These auxiliary functions are called by the cl_ and cqp_ functions.

Usage

```
check_registry(registry)

check_corpus(corpus, registry)

check_s_attribute(s_attribute, corpus,
  registry = Sys.getenv("CORPUS_REGISTRY"))

check_p_attribute(p_attribute, corpus,
  registry = Sys.getenv("CORPUS_REGISTRY"))

check_strucs(corpus, s_attribute, strucs, registry)

check_region_matrix(region_matrix)

check_cqp_query(query)

check_cpos(corpus, p_attribute = "word", cpos,
```

```
  registry = Sys.getenv("CORPUS_REGISTRY"))

check_id(corpus, p_attribute, id,
  registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

registry	path to registry directory
corpus	name of a CWB corpus
s_attribute	a structural attribute
p_attribute	a positional attribute
strucs	strucs (indices of structural attributes)
region_matrix	a region matrix
query	a CQP query
cpos	vector of corpus positions
id	id (encoded p-attribute), integer value

---

check_pkg_registry_files

Check Paths in Registry Files

Description

Check Paths in Registry Files

Usage

```
check_pkg_registry_files(pkg = system.file(package = "RcppCWB"),
  set = FALSE)
```

Arguments

pkg	Full path to package directory
set	Logical, whether

Value

Logical value, whether home directories are set correctly.

CL: p_attributes *Using Positional Attributes.*

Description

CWB indexed corpora store the text of a corpus as numbers: Every token in the token stream of the corpus is identified by a unique corpus position. The string value of every token is identified by a unique integer id. The corpus library (CL) offers a set of functions to make the transitions between corpus positions, token ids, and the character string of tokens.

Usage

```
cl_cpos2str(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"), cpos)

cl_cpos2id(corpus, p_attribute, registry = Sys.getenv("CORPUS_REGISTRY"),
  cpos)

cl_id2str(corpus, p_attribute, registry = Sys.getenv("CORPUS_REGISTRY"),
  id)

cl_regex2id(corpus, p_attribute, regex,
  registry = Sys.getenv("CORPUS_REGISTRY"))

cl_str2id(corpus, p_attribute, str,
  registry = Sys.getenv("CORPUS_REGISTRY"))

cl_id2freq(corpus, p_attribute, id,
  registry = Sys.getenv("CORPUS_REGISTRY"))

cl_id2cpos(corpus, p_attribute, id,
  registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

corpus	name of a CWB corpus (upper case)
p_attribute	a p-attribute (positional attribute)
registry	path to the registry directory, defaults to the value of the environment variable CORPUS_REGISTRY
cpos	corpus positions (integer vector)
id	id of a token
regex	a regular expression
str	a character string

Examples

```
# registry directory and cpos_total will be needed in examples
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()
Sys.setenv(CORPUS_REGISTRY = registry)
cpos_total <- cl_attribute_size(
  corpus = "REUTERS", attribute = "word",
  attribute_type = "p", registry = registry
  )

# decode the token stream of the corpus (the quick way)
token_stream_str <- cl_cpos2str(
  corpus = "REUTERS", p_attribute = "word",
  cpos = seq.int(from = 0, to = cpos_total - 1),
  registry = registry
  )

# decode the token stream (cpos2id first, then id2str)
token_stream_ids <- cl_cpos2id(
  corpus = "REUTERS", p_attribute = "word",
  cpos = seq.int(from = 0, to = cpos_total - 1),
  registry = registry
  )
token_stream_str <- cl_id2str(
  corpus = "REUTERS", p_attribute = "word",
  id = token_stream_ids, registry = registry
)

# get corpus positions of a token
token_to_get <- "oil"
id_oil <- cl_str2id(
  corpus = "REUTERS", p_attribute = "word",
  str = token_to_get
  )
cpos_oil <- cl_id2cpos <- cl_id2cpos(
  corpus = "REUTERS", p_attribute = "word",
  id = id_oil
)

# get frequency of token
oil_freq <- cl_id2freq(
  corpus = "REUTERS", p_attribute = "word", id = id_oil
)
length(cpos_oil) # needs to be the same as oil_freq

# use regular expressions
ids <- cl_regex2id(
  corpus = "REUTERS", p_attribute = "word",
  regex = "M.*"
)
m_words <- cl_id2str(
  corpus = "REUTERS", p_attribute = "word",
  id = ids
```

```
)
```

CL: s_attributes *Using Structural Attributes.*

Description

Structural attributes store the metadata of texts in a CWB corpus and/or any kind of annotation of a region of text. The fundamental unit are so-called strucs, i.e. indices of regions identified by a left and a right corpus position. The corpus library (CL) offers a set of functions to make the translations between corpus positions (cpos) and strucs (struc).

