Package 'hpgltools'

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Type Package

Title A pile of (hopefully) useful R functions

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Description This is a set of functions I have been using in my various analyses in the El-Sayed laboratory. The set of tasks included herein run a spectrum from preprocessing count-tables from RNAseq-like data, through differential expression analyses, to post-processing tasks like gene ontology enrichment. Along the way, these function seek to make plotting analyses consistent, provide multiple entry-points to the various tools, and handle corner cases which are not flexibly handled by the packages this is based upon.

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Suggests acepack, ade4, affy, AnnotationDbi, AnnotationForge, AnnotationHub, base64enc, Biobase, BiocGenerics, BiocInstaller, Biostrings, biomaRt, bumphunter, Category, caTools, clusterProfiler, corpcor, corrplot, DBI, DESeq2, DESeq, devtools, directlabels, dplyr, doParallel, DOSE, EDASeq, edgeR, ffpe, fission, Formula, gdata, genbankr, genefilter, genomeIntervals, GenomeInfoDb, GenomicFeatures, genoPlotR, GenomicRanges, ggdendro, ggrepel, GO.db, googleVis, goseq, GOstats, gplots, graph, gProfileR, GSEABase, gtools, gridExtra, hash, Heatplus, Hmisc, htmlTable, igraph, inflection, IRanges, iterators, jsonlite, KEGGgraph, KEGGREST, knitcitations, knitr, lattice, limma, matrixStats, motifRG, multtest, mygene, openxlsx, OrganismDbi, pander, parallel, pasilla, pathview, plyr, preprocessCore, qvalue, RamiGO, RColorBrewer, ReactomePA, readr, rentrez, reshape2, RCurl, rGADEM, Rgraphviz, rmarkdown, RMySQL, robustbase, RefManageR, reshape, rjson, robust, Rsamtools, rtracklayer, RUVSeq, S4Vectors, scales, seqinr, seqLogo, statmod, stringi, stringr, survival, survJamda, sva, taxize, testthat, topGO, variancePartition, xtable, XVector

Imports Biobase, data.table, knitr, ggplot2, magrittr, methods, foreach

VignetteBuilder knitr

RoxygenNote 6.0.1

R topics documented:

`all_ontology_searches` *Perform ontology searches given the results of a differential expression analysis.*

Description

This takes a set of differential expression results, extracts a subset of up/down expressed genes; passes them to goseq, clusterProfiler, topGO, GOstats, and gProfiler; collects the outputs; and returns them in a (hopefully) consistent fashion. It attempts to handle the differing required annotation/GOid inputs required for each tool and/or provide supported species in ways which the various tools expect.

Usage

```
all_ontology_searches(de_out, gene_lengths = NULL, goids = NULL, n = NULL,
  z = NULL, fc = NULL, p = NULL, overwrite = FALSE,
  species = "unsupported", orgdb = "org.Dm.eg.db",
  goid_map = "reference/go/id2go.map", gff_file = NULL, gff_type = "gene",
  do_goseq = TRUE, do_cluster = TRUE, do_topgo = TRUE,
  do_gostats = TRUE, do_gprofiler = TRUE, do_trees = FALSE, ...)
```

Arguments

de_out	List of topTables comprising limma/deseq/edger outputs.
gene_lengths	Data frame of gene lengths for goseq.
goids	Data frame of goids and genes.
n	Number of genes at the top/bottom of the fold-changes to define 'significant.'
z	Number of standard deviations from the mean fold-change used to define 'significant.'
fc	Log fold-change used to define 'significant'.
p	Maximum pvalue to define 'significant.'
overwrite	Overwrite existing excel results file?
species	Supported organism used by the tools.
orgdb	Provide an organismDbi/Orgdb to hold the various annotation data, in response to the shift of clusterprofiler and friends towards using them.
goid_map	Mapping file used by topGO, if it does not exist then goids_df creates it.
gff_file	gff file containing the annotations used by gff2genetable from clusterprofiler.
gff_type	Column to use from the gff file for the universe of genes.
do_goseq	Perform simple_goseq()?
do_cluster	Perform simple_clusterprofiler()?
do_topgo	Perform simple_topgo()?
do_gostats	Perform simple_gostats()?
do_gprofiler	Perform simple_gprofiler()?
do_trees	make topGO trees from the data?
...	Arguments to pass through in arglist.

Value

a list of up/down ontology results from goseq/clusterprofiler/topgo/gostats, and associated trees.

