# Package 'sdam'

March 4, 2021

Type Package

| Title Digital tools for the SDAM project at Aarhus University  |     |
|--|-----|
| Description  This package provides tools for performing analyses within Social Dynamics and complexity in the Ancient Mediterranean (SDAM), which is a research group based at Aarhus University | ty. |
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| License CC BY 4.0  R topics documented:  |     |
| plot.map  prex  request  rp  rpmcd   |     |
|  | - ' |

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sdam-package

Digital tools for the SDAM project at Aarhus University

## **Description**

This package provides tools for performing analyses within Social Dynamics and complexity in the Ancient Mediterranean (SDAM), which is a research group based at Aarhus University.

#### **Details**

Package: sdam
Type: Package
Version: 0.4.2

Date: 4 March 2021 License: CC BY-SA 4.0

Currently, it is possible with the "sdam" package to access data from the Epigraphic Database Heidelberg API with get.edh(), and the wrapper function get.edhw(). Most of the data is available in the EDH dataset attached to the package, which can be manipulated by using edhw().

Besides, the request() function allows performing different types of HTTP requests to DEiC'S <a href="https://sciencedata.dk">https://sciencedata.dk</a> or another cloud repository with a customized URL address.

There is also the possibility to compute probabilities of existence with prex() with either the aoristic sum or count matching for observations for different periodization options. Function plot.dates() allows visualizing interval time events that can be manipulated by the internal function dts as illustrated in a vignette.

Another plotting function in "sdam" is found in plot.map() that allows visualizing maps of ancient Roman provinces that are found in EDH. This function depends on two datasets that are rpmp.

Similarity by simple matching among column vectors is achieved by the simil() function (still under development) in order to make analyses of relations between assemblages and artifacts.

#### Author(s)

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Maintainer: Antonio Rivero Ostoic <jaro@cas.au.dk>

#### See Also

multigraph

EDH

Epigraphic Database Heidelberg Dataset

#### **Description**

This is a data set retrieved from the Epigraphic Database Heidelberg API repository.

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## Usage

```
data("EDH")
```

#### **Format**

A list object of 84701 records (until 10-11-2020) with at least one of the following 47 (or more) names in the EDH list:

```
"ID", "commentary", "fotos", "country", "depth", "diplomatic_text", "edh_geography_uri",
"findspot", "findspot_ancient", "findspot_modern", "geography", "height", "id", "language",
"last_update", "letter_size", "literature", "material", "military", "modern_region",
"not_after", "not_before", "people" (which is a list with: "person_id", "nomen", "cognomen",
"praenomen", "name", "gender", "status", "tribus", "origo", "occupation", "age: years",
"age: months", "age: days"), "present_location", "province_label", "religion",
"responsible_individual", "social_economic_legal_history", "transcription", "trismegistos_uri",
"type_of_inscription", "type_of_monument", "uri", "width", "work_status", and "year_of_find".
```

#### Source

https://edh-www.adw.uni-heidelberg.de/data/api

#### See Also

```
get.edh, get.edhw,edhw
```

edhw

Wrapper function for manipulation of EDH dataset

## **Description**

A function to obtain variable data and perform transformations on the Epigraphic Database Heidelberg EDH dataset.

## Usage

| X      | A list object name with fragments of the EDH dataset (optional)                                    |
|--------|--|
| vars   | Variables of interest from $x$ ; if $x=NULL$ , the entire EDH dataset is taken. (optional, vector) |
| as     | Format to return the output. Currently either as a "list" or a data frame "df" object.             |
| type   | Type format of data frame. Currently either "long" or "wide" ("narrow" not yet implemented)        |
| split  | Divide the data into groups by id? (optional and logical)  |
| select | Choose "people" variables (optional, vector)   |
| addID  | Add identification to the output? (optional and logical)   |

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limit Limit the returned output. Ignored if id is specified (optional, integer or vector)

id Select only hd\_nr records (optional, integer or character)
na.rm Remove entries with NA data? (optional and logical)

clean clean list object x? (optional and logical)
province Roman province (character, optional)
gender people gender in EDH (character, optional)

... Optional arguments if needed.