Usage

```
cl_cpos2struc(corpus, s_attribute, cpos,
  registry = Sys.getenv("CORPUS_REGISTRY"))

cl_struc2cpos(corpus, s_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"), struc)

cl_struc2str(corpus, s_attribute, struc,
  registry = Sys.getenv("CORPUS_REGISTRY"))

cl_cpos2lbound(corpus, s_attribute, cpos,
  registry = Sys.getenv("CORPUS_REGISTRY"))

cl_cpos2rbound(corpus, s_attribute, cpos,
  registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

corpus	name of a CWB corpus (upper case)
s_attribute	name of structural attribute (character vector)
cpos	corpus positions (integer vector)
registry	path to the registry directory, defaults to the value of the environment variable CORPUS_REGISTRY
struc	a struc identifying a region

Examples

```
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()

# get metadata for matches of token
# scenario: id of the texts with occurrence of 'oil'
token_to_get <- "oil"
token_id <- cl_str2id("REUTERS", p_attribute = "word", str = "oil")
```

```
token_cpos <- cl_id2cpos("REUTERS", p_attribute = "word", id = token_id)
strucs <- cl_cpos2struc("REUTERS", s_attribute = "id", cpos = token_cpos)
strucs_unique <- unique(strucs)
text_ids <- cl_struc2str("REUTERS", s_attribute = "id", struc = strucs_unique)

# get the full text of the first text with match for 'oil'
left_cpos <- cl_cpos2lbound("REUTERS", s_attribute = "id", cpos = min(token_cpos))
right_cpos <- cl_cpos2rbound("REUTERS", s_attribute = "id", cpos = min(token_cpos))
txt <- cl_cpos2str("REUTERS", p_attribute = "word", cpos = left_cpos:right_cpos)
fulltext <- paste(txt, collapse = " ")

# alternativ approach to achieve same result
first_struc_match_oil <- cl_cpos2struc("REUTERS", s_attribute = "id", cpos = min(token_cpos))
cpos_struc <- cl_struc2cpos("REUTERS", s_attribute = "id", struc = first_struc_match_oil)
txt <- cl_cpos2str("REUTERS", p_attribute = "word", cpos = cpos_struc[1]:cpos_struc[2])
fulltext <- paste(txt, collapse = " ")
```

`cl_attribute_size` *Get Attribute Size (of Positional/Structural Attribute).*

Description

Use `cl_attribute_size` to get the total number of values of a positional attribute (param `attribute_type` = "p"), or structural attribute (param `attribute_type` = "s"). Note that indices are zero-based, i.e. the maximum position of a positional / structural attribute is attribute size minus 1 (see examples).

Usage

```
cl_attribute_size(corpus, attribute, attribute_type,
  registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

`corpus`	name of a CWB corpus (upper case)
`attribute`	name of a p- or s-attribute
`attribute_type`	either "p" or "s", for structural/positional attribute
`registry`	path to the registry directory, defaults to the value of the environment variable CORPUS_REGISTRY

Examples

```
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()

Sys.setenv(CORPUS_REGISTRY = registry)
token_no <- cl_attribute_size("REUTERS", attribute = "word", attribute_type = "p")
corpus_positions <- seq.int(from = 0, to = token_no - 1)
cl_cpos2id("REUTERS", "word", cpos = corpus_positions)
```

```
places_no <- cl_attribute_size("REUTERS", attribute = "places", attribute_type = "s")
strucs <- seq.int(from = 0, to = places_no - 1)
cl_struc2str("REUTERS", "places", struc = strucs)
```

---

cl_charset_name *Get charset of a corpus.*

Description

The encoding of a corpus is declared in the registry file (corpus property "charset"). Once a corpus is loaded, this information is available without parsing the registry file again and again. The cl_charset_name offers a quick access to this information.

Usage

```
cl_charset_name(corpus, registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

corpus	Name of a CWB corpus (upper case).
registry	Path to the registry directory, defaults to the value of the environment variable CORPUS_REGISTRY

Examples

```
cl_charset_name(
  corpus = "REUTERS",
  registry = system.file(package = "RcppCWB", "extdata", "cwb", "registry")
)
```

---

cl_delete_corpus *Drop loaded corpus.*

Description

Remove a corpus from the list of loaded corpora of the corpus library (CL).

Usage

```
cl_delete_corpus(corpus, registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

corpus	name of a CWB corpus (upper case)
registry	path to the registry directory, defaults to the value of the environment variable CORPUS_REGISTRY

Details

The corpus library (CL) internally maintains a list of corpora including information on positional and structural attributes so that the registry file needs not be parsed again and again. However, when an attribute has been added to the corpus, it will not yet be visible, because it is not part of the data that has been loaded. The `cl_delete_corpus` function exposes a CL function named identically, to force reloading the corpus (after it has been deleted), which will include parsing an updated registry file.