See Also

goseq clusterProfiler topGO goStats gProfiler GO.db

Examples

```
## Not run:
 many_comparisons = limma_pairwise(expt=an_expt)
 tables = many_comparisons$limma
 this_takes_forever = limma_ontology(tables, gene_lengths=lengthdb,
                                     goids=goids_df, z=1.5, gff_file='length_db.gff')

## End(Not run)
```

`all_pairwise` *Perform limma, DESeq2, EdgeR pairwise analyses.*

Description

This takes an expt object, collects the set of all possible pairwise comparisons, sets up experimental models appropriate for the differential expression analyses, and performs them.

Usage

```
all_pairwise(input = NULL, conditions = NULL, batches = NULL,
  model_cond = TRUE, modify_p = FALSE, model_batch = TRUE,
  model_intercept = TRUE, extra_contrasts = NULL, alt_model = NULL,
  libsize = NULL, annot_df = NULL, parallel = TRUE, ...)
```

Arguments

`input`	Dataframe/vector or expt class containing count tables, normalization state, etc.
`conditions`	Factor of conditions in the experiment.
`batches`	Factor of batches in the experiment.
`model_cond`	Include condition in the model? This is likely always true.
`modify_p`	Depending on how it is used, sva may require a modification of the p-values.
`model_batch`	Include batch in the model? This may be true/false/"sva" or other methods supported by get_model_adjust().
`model_intercept`	Use an intercept model instead of cell means?
`extra_contrasts`	Optional extra contrasts beyone the pairwise comparisons. This can be pretty neat, lets say one has conditions A,B,C,D,E and wants to do (C/B)/A and (E/D)/A or (E/D)/(C/B) then use this with a string like: "c_vs_b_ctrla = (C-B)-A, e_vs_d_ctrla = (E-D)-A, de_vs_cb = (E-D)-(C-B)".
`alt_model`	Alternate model to use rather than just condition/batch.
`libsize`	Library size of the original data to help voom().
`annot_df`	Annotations to add to the result tables.
`parallel`	Use dopar to run limma, deseq, edger, and basic simultaneously.
`...`	Picks up extra arguments into arglist, currently only passed to write_limma().

Details

Tested in test_29de_shared.R This runs limma_pairwise(), deseq_pairwise(), edger_pairwise(), basic_pairwise() each in turn. It collects the results and does some simple comparisons among them.

Value

A list of limma, deseq, edger results.

See Also

limma DESeq2 edgeR `link{limma_pairwise}` deseq_pairwise edger_pairwise basic_pairwise

Examples

```
 ## Not run:
  finished_comparison = eBayes(limma_output)
  data_list = all_pairwise(expt)

## End(Not run)
```

---

backup_file *Make a backup of an existing file with n revisions, like VMS!*

Description

Sometimes I just want to kick myself for overwriting important files and then I remember using VMS and wish modern computers were a little more like it.

Usage

```
backup_file(backup_file, backups = 4)
```

Arguments

backup_file	Filename to backup.
backups	How many revisions?

basic_pairwise *The simplest possible differential expression method.*

Description

Perform a pairwise comparison among conditions which takes nothing into account. It _only_ takes the conditions, a mean value/variance among them, divides by condition, and returns the result. No fancy nomalizations, no statistical models, no nothing. It should be the very worst method possible. But, it should also provide a baseline to compare the other tools against, they should all do better than this, always.

Usage

```
basic_pairwise(input = NULL, design = NULL, force = FALSE, ...)
```

Arguments

input	Count table by sample.
design	Data frame of samples and conditions.
force	Force as input non-normalized data?
...	Extra options passed to arglist.

Details

Tested in test_27de_basic.R This function was written after the corresponding functions in de_deseq.R, de_edger.R, and de_limma.R. Like those, it performs the full set of pairwise comparisons and returns a list of the results. As mentioned above, unlike those, it is purposefully stupid.

Value

Df of pseudo-logFC, p-values, numerators, and denominators.