#### **Details**

This is a convenient function to "extract" *variables* from the EDH dataset attached to this package. However, the input in x can be fragments of the EDH dataset or from the Epigraphic Database Heidelberg API obtained by functions get.edh() or get.edhw() with the rjson format. When x is explicit, it must be at least a list object with a comparable structure to the EDH dataset.

Through vars argument and return the output either as a list with list or a data frame with df, and when argument vars is missing, then all entries in x are taken.

By default, a list object is returned, with or without an ID identification provided by the addID argument. When the input list is converted into a data frame, the ordering of the variables is given alphabetically. If desired, it is also possible to remove missing data from the output by activating na.rm and work with complete cases.

Arguments id and limit serve to reduce the returned output either to some Epigraphic Database number or numbers, which are specified by hd\_nr, or else by limiting the amount of the returned output. limit here is like the limit argument of function get.edh(), but in this case the offset can be specified as a sequence. While "limit" is a faster way to get to entries in the EDH dataset, argument id is for referring to precisely one or more hd\_nrs in the Epigraphic Database Heidelberg API.

Component "people" is a separated list in the EDH dataset, and it should be considered as a separate case from the rest of the variables. In the case that the output is a data frame, the default output is a 'long' type table; that is records can appear in different rows and each variable is assigned into a single column, and with this option is possible to select "people" variables.

By setting "wide" in type, it is possible to place the different people from a single entry column by column in the data frame and each record has a single row. Finally, argument split allows dividing the data in the data frame into groups by 'id', which corresponds to the HD number of inscription in the EDH dataset.

Ad hoc arguments are the EDH entries province and gender for entering a Roman province and people's gender in x.

#### Value

A list or a data frame with a long or wide format, depending on the arguments inputs.

#### Note

When choosing "people" variables with select with a data frame output, then this attribute should be chosen in vars.

#### Author(s)

Antonio Rivero Ostoic

#### References

https://edh-www.adw.uni-heidelberg.de/data/api

#### See Also

```
get.edh, get.edhw, prex, plot.dates, EDH
```

#### **Examples**

```
## Not run:
## load data set
data(EDH)

## make a list for three variables in 'EDH' (default)
edhw(vars=c("type_of_inscription", "not_after", "not_before") )

## select 'gender' from 'people' in 'EDH' (default)
edhw(vars=c("people", "not_after", "not_before"), select="gender" )
## End(Not run)
```

get.edh

Get data from the Epigraphic Database Heidelberg API

#### **Description**

A function to obtain data from the Epigraphic Database Heidelberg API repository.

#### Usage

```
get.edh(search = c("inscriptions", "geography"),
    url = "https://edh-www.adw.uni-heidelberg.de/data/api",
    hd_nr, province, country, findspot_modern, findspot_ancient,
    year_not_before, year_not_after, tm_nr, transcription, type,
    bbox, findspot, pleiades_id, geonames_id, offset, limit,
    maxlimit = 4000, addID, printQ)
```

## **Arguments**

search Whether the search is on inscriptions *or* on geography.

url Open data repository API
hd\_nr HD number of inscription
province Ancient Roman province name

country Actual country name

findspot\_modern

Actual location name findspot

findspot\_ancient

Ancient location name findspot

year\_not\_before

Year, not before (integer, BC years are negative)

year\_not\_after Year, not after (integer, BC years are negative)
tm\_nr Trismegistos' database number (?)

transcription Automatic leading and trailing truncation (brackets are ignored)

type Type of inscription (case insensitive)

bbox Bounding box with character format bbox = "minLong, minLat, maxLong, maxLat"

findspot Level of village, street etc. (add leading and/or trailing)

pleiades\_id Pleiades identifier of a place (integer)
geonames\_id Geonames identifier of a place (integer)

offset Clause to specify which row to start from retrieving data (optional and integer)

limit Clause to limit the number of results (optional and integer)

maxlimit Maximum limit of the query (integer, default 4000) addID Add identification to the output? (optional and logical)

printQ Also print query? (optional and logical)

#### **Details**

Since with the inscriptions option the id "component" of the output list is not with a numeric format, then the function adds an ID at the beginning of the list with the identifier with a numerical format.

Notice that hd\_nr is not the same as ID nor id.

Use function get.edhw in case you want to grab several items.

