

# Package ‘gower’

October 13, 2022

**Maintainer** Mark van der Loo <mark.vanderloo@gmail.com>

**License** GPL-3

**Title** Gower's Distance

**Type** Package

**LazyLoad** yes

**Description** Compute Gower's distance (or similarity) coefficient between records. Compute the top-n matches between records. Core algorithms are executed in parallel on systems supporting OpenMP.

**Version** 1.0.0

**URL** <https://github.com/markvanderloo/gower>

**BugReports** <https://github.com/markvanderloo/gower/issues>

**Suggests** tinytest (>= 0.9.3),

**RoxygenNote** 7.1.1

**NeedsCompilation** yes

**Author** Mark van der Loo [aut, cre],  
David Turner [ctb]

**Repository** CRAN

**Date/Publication** 2022-02-03 11:50:06 UTC

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gower-package	<i>Gower's distance/similarity measure.</i>
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### Description

A C-based implementation of Gower's distance.

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gower_dist	<i>Gower's distance</i>
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### Description

Compute Gower's distance, pairwise between records in two data sets *x* and *y*. Records from the smallest data set are recycled over.

### Usage

```
gower_dist(
  x,
  y,
  pair_x = NULL,
  pair_y = NULL,
  eps = 1e-08,
  weights = NULL,
  ignore_case = FALSE,
  nthread = getOption("gd_num_thread")
)
```

### Arguments

<i>x</i>	[data.frame]
<i>y</i>	[data.frame]
<i>pair_x</i>	[numeric character] (optional) Columns in <i>x</i> used for comparison. See Details below.
<i>pair_y</i>	[numeric character] (optional) Columns in <i>y</i> used for comparison. See Details below.
<i>eps</i>	[numeric] (optional) Computed numbers (variable ranges) smaller than <i>eps</i> are treated as zero.
<i>weights</i>	[numeric] (optional) A vector of weights of length <code>ncol(x)</code> that defines the weight applied to each component of the gower distance.
<i>ignore_case</i>	[logical] Toggle ignore case when neither <i>pair_x</i> nor <i>pair_y</i> are user-defined.
<i>nthread</i>	Number of threads to use for parallelization. By default, for a dual-core machine, 2 threads are used. For any other machine <i>n</i> -1 cores are used so your machine doesn't freeze during a big computation. The maximum nr of threads are determined using <code>omp_get_max_threads</code> at C level.

**Value**

A numeric vector of length  $\max(\text{nrow}(x), \text{nrow}(y))$ . When there are no columns to compare, a message is printed and both `numeric(0)` is returned invisibly.

**Details**

There are three ways to specify which columns of  $x$  should be compared with what columns of  $y$ . The first option is do give no specification. In that case columns with matching names will be used. The second option is to use only the `pairs_y` argument, specifying for each column in  $x$  in order, which column in  $y$  must be used to pair it with (use `0` to skip a column in  $x$ ). The third option is to explicitly specify the columns to be matched using `pair_x` and `pair_y`.

**Note**

Gower (1971) originally defined a similarity measure ( $s$ , say) with values ranging from 0 (completely dissimilar) to 1 (completely similar). The distance returned here equals  $1 - s$ .

**References**

Gower, John C. "A general coefficient of similarity and some of its properties." *Biometrics* (1971): 857-871.

**See Also**

[gower\\_topn](#)

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gower\_topn

*Find the top-n matches*

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**Description**

Find the top-n matches in  $y$  for each record in  $x$ .

**Usage**

```
gower_topn(  
  x,  
  y,  
  pair_x = NULL,  
  pair_y = NULL,  
  n = 5,  
  eps = 1e-08,  
  weights = NULL,  
  ignore_case = FALSE,  
  nthread = getOption("gd_num_thread")  
)
```

**Arguments**

x	[data.frame]
y	[data.frame]
pair_x	[numeric character] (optional) Columns in x used for comparison. See Details below.
pair_y	[numeric character] (optional) Columns in y used for comparison. See Details below.
n	The top-n indices and distances to return.
eps	[numeric] (optional) Computed numbers (variable ranges) smaller than eps are treated as zero.
weights	[numeric] (optional) A vector of weights of length ncol(x) that defines the weight applied to each component of the gower distance.
ignore_case	[logical] Toggle ignore case when neither pair_x nor pair_y are user-defined.
nthread	Number of threads to use for parallelization. By default, for a dual-core machine, 2 threads are used. For any other machine n-1 cores are used so your machine doesn't freeze during a big computation. The maximum nr of threads are determined using omp_get_max_threads at C level.

**Value**

A list with two array elements: `index` and `distance`. Both have size  $n \times \text{nrow}(x)$ . Each  $i$ th column corresponds to the top- $n$  best matches of  $x$  with rows in  $y$ . When there are no columns to compare, a message is printed and both `distance` and `index` will be empty matrices; the list is then returned invisibly.

**See Also**

[gower\\_dist](#)

**Examples**

```
# find the top 4 best matches in the iris data set with itself.
x <- iris[1:3,]
lookup <- iris[1:10,]
gower_topn(x=x,y=lookup,n=4)
```

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