

stringdist_api

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Chapter 1

Stringdist C API

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Version

R package stringdist version 0.9.5.0 and higher.

1.1 Using the stringdist C API

To call the functions described here from your package you need to:

1. Make sure that `stringdist` is installed.
2. Add `stringdist` to Imports (or Depends) and LinkingTo in the DESCRIPTION file.
3. In your source file under the package's `/src` directory, add the line

```
#include <stringdist_api.h>
```

An example of a published package using this API is [refinr](#). A minimal example can be found [here](#).

1.2 Character encoding

All character vector input is expected to be in UTF-8 (this also allows ASCII). Distance computations are based on UTF [code points](#) unless `useBytes` is `TRUE`, in which case distances are computed over byte sequences. Using non-UTF-8 encoded strings is untested and is highly likely to result in errors.

1.3 Thread safety

It is not safe to call functions from `stringdist` C API from multiple concurrent threads.

Chapter 2

File Index

2.1 File List

Here is a list of all documented files with brief descriptions:

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Chapter 3

File Documentation

3.1 stringdist_api.h File Reference

Functions exported from the stringdist package.

```
#include <R_ext/Rdynload.h>
```

Functions

- SEXP attribute_hidden [sd_amatch](#) (SEXP x, SEXP table, SEXP method, SEXP nomatch, SEXP matchNA, SEXP weight, SEXP p, SEXP bt, SEXP q, SEXP maxDistance, SEXP useBytes, SEXP nthrd)
Find the location of values in x in table by approximate matching.
- SEXP attribute_hidden [sd_get_qgrams](#) (SEXP a, SEXP qq)
Compute q-gram counts.
- SEXP attribute_hidden [sd_lower_tri](#) (SEXP a, SEXP method, SEXP weight, SEXP p, SEXP bt, SEXP q, SEXP useBytes, SEXP nthrd)
Lower tridiagonal elements of distance matrix.
- SEXP attribute_hidden [sd_soundex](#) (SEXP x, SEXP useBytes)
Compute soundex code.
- SEXP attribute_hidden [sd_stringdist](#) (SEXP a, SEXP b, SEXP method, SEXP weight, SEXP p, SEXP bt, SEXP q, SEXP useBytes, SEXP nthrd)
compute string distances

3.1.1 Detailed Description

Functions exported from the stringdist package.

3.1.2 Function Documentation

3.1.2.1 sd_amatch()

```
SEXP attribute_hidden sd_amatch (
    SEXP x,
    SEXP table,
    SEXP method,
    SEXP nomatch,
    SEXP matchNA,
    SEXP weight,
    SEXP p,
    SEXP bt,
    SEXP q,
    SEXP maxDistance,
    SEXP useBytes,
    SEXP nthrd )
```

Find the location of values in `x` in `table` by approximate matching.

Parameters

<code>x</code>	[character] vector.
<code>table</code>	[character] vector (lookup table)
<code>method</code>	[integer] scalar, indicating the distance method as follows <ul style="list-style-type: none"> • 0: Optimal String Alignment ("osa") • 1: Levenshtein ("lv") • 2: Damerau-Levenshtein ("dl") • 3: Hamming ("hamming") • 4: Longest Common Substring ("lcs") • 5: q-gram ("qgram") • 6: cosine ("cosine") • 7: Jaccard ("jaccard") • 8: Jaro-Winkler ("jw") • 9: Soundex ("soundex")
<code>nomatch</code>	[integer] The value to be returned when no match is found.
<code>matchNA</code>	Should NAs be matched? Default behaviour mimics the behaviour of base <code>match</code> , meaning that NA matches NA (see also the note on NA handling below).
<code>weight</code>	[numeric] vector. Edit penalty For <code>method='osa'</code> or <code>'dl'</code> , the penalty for deletion, insertion, substitution and transposition, in that order. When <code>method='lv'</code> , the penalty for transposition is ignored. When <code>method='jw'</code> , the weights associated with characters of <code>a</code> , characters from <code>b</code> and the transposition weight, in that order. Weights must be positive and not exceed 1. <code>weight</code> is ignored completely for other methods
<code>q</code>	[integer] scalar. Size of the q-gram; must be nonnegative. Only applies to <code>method='qgram', 'jaccard'</code> or <code>'cosine'</code> .
<code>maxDistance</code>	[numeric] scalar. The maximum distance allowed for matching.
<code>p</code>	[numeric] scalar. Penalty factor for Jaro-Winkler distance. The valid range for <code>p</code> is $0 \leq p \leq 0.25$. If <code>p=0</code> (default), the Jaro-distance is returned. Applies only to <code>method='jw'</code> .
<code>bt</code>	[numeric] vector. Winkler's boost threshold. Winkler's penalty factor is only applied when the Jaro distance is larger than <code>bt</code> . Applies only to <code>method='jw'</code> and <code>p>0</code> .

Parameters

<i>useBytes</i>	Perform byte-wise comparison (i.e. do not translate UTF-8 to integer prior to distance calculation)
<i>nthread</i>	[integer] scalar. Maximum number of threads to use.

Returns

[integer] vector of length(x) with indices in table.

3.1.2.2 sd_get_qgrams()

```
SEXP attribute_hidden sd_get_qgrams (
    SEXP a,
    SEXP qq )
```

Compute q-gram counts.

Parameters

<i>a</i>	[character] vector
<i>qq</i>	[integer] scalar.