Entries in country are abbreviated country names where the inscription was located. A list with the of valid values for countries from the EDH API are

| "ad" | Andorra                | "gr" | Greece                 | "pl"  | Poland               |
|------|------------------------|------|------------------------|-------|----------------------|
| "al" | Albania                | "hr" | Croatia                | "pt"  | Portugal             |
| "am" | Armenia                | "hu" | Hungary                | "rks" | Kosovo               |
| "at" | Austria                | "il" | Israel                 | "ro"  | Romania              |
| "az" | Azerbaijan             | "iq" | Iraq                   | "rs"  | Serbia               |
| "ba" | Bosnia and Herzegovina | "it" | Italy                  | "ru"  | Russia               |
| "be" | Belgium                | "jo" | Jordan                 | "sa"  | Saudi Arabia         |
| "bg" | Bulgaria               | "kg" | Kyrgyzstan             | "sd"  | Sudan                |
| "ch" | Switzerland            | "kz" | Kazakhstan             | "se"  | Sweden               |
| "cy" | Cyprus                 | "lb" | Lebanon                | "si"  | Slovenia             |
| "cz" | Czech Republic         | "li" | Liechtenstein          | "sk"  | Slovakia             |
| "de" | Germany                | "lu" | Luxembourg             | "sm"  | San Marino           |
| "dk" | Denmark                | "ly" | Libyan Arab Jamahiriya | "sy"  | Syrian Arab Republic |
| "dz" | Algeria                | "ma" | Morocco                | "tj"  | Tajikistan           |
| "eg" | Egypt                  | "mc" | Monaco                 | "tn"  | Tunisia              |
| "es" | Spain                  | "md" | Moldova                | "tr"  | Turkey               |
| "fr" | France                 | "me" | Montenegro             | "ua"  | Ukraine              |
| "gb" | United Kingdom         | "mk" | Macedonia              | "uz"  | Uzbekistan           |
| "ge" | Georgia                | "mt" | Malta                  | "va"  | Vatican City State   |
| "gi" | Gibraltar              | "nl" | Netherlands            | "ye"  | Yemen                |

| "Ach" | Achaia                          | "Cor" | Corsica                      | "Mes" | Mesopotamia                 |
|-------|---------------------------------|-------|------------------------------|-------|-----------------------------|
| "Aeg" | Aegyptus                        | "Cre" | Creta                        | "MoI" | Moesia inferior             |
| "Aem" | Aemilia (Regio VIII)            | "Cyp" | Cyprus                       | "MoS" | Moesia superior             |
| "Afr" | Africa Proconsularis            | "Cyr" | Cyrene                       | "Nar" | Narbonensis                 |
| "AlC" | Alpes Cottiae                   | "Dac" | Dacia                        | "Nor" | Noricum                     |
| "AlG" | Alpes Graiae                    | "Dal" | Dalmatia                     | "Num" | Numidia                     |
| "AlM" | Alpes Maritimae                 | "Epi" | Epirus                       | "PaI" | Pannonia inferior           |
| "AlP" | Alpes Poeninae                  | "Etr" | Etruria (Regio VII)          | "PaS" | Pannonia superior           |
| "ApC" | Apulia et Calabria (Regio II)   | "Gal" | Galatia                      | "Pic" | Picenum (Regio V)           |
| "Aqu" | Aquitania                       | "GeI" | Germania inferior            | "Rae" | Raetia                      |
| "Ara" | Arabia                          | "GeS" | Germania superior            | "ReB" | Regnum Bospori              |
| "Arm" | Armenia                         | "HiC" | Hispania citerior            | "Rom" | Roma                        |
| "Asi" | Asia                            | "Inc" | Provincia incerta            | "Sam" | Samnium (Regio IV)          |
| "Ass" | Assyria                         | "Iud" | Iudaea                       | "Sar" | Sardinia                    |
| "Bae" | Baetica                         | "LaC" | Latium et Campania (Regio I) | "Sic" | Sicilia, Melita             |
| "Bar" | Barbaricum                      | "Lig" | Liguria (Regio IX)           | "Syr" | Syria                       |
| "Bel" | Belgica                         | "Lug" | Lugdunensis                  | "Thr" | Thracia                     |
| "BiP" | Bithynia et Pontus              | "Lus" | Lusitania                    | "Tra" | Transpadana (Regio XI)      |
| "BrL" | Bruttium et Lucania (Regio III) | "LyP" | Lycia et Pamphylia           | "Tri" | Tripolitania                |
| "Bri" | Britannia                       | "MaC" | Mauretania Caesariensis      | "Umb" | Umbria (Regio VI)           |
| "Cap" | Cappadocia                      | "MaT" | Mauretania Tingitana         | "Val" | Valeria                     |
| "Cil" | Cilicia                         | "Mak" | Macedonia                    | "VeH" | Venetia et Histria (Regio X |
|       |                                 |       |                              |       |                             |

