Package ‘ontologyPlot’

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**annotation_grid**

Get logical matrix of term annotation for group of cases

**Description**

Get logical matrix of term annotation for group of cases

**Usage**

```r
annotation_grid(
    ontology,
    term_sets,
    all_terms = grid_terms(ontology, term_sets),
    remove_unanimous = FALSE,
    cluster_rows = TRUE,
    cluster_cols = TRUE
)
```
calibrate_sizes

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ontology</td>
<td>ontology_index object</td>
</tr>
<tr>
<td>term_sets</td>
<td>List of character vectors of ontological term IDs</td>
</tr>
<tr>
<td>all_terms</td>
<td>Character vector giving terms to use in annotation.</td>
</tr>
<tr>
<td>remove_unanimous</td>
<td>Logical value determining whether to remove terms present in all term_sets.</td>
</tr>
<tr>
<td>cluster_rows</td>
<td>Logical value rows determining whether to use hclust to cluster term_sets.</td>
</tr>
<tr>
<td>cluster_cols</td>
<td>Logical value rows determining whether to use hclust to cluster terms (based on correlation of inclusion in term_sets).</td>
</tr>
</tbody>
</table>

Value

Logical matrix.

Description

Could be useful to modify a vector of sizes to between, say 1 and 3, before passing to `onto_plot`.

Usage

calibrate_sizes(x, high, low)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>Numeric vector</td>
</tr>
<tr>
<td>high</td>
<td>Numeric value of largest size</td>
</tr>
<tr>
<td>low</td>
<td>Numeric value of smallest size</td>
</tr>
</tbody>
</table>

Value

Numeric vector

Examples

calibrate_sizes(c("HP:0000001"=10, "HP:0000006"=5), high=3, low=1)
colour_by_frequency

Function to assign colours to terms based on frequency with which terms appear in term_sets

Description

Function to assign colours to terms based on frequency with which terms appear in term_sets

Usage

colour_by_frequency(
    ontology,
    terms,
    term_sets,
    colour_func = colorRampPalette(c("Yellow", "Green", 
                                     "#0099FF"))
)

Arguments

- ontology: ontology_index object
- terms: Character vector of ontological terms
- term_sets: List of character vectors of ontological term IDs
- colour_func: Function capable of returning a set of colours, given the number of colours it needs to return

Value

Character vector of colours, named by term

See Also

colour_by_term_set, colour_by_population_frequency

colour_by_population_frequency

Function to assign colours to terms based on population frequency of terms

Description

Function to assign colours to terms based on population frequency of terms
Usage

colour_by_population_frequency(
  ontology,
  terms,
  frequencies,
  colour_palette = colorRampPalette(c("Yellow", "Green", "#0099FF"))(10),
  max_colour_freq = max(terms_freq),
  min_colour_freq = min(terms_freq)
)

Arguments

ontology ontology_index object
terms Character vector of ontological terms
frequencies Numeric vector of term frequencies named by term IDs
colour_palette Character vector of colours for the different information contents of the terms to be plotted, going from rare to common
max_colour_freq Numeric value in [0, 1] giving the maximum frequency (to which the dullest color will be assigned)
min_colour_freq Numeric value in [0, 1] giving the minimum frequency (to which the brightest color will be assigned)

Value

Character vector of colours, named by term

See Also

colour_by_term_set, colour_by_frequency

Description

Function to set colours of nodes in plot to distinguish terms belonging to different term sets
Usage

colour_by_term_set(
    ontology,
    terms,
    term_sets,
    colour_generator = rainbow,
    alpha = 0.5
)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ontology</td>
<td>ontology_index object</td>
</tr>
<tr>
<td>terms</td>
<td>Character vector of ontological terms</td>
</tr>
<tr>
<td>term_sets</td>
<td>List of character vectors of ontological term IDs</td>
</tr>
<tr>
<td>colour_generator</td>
<td>Function which returns a vector of colours, e.g. rainbow or heat.colors.</td>
</tr>
<tr>
<td>alpha</td>
<td>alpha parameter to pass to colour_generator.</td>
</tr>
</tbody>
</table>

Value

Character vector of colours, named by term.

See Also

colour_by_frequency, colour_by_population_frequency

dot_string ontology_plot object to dot string

dot_string

Description

ontology_plot object to dot string

Usage

dot_string(ontology_plot)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ontology_plot</td>
<td>Object of class ‘ontology_plot’ to export.</td>
</tr>
</tbody>
</table>

Value

String

See Also

onto_plot
get_adjacency_matrix

Get an adjacency matrix for a set of ontological terms

Description

Get an adjacency matrix for a set of ontological terms

Usage

get_adjacency_matrix(ontology, terms)

Arguments

- **ontology**: ontology_index object
- **terms**: Character vector of ontological terms

Value

A logical matrix representing the adjacency matrix of terms based on the directed acyclic graph of ontology. A TRUE entry means the term corresponding to the column is a parent of the row term in ontology.