Returns

A [numeric] vector of length(a)*n_qgrams, where n_qgrams is the number of different qgrams observed in the elements of a. The output vector has an attribute called qgrams, which is an integer vector of size q*n_qgrams containing integer (UTF-32) labels for the q-grams sequentially.

3.1.2.3 sd_lower_tri()

```
SEXP attribute_hidden sd_lower_tri (
    SEXP a,
    SEXP method,
    SEXP weight,
    SEXP p,
    SEXP bt,
    SEXP q,
    SEXP useBytes,
    SEXP nthrd )
```

Lower tridiagonal elements of distance matrix.

Parameters

<i>a</i>	[character] vector
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Parameters

<i>method</i>	<p>[integer] scalar, indicating the distance method as follows</p> <ul style="list-style-type: none"> • 0: Optimal String Alignment ("osa") • 1: Levenshtein ("lv") • 2: Damerau-Levenshtein ("dl") • 3: Hamming ("hamming") • 4: Longest Common Substring ("lcs") • 5: q-gram ("qgram") • 6: cosine ("cosine") • 7: Jaccard ("jaccard") • 8: Jaro-Winkler ("jw") • 9: Soundex ("soundex")
<i>weight</i>	<p>[numeric] vector. Edit penalty For <code>method='osa'</code> or <code>'dl'</code>, the penalty for deletion, insertion, substitution and transposition, in that order. When <code>method='lv'</code>, the penalty for transposition is ignored. When <code>method='jw'</code>, the weights associated with characters of <code>a</code>, characters from <code>b</code> and the transposition weight, in that order. Weights must be positive and not exceed 1. <code>weight</code> is ignored completely for other methods</p>
<i>q</i>	<p>[integer] scalar. Size of the q-gram; must be nonnegative. Only applies to <code>method='qgram', 'jaccard' or 'cosine'</code>.</p>
<i>p</i>	<p>[numeric] scalar. Penalty factor for Jaro-Winkler distance. The valid range for <code>p</code> is $0 \leq p \leq 0.25$. If <code>p=0</code> (default), the Jaro-distance is returned. Applies only to <code>method='jw'</code>.</p>
<i>bt</i>	<p>[numeric] vector. Winkler's boost threshold. Winkler's penalty factor is only applied when the Jaro distance is larger than <code>bt</code>. Applies only to <code>method='jw'</code> and <code>p>0</code>.</p>
<i>useBytes</i>	<p>Perform byte-wise comparison (i.e. do not translate UTF-8 to integer prior to distance calculation)</p>
<i>nthread</i>	<p>[integer] scalar. Maximum number of threads to use.</p>

Returns

A [numeric] vector of length $n*(n-1)/2$, where $n=\text{length}(a)$. It contains the positive values of consecutive columns of the distance matrix. Also see the R-code in `stringdist:::lower_tri`.

3.1.2.4 sd_soundex()

```
SEXP attribute_hidden sd_soundex (
    SEXP x,
    SEXP useBytes )
```

Compute soundex code.

Parameters

in	<i>x</i>	[character] vector
in	<i>useBytes</i>	[logical] scalar.

Returns

A list with `length(x)` element. Each element is a length 4 integer vector representing a 4-character soundex code. The integers are ASCII code points.

3.1.2.5 `sd_stringdist()`

```
SEXP attribute_hidden sd_stringdist (
    SEXP a,
    SEXP b,
    SEXP method,
    SEXP weight,
    SEXP p,
    SEXP bt,
    SEXP q,
    SEXP useBytes,
    SEXP nthrd )
```

compute string distances

Parameters

<i>a</i>	[character] vector
<i>b</i>	[character] vector
<i>method</i>	[integer] scalar, indicating the distance method as follows <ul style="list-style-type: none"> • 0: Optimal String Alignment ("osa") • 1: Levenshtein ("lv") • 2: Damerau-Levenshtein ("dl") • 3: Hamming ("hamming") • 4: Longest Common Substring ("lcs") • 5: q-gram ("qgram") • 6: cosine ("cosine") • 7: Jaccard ("jaccard") • 8: Jaro-Winkler ("jw") • 9: Soundex ("soundex")
<i>weight</i>	[numeric] vector. Edit penalty For <code>method='osa'</code> or <code>'dl'</code> , the penalty for deletion, insertion, substitution and transposition, in that order. When <code>method='lv'</code> , the penalty for transposition is ignored. When <code>method='jw'</code> , the weights associated with characters of <i>a</i> , characters from <i>b</i> and the transposition weight, in that order. Weights must be positive and not exceed 1. <i>weight</i> is ignored completely for other methods
<i>q</i>	[integer] scalar. Size of the q-gram; must be nonnegative. Only applies to <code>method='qgram', 'jaccard' or 'cosine'</code> .
<i>p</i>	[numeric] scalar. Penalty factor for Jaro-Winkler distance. The valid range for <i>p</i> is $0 \leq p \leq 0.25$. If <i>p</i> =0 (default), the Jaro-distance is returned. Applies only to <code>method='jw'</code> .
<i>bt</i>	[numeric] vector. Winkler's boost threshold. Winkler's penalty factor is only applied when the Jaro distance is larger than <i>bt</i> . Applies only to <code>method='jw'</code> and <i>p</i> >0.
<i>useBytes</i>	Perform byte-wise comparison (i.e. do not translate UTF-8 to integer prior to distance calculation)
<i>nthread</i>	[integer] scalar. Maximum number of threads to use.

Returns

A `[numeric]` vector of length `max(length(a), length(b))` where the shortest vector is recycled over the longer (no warnings are given when the longer length is not an integer multiple of the shorter length).

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