`cl_lexicon_size` *Get Lexicon Size.*

Description

Get the total number of unique tokens/ids of a positional attribute. Note that token ids are zero-based, i.e. when iterating through tokens, start at 0, the maximum will be `cl_lexicon_size()` minus 1.

Usage

```
cl_lexicon_size(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

`corpus`	name of a CWB corpus (upper case)
`p_attribute`	name of positional attribute
`registry`	path to the registry directory, defaults to the value of the environment variable CORPUS_REGISTRY

Examples

```
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()
Sys.setenv(CORPUS_REGISTRY = registry)
lexicon_size <- cl_lexicon_size("REUTERS", p_attribute = "word")
token_ids <- seq.int(from = 0, to = lexicon_size - 1)
cl_id2str("REUTERS", p_attribute = "word", id = token_ids)
```

cqp_initialize *Initialize Corpus Query Processor (CQP).*

Description

CQP needs to know where to look for CWB indexed corpora. To initialize CQP, call `cqp_initialize`. To reset the registry, use the function `cqp_reset_registry`. To get the registry used by CQP, use `cqp_get_registry`. To get the initialization status, use `cqp_is_initialized`

Usage

```
cqp_initialize(registry = Sys.getenv("CORPUS_REGISTRY"))

cqp_is_initialized()

cqp_get_registry()

cqp_reset_registry(registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

`registry`	the registry directory

Author(s)

Andreas Blaette, Bernard Desgraupes, Sylvain Loiseau

Examples

```
cqp_is_initialized() # check initialization status
if (!cqp_is_initialized()) cqp_initialize()
cqp_is_initialized() # check initialization status (TRUE now?)
cqp_get_registry() # get registry dir used by CQP

registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()
if (cqp_get_registry() != registry) cqp_reset_registry(registry = registry)
cqp_list_corpora() # get list of corpora
```

cqp_list_corpora *List Available CWB Corpora.*

Description

List the corpora described by the registry files in the registry directory that is currently set.

Usage

```
cqp_list_corpora()
```

Author(s)

Andreas Blaette, Bernard Desgraupes, Sylvain Loiseau

Examples

```
if (!cqp_is_initialized()){
  registry <- system.file(package = "RcppCWB", "extdata", "cwb", "registry")
  cqp_initialize(registry)
}
cqp_list_corpora()
```

---

cqp_query *Execute CQP Query and Retrieve Results.*

Description

Using CQP queries requires a two-step procedure: At first, you execute a query using `cqp_query`. Then, `cqp_dump_subcorpus` will return a matrix with the regions of the matches for the query.

Usage

```
cqp_query(corpus, query, subcorpus = "QUERY")

cqp_dump_subcorpus(corpus, subcorpus = "QUERY")

cqp_subcorpus_size(corpus, subcorpus = "QUERY")

cqp_list_subcorpora(corpus)
```

Arguments

`corpus`	a CWB corpus
`query`	a CQP query
`subcorpus`	subcorpus name

Details

The `cqp_query` function executes a CQP query. The `cqp_subcorpus_size` function returns the number of matches for the CQP query. The `cqp_dump_subcorpus` function will return a two-column matrix with the left and right corpus positions of the matches for the CQP query.

Author(s)

Andreas Blaette, Bernard Desgraupes, Sylvain Loiseau

References

Evert, S. 2005. The CQP Query Language Tutorial. Available online at http://cwb.sourceforge.net/files/CWB_Encoding_Tutorial.pdf

Examples

```
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()

if (!cqp_is_initialized()){
  cqp_initialize(registry = registry)
} else {
  if (cqp_get_registry() != registry) cqp_reset_registry(registry)
}
cqp_query(corpus = "REUTERS", query = '"oil";')
cqp_subcorpus_size("REUTERS")
cqp_dump_subcorpus("REUTERS")

cqp_query(corpus = "REUTERS", query = '"crude" "oil";')
cqp_subcorpus_size("REUTERS", subcorpus = "QUERY")
cqp_dump_subcorpus("REUTERS")
```

`cwb_makeall` *CWB Tools for Creating Corpora*

Description

Wrappers for the CWB tools (`cwb-makeall`, `cwb-huffcode`, `cwb-compress-rdx`). Unlike the 'original' command line tools, these wrappers will always perform a specific indexing/compression step on one positional attribute, and produce all components.