See Also

get_pseudo_adjacency_matrix

Examples

```r
library(ontologyIndex)
data(hpo)
get_adjacency_matrix(hpo, c("HP:0000118", "HP:0001873", "HP:0011877"))
```

get_node_friendly_long_names

Split up node labels across lines so they fit in nodes better

Description

Split up node labels across lines so they fit in nodes better

Usage

get_node_friendly_long_names(ontology, terms, official_names = FALSE)
**get_ontology_plot**

**Arguments**

- **ontology**  
  ontology_index object

- **terms**  
  Character vector of ontological terms

- **official_names**  
  Logical value indicating whether to use the exact names from the ontology. Otherwise, shortened, capitalised names are used.

**Value**

Character vector.

**Examples**

```r
library(ontologyIndex)
data(hpo)
get_node_friendly_long_names(hpo, c("HP:0001873", "HP:0011877"))
```

---

**Description**

Function to create `ontology_plot` objects where all graphical parameters to be used must be specified.

**Usage**

```r
get_ontology_plot(
  ontology,
  terms,
  edge_attributes = list(color = "#000000", lty = "solid"),
  ...
)
```

**Arguments**

- **ontology**  
  ontology_index object

- **terms**  
  Character vector of ontological terms

- **edge_attributes**  
  List of properties to set for arrows (note, these properties will be used for all arrow).

- **...**  
  Named graphical parameters. These must either be vectors of values the same length as `terms`, or of length 1 if they should be used for all terms.

**Value**

`ontology_plot` object.
**get_pseudo_adjacency_matrix**

*Get an adjacency matrix for a set of ontological terms*

**Description**

Get an adjacency matrix for a set of ontological terms

**Usage**

```r
get_pseudo_adjacency_matrix(ontology, terms)
```

**Arguments**

- `ontology`: ontology_index object
- `terms`: Character vector of ontological terms

**Value**

A logical matrix representing the adjacency matrix of `terms` based on the directed acyclic graph of `ontology`. A TRUE entry means the term corresponding to the column is a parent of the row term within `terms`.

**See Also**

- `get_adjacency_matrix`

**Examples**

```r
library(ontologyIndex)
data(hpo)
get_pseudo_adjacency_matrix(hpo, c("HP:0000118", "HP:0001873", "HP:0011877"))
```

---

**get_shortened_names**

*Get human readable, shortened (where possible) ontological term names*

**Description**

Get human readable, shortened (where possible) ontological term names

**Usage**

```r
get_shortened_names(ontology, terms)
```
grid_terms

Arguments

ontology ontology_index object

terms Character vector of ontological terms

Value

Character vector

Examples

library(ontologyIndex)
data(hpo)
get_shortened_names(hpo, c("HP:0001873", "HP:0011877"))
label_by_frequency

Function to get plot labels for terms based on frequency in term_sets

Description
Function to get plot labels for terms based on frequency in term_sets

Usage
label_by_frequency(ontology, terms, term_sets)

Arguments
- ontology: ontology_index object
- terms: Character vector of ontological terms
- term_sets: List of character vectors of ontological term IDs

Value
Character vector of labels, named by term.

See Also
simple_labels, long_labels

label_by_term_set

Function to label nodes by term_set

Description
Function to label nodes by term_set

Usage
label_by_term_set(ontology, terms, term_sets)

Arguments
- ontology: ontology_index object
- terms: Character vector of ontological terms
- term_sets: List of character vectors of ontological term IDs

Value
Character vector of colours, named by term.
long_labels

*Function to assign detailed node labels to terms*

**Description**

Label includes term ID, term name, number of instances of term amongst `term_sets` and percentage frequency in population.

**Usage**

`long_labels(ontology, terms, term_sets, frequencies)`

**Arguments**

- `ontology` : ontology_index object
- `terms` : Character vector of ontological terms
- `term_sets` : List of character vectors of ontological term IDs
- `frequencies` : Numeric vector of term frequencies named by term IDs

**Value**

Character vector of labels, named by term.

**See Also**

`simple_labels, label_by_frequency, long_labels`

---

**n_most_frequent_terms**

*Select n most prevalent terms in term_sets*

**Description**

Selects `n` most prevalent terms in set of term sets/annotations including implicit terms. If more than one term are tied at the `n`th position, all terms are included in the result.