## Value

A list object with at least one the following items:

```
"ID"
                (Optional), only if addID is set to TRUE.
"commentary"
"fotos"
"country"
"depth"
"diplomatic_text"
"edh_geography_uri"
"findspot"
"findspot\_ancient"\\
"findspot\_modern"
"geography"
"height"
"id"
"language"
"last_update"
"letter_size"
```

```
"literature"
"material"
"military"
"modern_region"
"not_after"
"not_before"
"people"
                This item is another list with at least one the following items:
                "person_id"
                "nomen"
                "cognomen"
                "praenomen"
                "name"
                "gender"
                "status"
                "tribus"
                "origo"
                "occupation"
                "age: years"
                "age: months"
                "age: days"
"present_location"
"religion"
"province_label"
"responsible_individual"
"social_economic_legal_history"
"transcription"
"trismegistos_uri"
"type_of_inscription"
"type_of_monument"
"uri"
"width"
"work_status"
"year_of_find"
```

And also the query is printed if specified by printQ.

#### Note

The other two search options from the [EDH] database [API], which are "photos" and "bibliography" may be implemented in the future.

#### Author(s)

Antonio Rivero Ostoic

#### References

https://edh-www.adw.uni-heidelberg.de/data/api

https://edh-www.adw.uni-heidelberg.de/data/api/terms/country

https://edh-www.adw.uni-heidelberg.de/data/api/terms/province

#### See Also

```
get.edhw, plot.map, simil
```

#### **Examples**

```
## get inscriptions from EDH API data
## Not run:
get.edh(findspot_modern="madrid")
## End(**Not run**)
```

get.edhw

Wrapper to get data from the Epigraphic Database Heidelberg API

## **Description**

A wrapper function to obtain data from the Epigraphic Database Heidelberg repository.

## Usage

```
get.edhw(file = NULL, hd_nr, ...)
```

## **Arguments**

file JSON file with EDH data (optional)
hd\_nr HD number of inscriptions

... Additional arguments

## **Details**

This is a wrapper function to obtain a sample data from the Epigraphic Database Heidelberg API repository by their HD numbers or, alternatively, a file with a valid format JSON can be specified in file.

In any case, the JSON output will be converted into a list object with the rjson package.

plot.dates

#### Value

A list of lists object with the items described in get.edh.

#### Note

Large samples can take a lot of time.

## Author(s)

Antonio Rivero Ostoic

#### References

https://edh-www.adw.uni-heidelberg.de/data/api

## See Also

```
get.edh, simil
```

## **Examples**

```
## get 10 records from EDH API data
## Not run:
get.edhw(hd_nr=1:10)
## End(**Not run**)
```

plot.dates

Plot interval dates

## Description

A function to plot interval dates.

## Usage

| х    | data frame object of variables and observations. If NULL then EDH dataset is taken. |
|------|---|
| У    | optional identifiers (vector).  |
| file | path to file for a PDF format (optional)  |
| taq  | terminus ante quem  |
| tpq  | terminus post quem  |
| out  | number of outliers to omit (integer or vector where first entry id for latest date) |
| main | plot's main tile  |
| xlab | plot's x label  |
| ylab | plot's y label  |

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| xlim  | plot's x limits                               |
|-------|---|
| cex   | size of pch                                   |
| pch   | symbol for taq and tpq                        |
| col   | color of pch                                  |
| lwd   | width of time interval segments               |
| lty   | shape of time interval segments               |
| alpha | alpha transparency for time interval segments |
|       | additional optional parameters                |

## **Details**

This plot function is for time interval segments

## Value

A graphical plot.

## Author(s)

Antonio Rivero Ostoic

#### See Also

```
get.edh, edhw, prex.
```

## **Examples**

#TBD.

| plot.map | Plot cartographical map |  |
|----------|-------------------------|--|
|          |                         |  |

## **Description**

A function to plot a cartographical map, initially of a Roman province or an Italian region.