Usage

```
cwb_makeall(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"))

cwb_huffcode(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"))

cwb_compress_rdx(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

`corpus`	name of a CWB corpus (upper case)
`p_attribute`	name p-attribute
`registry`	path to the registry directory, defaults to the value of the environment variable CORPUS_REGISTRY

Examples

```
# The package includes and 'unfinished' corpus of debates in the UN General
# Assembly ("UNGA"), i.e. it does not yet include the reverse index, and it is
# not compressed.
#
# The first step in the following example is to copy the raw
# corpus to a temporary place.

registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()
home_dir <- system.file(package = "RcppCWB", "extdata", "cwb", "indexed_corpora", "unga")

tmpdir <- tempdir()
win <- if (Sys.info()["sysname"] == "Windows") TRUE else FALSE
if (win) tmpdir <- normalizePath(tmpdir)
tmp_regdir <- file.path(tmpdir, "registry", fsep = if (win) "\\" else "/")
tmp_data_dir <- file.path(tmpdir, "indexed_corpora", fsep = if (win) "\\" else "/")
tmp_unga_dir <- file.path(tmp_data_dir, "unga", fsep = if (win) "\\" else "/")
if (!file.exists(tmp_regdir)) dir.create(tmp_regdir)
if (!file.exists(tmp_data_dir)) dir.create(tmp_data_dir)
if (!file.exists(tmp_unga_dir)){
  dir.create(tmp_unga_dir)
} else {
  file.remove(list.files(tmp_unga_dir, full.names = TRUE))
}
regfile <- readLines(file.path(registry, "unga"))
homedir_line <- grep("^HOME", regfile)
regfile[homedir_line] <- sprintf('HOME "%s"', tmp_unga_dir)
writeLines(text = regfile, con = file.path(tmp_regdir, "unga"))
for (x in list.files(home_dir, full.names = TRUE)){
  file.copy(from = x, to = tmp_unga_dir)
}

# perform cwb_makeall (equivalent to cwb-makeall command line utility)
cwb_makeall(corpus = "UNGA", p_attribute = "word", registry = tmp_regdir)

# see whether it works
ids_sentence_1 <- cl_cpos2id(
  corpus = "UNGA", p_attribute = "word", registry = tmp_regdir,
  cpos = 0:83
  )
tokens_sentence_1 <- cl_id2str(
  corpus = "UNGA", p_attribute = "word",
  registry = tmp_regdir, id = ids_sentence_1
  )
sentence <- gsub("\\s+([\\.,])", "\\1", paste(tokens_sentence_1, collapse = " "))
## Not run:
cwb_huffcode(corpus = "UNGA", p_attribute = "word", registry = tmp_regdir)

## End(Not run)
cwb_compress_rdx(corpus = "UNGA", p_attribute = "word", registry = tmp_regdir)
```

get_cbow_matrix *Get CBOW Matrix.*

Description

Get matrix with moving windows. Negative integer values indicate absence of a token at the respective position.

Usage

```
get_cbow_matrix(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"), matrix, window)
```

Arguments

corpus	a CWB corpus
p_attribute	a positional attribute
registry	the registry directory
matrix	a matrix
window	window size

Examples

```
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()

m <- get_region_matrix(
  corpus = "REUTERS", s_attribute = "places",
  strucs = 0L:5L, registry = registry
  )
windowsize <- 3L
m2 <- get_cbow_matrix(
  corpus = "REUTERS", p_attribute = "word",
  registry = registry, matrix = m, window = windowsize
  )
colnames(m2) <- c(-windowsize:-1, "node", 1:windowsize)
```

get_count_vector *Get Vector with Counts for Positional Attribute.*

Description

The return value is an integer vector. The length of the vector is the number of unique tokens in the corpus / the number of unique ids. The order of the counts corresponds to the number of ids.

Usage

```
get_count_vector(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

corpus	a CWB corpus
p_attribute	a positional attribute
registry	registry directory

Value

an integer vector

Examples

```
registry <- use_tmp_registry()
y <- get_count_vector(
  corpus = "REUTERS", p_attribute = "word",
  registry = registry
  )
df <- data.frame(token_id = 0:(length(y) - 1), count = y)
df[["token"]] <- cl_id2str(
  "REUTERS", p_attribute = "word",
  id = df[["token_id"]], registry = registry
  )
df <- df[,c("token", "token_id", "count")] # reorder columns
df <- df[order(df[["count"]], decreasing = TRUE),]
head(df)
```

---

get_pkg_registry *Get Registry Directory Within Package*

Description

Get Registry Directory Within Package

Usage

```
get_pkg_registry(pkgname = "RcppCWB")
```

Arguments

pkgname	Name of package (character vector)

get_region_matrix *Get Matrix with Regions for Strucs.*

Description

The return value is an integer matrix with the left and right corpus positions of the strucs in columns one and two, respectively.

