

Package ‘GEOsearch’

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Type Package

Title GEOsearch

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Description GEOsearch is an extendable search engine for NCBI GEO (Gene Expression Omnibus). Instead of directly searching the term, GEOsearch can find all the gene names contained in the search term and search all the alias of the gene names simultaneously in GEO database. GEOsearch also provides other functions such as summarizing common biology keywords in the search results.

License GPL(>=2)

Imports org.Hs.eg.db, org.Mm.eg.db

VignetteBuilder knitr

Suggests knitr, shiny, DT, org.Ag.eg.db, org.At.tair.db, org.Bt.eg.db, org.Ce.eg.db, org.Cf.eg.db, org.Dm.eg.db, org.Dr.eg.db, org.EcK12.eg.db, org.EcSakai.eg.db, org.Gg.eg.db, org.Mmu.eg.db, org.Pf.plasmo.db, org.Pt.eg.db, org.Rn.eg.db, org.Sc.sgd.db, org.Ss.eg.db, org.Xl.eg.db

Depends R(>= 3.2)

biocViews GUI,Software

NeedsCompilation no

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database	<i>List of species database</i>
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Description

The list of species annotation databases used in alias searching. All databases are from Bioconductor.

Format

A data.frame with two columns. First column: name of Bioconductor database; Second column: corresponding species name.

Source

<http://www.bioconductor.org/>

GEOSearchTerm	<i>GEOSearchTerm</i>
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Description

Perform searching in NCBI GEO database.

Usage

```
GEOSearchTerm(termlist)
```

Arguments

termlist	A character vector of terms to be searched in NCBI GEO. Typically the direct output of function "termalias"
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Details

Search the terms one by one in NCBI GEO database and return an integrated table of search results. The returned results should contain exactly the same information as the results returned by directly searching in <http://www.ncbi.nlm.nih.gov/geo/>.

Value

A data frame containing the search results returned from NCBI GEO. First column: GEO Series Accession Number; Second column: Organism; Third column: Title; Fourth column: Type of experiment; Fifth column: Experiment Platform Sixth column: Number of Samples; Seventh column: URL for SRX download; Eighth column: Description Ninth column: Corresponding search term.

Author(s)

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Examples

```
GEOsearchTerm("Oct4 RNA-seq")
```

GEOsearchUI

GEOsearchUI

Description

Launch the GEOsearch graphical user interface

Usage

```
GEOsearchUI()
```

Details

This function will automatically launch the GEOsearch user interface in a web browser. The user interface provides many powerful functions (e.g. second-round search) which is not available by command line programming. It also provides a much easier and more convenient way to perform all functions available in command lines. The user interface can also be accessed by <http://zhiji.shinyapps.io/GEOsearch>. Neither R nor any packages are required in this online version. However, it is highly recommended that the user interface be launched locally for faster running speed.

Author(s)

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Examples

```
if(interactive()) {  
  GEOsearchUI()  
}
```

KeyWordFreq

KeyWordFreq

Description

Frequencies of common biology keywords appearing in search results

Usage

```
KeyWordFreq(searchtable, category = c("celltype", "disease", "tissue"))
```

Arguments

searchtable	The direct output of function "GEOsearchterm"
category	A character vector specifying which category in the common biology keyword list to be used. Should be contain "celltype", "disease" or "tissue".

Details

This function calculates the frequencies of each common biology keyword appearing in the given search table. The list of common biology keywords is compiled from <http://www.atcc.org/>. The list contains three categories: cell types, diseases and tissues. Users can specify which category to be used. The function also returns log fold change and FDR of fisher test to check whether each keyword has significantly more appearance compared to base frequency. The base frequency is defined as the number of appearance of the key word in all samples (roughly 40000 samples) included in GEO database.

Value

A data.frame with the frequency of each common biology keyword. First column: keyword name; Second column: keyword frequency; Third column: log fold change of the frequency; Fourth column: FDR of fisher test.

Author(s)

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Examples

```
KeyWordFreq(GEOSearchTerm("Oct4 RNA-seq"))
```

 SampleDetail

SampleDetail

Description

Details of GSM samples given GSE accession ID.

Usage

SampleDetail(GSEid)

Arguments

GSEid A character vector of GSE accession ID.

Details

This function returns an integrated table containing details of all GSM samples for a list of GSE accession ID.

Value

A data frame containing the search results returned from NCBI GEO. First column: GEO Series Accession Number; Second column: GEO Sample Accession Number; Third column: Title; Fourth column: Type of experiment; Fifth column: Source; Sixth column: Organism; Seventh column: Characteristic; Eighth column: Description.

Author(s)

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Examples

```
SampleDetail(c("GSE69322", "GSE64008"))
```

 term

List of common biology keywords

Description

The list of common biology keywords is compiled from <http://www.atcc.org/>. The list contains three categories: cell types, diseases and tissues.

Format

A data.frame with three columns. First column: keyword name; Second column: category; Third column: number of appearance in GEO database.

Source

<http://www.atcc.org/>

TermAlias

TermAlias

Description

Search Alias of a Term

Usage

```
TermAlias(searchterm, allspecies = c("Human", "Mouse"), mincount = 5)
```

Arguments

searchterm	A character value specifying the term being searched. Words should be separated by space.
allspecies	A character vector specifying the species in which the alias of gene names will be searched for. Available species: Anopheles, Arabidopsis, Bovine, Worm, Canine, Fly, Zebrafish, E coli strain K12, E coli strain Sakai, Chicken, Human, Mouse, Rhesus, Malaria, Chimp, Rat, Yeast, Pig, Xenopus
mincount	An integer value specifying the minimum number of appearance in the GEO database for the alias to be retained. If an alias has too few appearance it may not be of great interest.

Details

This function first picks gene names from the search term. It then searches alias for all the gene names contained in the search term. It next queries GEO and retain alias that appear frequently enough in GEO database. Finally it returns a combinatory results of retained alias.

Value

A character vector of combinatory results of alias.

Author(s)

Zhicheng Ji, Hongkai Ji <zji4@zji4.edu>

Examples

```
TermAlias("Oct4 RNA-seq")
```

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