## Usage

```
plot.map(x, cap, date, name, fsize, fcol, fsize2, fcol2, xd, yd, ...)
```

| X     | (character) acronym of ancient Roman province or Italian region (see get.edh) |
|-------|---|
| сар   | (optional and logical) display caption?                                       |
| date  | (optional and logical) display date?  |
| name  | (optional and logical) display main title name?                               |
| fsize | (optional) font size in main title  |
| fcol  | (optional) font color in main title   |

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| fsize2 | (optional) font size in date      |
|--------|-----------------------------------|
| fcol2  | (optional) font color in date     |
| xd     | (optional) x positioning for date |
| yd     | (optional) y positioning for date |
|        | additional optional parameters    |

#### **Details**

This plot function is for creating cartographical maps of ancient provinces and Italian regions of the Roman Empire around year 117 AD. The input data x can be a character vector, but this is intended for a recording output. By default, arguments name and cap are set to TRUE while date is set to FALSE.

#### Value

A cartographical map plot with a name, and a caption with an approximate province establishment date.

#### Note

Positions for caption and date are fixed for a PDF output.

## Author(s)

Antonio Rivero Ostoic

#### See Also

```
rpmp, rpmcd, get.edh, rp, EDH
```

## **Examples**

#TBD.

prex

Compute probability of existence

## **Description**

A function to compute the probability of existence of events.

## Usage

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## **Arguments**

x list or data frame object of variables and observations.

taq terminus ante quem (TAQ)
tpq terminus post quem (TPQ)

vars boundaries of existence in x (vector for TAQ and TPQ)

bins length of the break (integer)

cp chronological phase

aoristic return aoristic sum? (logical)

weight weight to observations

DF return also data frame with observations? Ignored for plot (logical and optional) out number of outliers to omit (integer or vector where first entry id for latest date)

plot plot the results? (logical and optional)

main plot's main title (optional)
... additional optional parameters

#### **Details**

Currently, the probability of existence is the *aoristic sum* computed across events for portions of time delimited by a TAQ in taq and TPQ in tpq, or else by the boundaries of existence in vars.

In case that bins is NULL, then the time breaks take the chronological periods in cp, which by default is "bin5" or five-periods for the EDH dataset. Another built-in option is "bin8" for eight chronological periods, but cp is open for other periodization models as long as they are recorded as a list object.

When aoristic is set to FALSE, then a simple matching of only TAQ and TPQ is computed from x.

## Value

A data frame with values according to either bins or cp.

## Author(s)

Antonio Rivero Ostoic

#### References

For a oristic sum: Crema, E. (2012) "Modelling temporal uncertainty in archaeological analysis" *J Archaeol Method Theory*.

For default chronological periods: see *Bevan et al*, 2013 (doi: 10.1111/j.1475-4754.2012.00674.x)

## See Also

edhw, plot.dates

#### **Examples**

#TBD.

14 request

## **Description**

A function to perform an HTTP request

#### Usage

#### **Arguments**

file the request file

URL protocol and domain of the url method the http *verb* for the object anonymous unauthenticated user? (logical)

cred authentication credentials (vector with username and password)

path path to add to the url (optional)
subdomain subdomain to add to the url (optional)
force force remote file overwriting? (optional)

rm. file remove file in local machine? (optional and logical)

... extra parameters if required

#### **Details**

request is basically a HTTP request, first aimed to interact with DEiC's (Danish e-Infrastructure Cooperation) https://sciencedata.dk. However, it is possible to specify the URL path and subdomain if necessary.

There are two types of folders in DEiC's <a href="https://sciencedata.dk">https://sciencedata.dk</a> that are *personal* and *shared* folders and both requires authentication with credentials.

The *path* to the shared folders where the files are located must be specified with the path argument. However, for personal folders is the file argument that includes the path information. Many times, DEiC's https://sciencedata.dk places the data on a *subdomain*, and for some methods like PUT it is required to specify the subdomain as well.

When a file already exists on the remote server, there is a prompt question for overwriting the file when the PUT method is invoked, and by activating argument force we can prevent confirmation and replace the file.