**Usage**

```r
n_most_frequent_terms(
  ontology,
  term_sets,
  n,
  terms = unique(unlist(term_sets))
)
```
**official_labels**

Get official names for terms

**Arguments**

- **ontology**: ontology_index object
- **term_sets**: List of character vectors of ontological term IDs
- **n**: Integer
- **terms**: Character vector of ontological terms

**Value**

Character vector of length at most n

**See Also**

`remove_terms_with_less_than_n_occurrences`

**Examples**

```r
library(ontologyIndex)
data(hpo)
n_most_frequent_terms(hpo, c("HP:0001873"),
list(term_sets=list("HP:0001873", "HP:0001902")), n=2)
```

---

**official_labels**

Get official names for terms

**Description**

Get official names for terms

**Usage**

```r
official_labels(ontology, terms)
```

**Arguments**

- **ontology**: ontology_index object
- **terms**: Character vector of ontological terms

**Value**

Character vector of labels, named by term.

**See Also**

`simple_labels`
ontologyPlot  
*Functions for Visualising Sets of Ontological Terms*

**Description**

Functions for visualising sets of ontological terms using the ‘graphviz’ layout system.

**Author(s)**

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Maintainer: Daniel Greene <dg333@cam.ac.uk>

**References**


onto_plot  
*Get ontology_plot object*

**Description**

A convenience wrapper for the `get_ontology_plot` function, enabling functions to be passed to generate graphical parameters for terms automatically.

**Usage**

```r
onto_plot(
  ontology,  
  term_sets = NULL,  
  frequencies = NULL,  
  terms = remove_uninformative_terms(ontology, term_sets),  
  edge_attributes = list(color = "#000000", lty = "solid"),  
  fillcolor = "powderblue",  
  label = simple_labels,  
  color = "transparent",  
  width = 0.75,  
  fontsize = 30,  
  style = "filled",  
  fixedsize = "true",
```

onto.plot

    shape = "circle",
...     
)

Arguments

ontology ontology_index object
term_sets List of character vectors of ontological term IDs
frequencies Numeric vector of term frequencies named by term IDs
terms Character vector of ontological terms
dot
edge_attributes List of properties to set for arrows (note, these properties will be used for all arrow).
fillcolor Character vector of colours to fill nodes corresponding to terms with. Alternatively a function to set the colours of the nodes in the graph based on term_sets.
label Character vector of labels (or function to set them).
color Character vector of colours for borders of nodes representing terms (or function to set them).
width Numeric vector of widths for nodes (or function to set them).
fontsize Numeric vector of font sizes for the text to be placed in the nodes (or function to set them).
style Display style for nodes, defaults to "filled".
fixedsize Character indicating whether nodes should be fixed size, "true", or adjusted to fit around the contained text, "false".
shape Character vector of shape names for nodes (or function to set them). Defaults to "circle".
... Other node attributes for dot format.

Value

ontology.plot object.

See Also

get_ontology.plot, write_dot

Examples

library(ontologyIndex)
data(hpo)
hpo_phenotypes <- c(
A=c("HP:0001382", "HP:0004272", "HP:0007917", "HP:0004912", "HP:0001596"),
D=c("HP:0001257", "HP:0001382", "HP:0007917", "HP:0012623", "HP:0002165"),
E=c("HP:0007917", "HP:0004800", "HP:0004272", "HP:0001596", "HP:0002165")
)
onto_plot(hpo, hpo_phenotypes)

plot.ontology_plot

---

**Description**

Plotting function for ontology_plot object

**Usage**

```r
## S3 method for class 'ontology_plot'
plot(x, ...)
```

**Arguments**

- `x`: Object of class ontologicalPlot.
- `...`: Other options passed to plot().

**Value**

Nothing, side-effect: plots a graph.

---

**plot.annotation_grid**  
Plot a logical matrix of term annotation

---

**Description**

Plot a logical matrix of term annotation

**Usage**

```r
plot.annotation_grid(..., onColour = "#FF0000FF", offColour = "#FFFFBFFF")
```

**Arguments**

- `...`: Arguments to be passed to annotation_grid.
- `onColour`: Colour to use to show presence of term.
- `offColour`: Colour to use to show absence of term.

**Value**

Plots heatmap.
print.ontology_plot  
\textit{Print function for ontology_plot object}

\section*{Description}
Print function for ontology_plot object

\section*{Usage}
\begin{verbatim}
## S3 method for class 'ontology_plot'
print(x, ...)
\end{verbatim}

\section*{Arguments}
\begin{description}
\item[x] Object of class ontologicalPlot.
\item[...\ ] Other options passed to be passed to plot().
\end{description}

\section*{Value}

\section*{p_values_for_occurrence_of_term_in_group}
\textit{Get p-values for observing at least as many of each term as occur in term_sets given the population frequencies of the terms}

\section*{Description}
Get p-values for observing at least as many of each term as occur in term_sets given the population frequencies of the terms

