Package ‘domainsignatures’

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Type Package

Title Geneset enrichment based on InterPro domain signatures

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Description Find significantly enriched gene classifications in a list of functionally undescribed genes based on their InterPro domain structure.

Depends R (>= 2.4.0), KEGG.db, prada, biomaRt, methods

Imports AnnotationDbi

License Artistic-2.0


LazyLoad yes

biocViews Annotation, Pathways, GeneSetEnrichment

NeedsCompilation no

R topics documented:

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domainsignatures-package

*Geneset enrichment based on InterPro domain signatures.*

**Description**

Compute similarities to pathways for a set of entrezgene identifiers based on the InterPro domain signature

**Details**

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see help for `gseDomain` for details

**Author(s)**

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dataSource

*Constructor for annotation object*

**Description**

This function creates the necessary annotation object of class `ipDataSource` containing the pathway and InterPro ID mappings.

**Usage**

```r
dataSource(mapping, type = "generic")
```

**Arguments**

- `mapping` A named list providing a mapping between entrezgene identifiers and arbitrary groupings of genes or pathways.
- `type` The type of pathway. A character scalar.

**Details**

For genes without pathway membership, NA list items need to be included in `mapping`. The names of the list comprise the gene universe to test against. The function will access the ensembl `biomaRt` database in order to retrieve the necessary InterPro domain information.
getKEGGdata

Value
Object of class ipDataSource

Author(s)
Florian Hahne

See Also
gseDomain, getKEGGdata

Examples
if(interactive())
{
  grouping <- list("653361"="pw1", "729230"="pw2", "415117"="pw3")
  dataSource(grouping)
}

getKEGGdata               Fetch KEGG annotations and InterPro domains

Description
Get all available KEGG annotations and InterPro domains for a set of entrezgene identifiers from
the KEGG annotation package and from the ensembl biomart.

Usage
getKEGGdata(universe=NULL, pathways=NULL, ensemblMart="hsapiens_gene_ensembl")

Arguments
  universe          Character vector of entrezgene identifiers. This is the global universe of genes
to test against.
  pathways          Optional character vector of KEGG pathway identifiers. This can be used in
                   order to test for over-representation of only a subset of all the available KEGG
                   pathways.
  ensemblMart       Character giving the type of Biomart to use. Defaults to Human Ensembl.

Details
This function is a wrapper around the KEGG annotation package and a customized query of the
ensembl biomart database. For the gene identifiers in universe and all or a selection of KEGG
pathways it will fetch the necessary information and create an object of class ipDataSource which
can later be used as input to gseDomain

Value
An object of class ipDataSource.
Author(s)

Florian Hahne

See Also

gseDomain

Examples

if(interactive())
getKEGGdata()

gKEGGdescription KEGG description from ID

Description

Get description of KEGG pathways from a list of KEGG identifiers.

Usage

getKEGGdescription(ids)

Arguments

ids Character vector of KEGG identifiers

Value

Character vector of KEGG descriptions

Author(s)

Florian Hahne

Examples

getKEGGdescription("hsa03050")
gosDomain

Geneset enrichment based on InterPro domain signatures

Description

Compute the similarity to pathways specified through `dataSource` for a set of `entrezgene` identifiers.

Usage

gseDomain(dataSource, geneset, n=10000, verbose=TRUE, samples=FALSE)

Arguments

dataSource Object of class `ipDataSource` containing pathway and InterPro domain mappings
genreset Character vector of `entrezgene` identifiers
n Number of subsampling iterations
verbose Toggle progress report
samples Logical indicating whether to return the similarity measures for all the resamples.

Details

Use this function to compute p-values for similarity of the domain signature of a gene set to all signatures of the pathways defined in `dataSource`. You should have created `dataSource` using either function `dataSource` or `getKEGGdata`.

Value

A list with items

- `similarity` Named vector of similarity measures for each pathway
- `pvalue` The p-values of similarity to each pathway. A named vector.
- `dist` A named list containing similarity measures for all the resamples (if `samples=TRUE`)

Author(s)

Florian Hahne

See Also

gseDomain

Examples

## see Vignette of this package for examples how to use this function
ipDataSource-class

A class to store mapping information between genes, pathways and interPro domains

Description

This class represents the data necessary to run gseDomain.

Details

You should always create these objects using either one of the functions dataSource or getKEGGdata.

Creating Objects

Objects can be created using

```r
new('ipDataSource',
  genes = ...., # Object of class character
  pathways = .... # Object of class character
  domains = .... # Object of class character
  gene2Domains = .... # Object of class environment
  path2Domains = .... # Object of class environment
  type = ...., # Object of class character
)
```

or the functions dataSource or getKEGGdata.

Slots

- genes: Vector of unique entrezgene identifiers
- pathways: Vector of unique pathway identifiers
- domains: Vector of unique InterPro identifiers
- gene2Domains: Hash table mapping entrezgene IDs to Interpro IDs
- path2Domains: Hash table mapping pathway IDs to InterPro IDs
- type: Type of pathway. A character skalar
- dims: Numeric vector of dimensions

Methods

- `show` display summary.

Author(s)

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See Also

- dataSource or getKEGGdata
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