In case that accessing the server requires basic authentication, then package "tcltk" may be needed as well to input the credentials with a widget prompt, and there is the cred argument for performing a basic authentication without a prompt. Public folders can be accessed as anonymous user.

## Value

Depends on the method, an action on the server site. A *Response* message is returned when the method is PUT with the url and items Date, Status, Content-Type.

Currently, method POST is not supported at sciencedata.dk.

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#### Note

Aliases for this function are sddk() and SDDK().

## Author(s)

Antonio Rivero Ostoic

#### See Also

```
https://sciencedata.dk
https://mplex.github.io/cedhar/Sciencedata_dk.html
```

## **Examples**

```
## get a public file from remote server as anonymous user
request("filename.extension", method="GET", anonymous=TRUE)
## End(Not run)
## put a file in remote server
## Not run:
sddk("filename.extension", method="PUT")
## End(Not run)
## put an existing file in remote server and force overwriting
## Not run:
sddk("filename.extension", method="PUT", force=TRUE)
## End(Not run)
## put an existing file in remote server and remove file from local machine
sddk("filename.extension", method="PUT", rm.file=TRUE)
## End(Not run)
## remove a file in remote server
## Not run:
SDDK("filename.extension", method="DELETE")
## End(Not run)
```

Roman province names and acronyms as in EDH

## **Description**

rp

This is a list with Roman province names and acronyms as in the Epigraphic Database Heidelberg, EDH.

## Usage

```
data("rp")
```

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#### **Format**

A list object of 66 Roman provinces named with "province\_label".

#### Source

https://edh-www.adw.uni-heidelberg.de/data/api/terms/province

#### See Also

```
get.edh, EDH, edhw
```

rpmcd

Caption maps and affiliation dates of Roman provinces

## Description

This is a list with specifications to plot caption maps of 59 Roman provinces (year 117 AD) and Italian regions under emperor Augustus (year 27 BC).

## Usage

```
data("rpmcd")
```

## **Format**

rpmcd is a list of lists for each province or region with two main components. One component is a list with shape data for a cartographical map caption in different slots, and the second component has an affiliation date for each Roman province or when the territory became Roman province. names(rpmcd) has the acronyms according to EDH dataset.

### Source

```
https://commons.wikimedia.org/wiki/File:RomanEmpire_117.svg
https://commons.wikimedia.org/wiki/File:Roman_provinces_trajan.svg
https://commons.wikimedia.org/wiki/File:Regioni_dell'Italia_Augustea.svg
```

## See Also

```
rpmp, plot.map, rp, EDH
```

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| rpmp | Maps of ancient Roman provinces and Italian regions |  |
|------|---|--|
|      |   |  |

## **Description**

This is a list with specifications to plot cartographical maps of ancient Roman provinces and Italian regions.

## Usage

```
data("rpmp")
```

#### **Format**

A list of lists object of 59 Roman provinces and Italian regions in year 117AD, and where names(rpmp) gives the province acronyms according to EDH dataset. Each province in rpmp has a two-length list with the province name and the shape data for a cartographical map in different slots.

#### Source

```
https://commons.wikimedia.org/wiki/File:RomanEmpire_117.svg
https://commons.wikimedia.org/wiki/File:Roman_provinces_trajan.svg
https://commons.wikimedia.org/wiki/File:Regioni_dell'Italia_Augustea.svg
```

## See Also

```
plot.map, rpmcd, rp, EDH
```

| simil Similarity between (column) vectors |
|---|
|---|

## Description

A function to compute the Similarity between vectors, which can arise from columns in a data frame or list entries.

## Usage

```
simil(x, att, null, uniq, diag.incl)
```

| X         | A list or a data frame                                     |
|-----------|--|
| att       | Column(s) in x representing attributes (vector)            |
| null      | Include NA or NULLs? (optional and logical)                |
| uniq      | remove duplicates? (optional and logical)                  |
| diag.incl | include entries in matrix diagonal? (optional and logical) |

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## **Details**

At this point, the ID column in the input represents the labels of the nodes. In case that an ID column does not exists, then the first column is taken provided that there are not duplicated entry names.

## Value

A valued matrix with similarities among units by simple matching.

## Note

Other similarity measures will be added in the near future.

## Author(s)

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## See Also

get.edh

## **Examples**

# TBD

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