Usage

```
get_region_matrix(corpus, s_attribute, strucs,
  registry = Sys.getenv("CORPUS_REGISTRY"))
```

Arguments

corpus	a CWB corpus
s_attribute	a structural attribute
strucs	strucs
registry	the registry directory

Value

A matrix with integer values indicating left and right corpus positions (columns 1 and 2, respectively).

Examples

```
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()
y <- get_region_matrix(
  corpus = "REUTERS", s_attribute = "id",
  strucs = 0L:5L, registry = registry
  )
```

ids_to_count_matrix *Perform Count for Vector of IDs.*

Description

The return value is a two-column integer matrix. Column one represents the unique ids of the input vector, column two the respective number of occurrences / counts.

Usage

```
ids_to_count_matrix(ids)
```

Arguments

ids	a vector of ids (integer values)

Examples

```
ids <- c(1L, 5L, 5L, 7L, 7L, 7L, 7L)
ids_to_count_matrix(ids)
table(ids) # alternative to get a similar result
```

---

region_matrix_ops *Get IDs and Counts for Region Matrices.*

Description

Get IDs and Counts for Region Matrices.

Usage

```
region_matrix_to_ids(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"), matrix)

region_matrix_to_count_matrix(corpus, p_attribute,
  registry = Sys.getenv("CORPUS_REGISTRY"), matrix)
```

Arguments

corpus	a CWB corpus
p_attribute	a positional attribute
registry	registry directory
matrix	a regions matrix

Examples

```
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()

# Scenario 1: Get full text for a subcorpus defined by regions
m <- get_region_matrix(
  corpus = "REUTERS", s_attribute = "places",
  strucs = 4L:5L, registry = registry
  )
ids <- region_matrix_to_ids(
  corpus = "REUTERS", p_attribute = "word",
  registry = registry, matrix = m
  )
tokenstream <- cl_id2str(
  corpus = "REUTERS", p_attribute = "word",
  registry = registry, id = ids
  )
```

```
txt <- paste(tokenstream, collapse = " ")
txt

# Scenario 2: Get data.frame with counts for region matrix
y <- region_matrix_to_count_matrix(
  corpus = "REUTERS", p_attribute = "word",
  registry = registry, matrix = m
  )
df <- as.data.frame(y)
colnames(df) <- c("token_id", "count")
df[["token"]] <- cl_id2str(
  "REUTERS", p_attribute = "word",
  registry = registry, id = df[["token_id"]]
  )
df[order(df[["count"]], decreasing = TRUE),]
head(df)
```

`s_attribute_decode` *Decode Structural Attribute.*

Description

Get `data.frame` with left and right corpus positions (cpos) for structural attributes and values.

Usage

```
s_attribute_decode(corpus, data_dir, s_attribute, encoding = NULL,
  registry = Sys.getenv("CORPUS_REGISTRY"), method = c("R", "Rcpp"))
```

Arguments

`corpus`	a CWB corpus
`data_dir`	data directory where binary files for corpus are stored
`s_attribute`	a structural attribute
`encoding`	encoding of the values ("latin-1" or "utf-8")
`registry`	registry directory
`method`	character vector, whether to use "R" or "Rcpp" implementation

Details

Two approaches are implemented: A pure R solution will decode the files directly in the directory specified by `data_dir`. An implementation using Rcpp will use the registry file for `corpus` to find the data directory.

Value

A `data.frame` with three columns. Column `cpos_left` are the start corpus positions of a structural annotation, `cpos_right` the end corpus positions. Column `value` is the value of the annotation.

a character vector

Examples

```
registry <- if (!check_pkg_registry_files()) use_tmp_registry() else get_pkg_registry()
Sys.setenv(CORPUS_REGISTRY = registry)

# pure R implementation (Rcpp implementation fails on Windows in vanilla mode)
b <- s_attribute_decode(
  data_dir = system.file(package = "RcppCWB", "extdata", "cwb", "indexed_corpora", "reuters"),
  s_attribute = "places", method = "R"
  )
```

---

use_tmp_registry *Use Temporary Registry*

Description

Use and get temporary registry directory to describe and access the corpora in a package.

Usage

```
use_tmp_registry(pkg = system.file(package = "RcppCWB"))

get_tmp_registry()
```

Arguments

pkg	Full path to a package.

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