\section*{Usage}
p_values_for_occurrence_of_term_in_group(ontology, term_sets, terms_freq)

\section*{Arguments}
\begin{description}
\item[ontology] ontology_index object
\item[term_sets] List of character vectors of ontological term IDs
\item[terms_freq] Numeric vector of population frequencies of terms.
\end{description}

\section*{Value}
Numeric vector of log p-values named by corresponding term.
See Also

width_by_significance

remove_links

Remove terms which just link two other terms together in a subontology

Description

Remove terms which just link two other terms together in a subontology

Usage

remove_links(ontology, terms, hard = FALSE)

Arguments

- **ontology**: ontology_index object
- **terms**: Character vector of ontological terms
- **hard**: Logical value determining whether to multiple edges to leaf terms are kept - `hard=FALSE`, or removed - `hard=TRUE`.

Value

Character vector.

See Also

remove_uninformative_terms

Examples

```r
library(ontologyIndex)
data(hpo)
remove_links(hpo, c("HP:0001873","HP:0001872","HP:0011873","HP:0011877"))
```
remove_terms_with_less_than_n_occurrences

Remove terms with less than certain number of occurrences

Description

Remove terms with less than certain number of occurrences

Usage

remove_terms_with_less_than_n_occurrences(
  ontology,
  term_sets,
  n,
  terms = unique(unlist(term_sets))
)

Arguments

ontology ontology_index object
term_sets List of character vectors of ontological term IDs
n Integer
terms Character vector of ontological terms

Value

Character vector

See Also

n_most_frequent_terms

Examples

library(ontologyIndex)
data(hpo)
remove_terms_with_less_than_n_occurrences(hpo,
term_sets=list("HP:0001873", "HP:0001902"), n=2)
**remove_uninformative_terms**

_Remove uninformative terms from union of all terms in set of annotations_

**Description**

For a set of ontological annotation sets, remove terms annotated to the same objects as all their children. Useful for selecting terms for summarising a set of annotation sets, as it can lead to a significant reduction in the number of terms.

**Usage**

```
remove_uninformative_terms(ontology, term_sets)
```

**Arguments**

- **ontology**  
  ontology_index object
- **term_sets**  
  List of character vectors of ontological term IDs

**Value**

Character vector of terms

**Examples**

```
library(ontologyIndex)
data(hpo)
remove_uninformative_terms(hpo, list(Patient1=c("HP:0001873","HP:0000118")))
```

---

**simple_cap**

_Capitalise words in character vector_

**Description**

Capitalise words in character vector

**Usage**

```
simple_cap(x)
```

**Arguments**

- **x**  
  Character vector
simple_labels

Value

Character vector

Examples

```r
to_svg_string(c("a simple test", "Another-test"))
```

---

**simple_labels**  
*Get simplified labels for terms*

---

**Description**

Get simplified labels for terms

**Usage**

```r
simple_labels(ontology, terms)
```

**Arguments**

- `ontology`: ontology_index object
- `terms`: Character vector of ontological terms

**Value**

Character vector of labels, named by term.

**See Also**

- `official_labels`

---

**to_svg_string**  
*Convert ontology_plot to SVG string*

---

**Description**

Note that by setting "id" and "class" attributes it enables nodes to be selected for manipulation using Javascript if interactivity is desired.

**Usage**

```r
to_svg_string(op)
```

**Arguments**

- `op`: Object of class ontology_plot.
width_by_frequency

Function to get node sizes for terms based on frequency in term_sets

Description
Function to get node sizes for terms based on frequency in term_sets

Usage
width_by_frequency(ontology, terms, term_sets)

Arguments
- ontology: ontology_index object
- terms: Character vector of ontological terms
- term_sets: List of character vectors of ontological term IDs

Value
Character vector of sizes, named by term

See Also
width_by_significance

width_by_significance

Function to get node sizes for terms based on statistical significance of seeing at least this number of each term in term_sets

Description
Function to get node sizes for terms based on statistical significance of seeing at least this number of each term in term_sets

Usage
width_by_significance(ontology, terms, term_sets, frequencies)
**Arguments**

- **ontology**: ontology_index object
- **terms**: Character vector of ontological terms
- **term_sets**: List of character vectors of ontological term IDs
- **frequencies**: Numeric vector of term frequencies named by term IDs

**Value**

Character vector of sizes, named by term

**See Also**

- `width_by_frequency`

---

**write_dot**  
*Export ontology_plot object as dot file*

**Description**

Export ontology_plot object as dot file

**Usage**

`write_dot(ontology_plot, file)`

**Arguments**

- **ontology_plot**: Object of class `ontology_plot` to export.
- **file**: Character value of target file path.

**Value**

Nothing, side effect - writes to file.

**See Also**

- `dot_string`
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