See Also

limma DESeq2 edgeR

Examples

```
## Not run:
stupid_de <- basic_pairwise(expt)

## End(Not run)
```

batch_counts *Perform different batch corrections using limma, sva, ruvg, and cbcb-SEQ.*

Description

I found this note which is the clearest explanation of what happens with batch effect data: https://support.bioconductor.org/p/7 Just to be clear, there's an important difference between removing a batch effect and modelling a batch effect. Including the batch in your design formula will model the batch effect in the regression step, which means that the raw data are not modified (so the batch effect is not removed), but instead the regression will estimate the size of the batch effect and subtract it out when performing all other tests. In addition, the model's residual degrees of freedom will be reduced appropriately to reflect the fact that some degrees of freedom were "spent" modelling the batch effects. This is the preferred approach for any method that is capable of using it (this includes DESeq2). You would only remove the batch effect (e.g. using limma's removeBatchEffect function) if you were going to do some kind of downstream analysis that can't model the batch effects, such as training a classifier. I don't have experience with ComBat, but I would expect that you run it on log-transformed CPM values, while DESeq2 expects raw counts as input. I couldn't tell you how to properly use the two methods together.

Usage

```
batch_counts(count_table, design, batch = TRUE, batch1 = "batch",
  expt_state = NULL, batch2 = NULL, noscale = TRUE, ...)
```

Arguments

count_table	Matrix of (pseudo)counts.
design	Model matrix defining the experimental conditions/batches/etc.
batch	String describing the method to try to remove the batch effect (or FALSE to leave it alone, TRUE uses limma).
batch1	Column in the design table describing the presumed covariant to remove.
expt_state	Current state of the expt in an attempt to avoid double-normalization.
batch2	Column in the design table describing the second covariant to remove (only used by limma at the moment).
noscale	Used for combatmod, when true it removes the scaling parameter from the invocation of the modified combat.
...	More options for you!

Value

The 'batch corrected' count table and new library size. Please remember that the library size which comes out of this may not be what you want for voom/limma and would therefore lead to spurious differential expression values.

See Also

limma edgeR RUVSeq sva cbcbSEQ

Examples

```
## Not run:
 limma_batch <- batch_counts(table, design, batch1='batch', batch2='strain')
 sva_batch <- batch_counts(table, design, batch='sva')

## End(Not run)
```

`bioc_all` *Grab a copy of all bioconductor packages and install them by type*

Description

This uses jsonlite to get a copy of all bioconductor packages by name and then iterates through them with BiocInstaller to install all of them. It performs a sleep between each installation in an attempt to avoid being obnoxious. As a result, it will of a necessity take forever.

Usage

```
bioc_all(release = "3.4", mirror = "bioc.ism.ac.jp", base = "packages",
  type = "software", suppress_updates = TRUE, suppress_auto = TRUE,
  force = FALSE)
```

Arguments

`release`	Bioconductor release to use, should probably be adjusted to automatically find it.
`mirror`	Bioconductor mirror to use.
`base`	Base directory on the mirror to download from.
`type`	Type in the tree to use (software or annotation)
`suppress_updates`	For BiocLite(), don't update?
`suppress_auto`	For BiocLite(), don't update?
`force`	Install if already installed?

Value

a number of packages installed

See Also

BiocInstaller

Examples

```
## Not run:
 go_get_some_coffee_this_will_take_a_while <- bioc_all()

## End(Not run)
```

`biomart_orthologs` *Use biomart to get orthologs between supported species.*

Description

Biomart's function getLDS is incredibly powerful, but it makes me think very polite people are going to start knocking on my door, and it fails weirdly pretty much always. This function attempts to alleviate some of that frustration.

Usage

```
biomart_orthologs(gene_ids, first_species = "hsapiens",
  second_species = "mmusculus", host = "dec2015.archive.ensembl.org",
  trymart = "ENSEMBL_MART_ENSEMBL", first_attributes = "ensembl_gene_id",
  second_attributes = c("ensembl_gene_id", "hgnc_symbol"))
```

Arguments

`gene_ids`	List of gene IDs to translate.
`first_species`	Linnean species name for one species.
`second_species`	Linnean species name for the second species.
`host`	Ensembl server to query.
`trymart`	Assumed mart name to use.
`first_attributes`	Key(s) of the first database to use.
`second_attributes`	Key(s) of the second database to use.

Details

Tested in test_40ann_biomart.R As with my other biomart functions, this one grew out of frustrations when attempting to work with the incredibly unforgiving biomart service. It does not attempt to guarantee a useful biomart connection, but will hopefully point out potentially correct marts and attributes to use for a successful query. I can say with confidence that it works well between mice and humans.

Value

Df of orthologs.

See Also

biomaRt getLDS useMart

Examples

```
## Not run:
 mouse_genes <- biomart_orthologs(some_ids)
 ## Hopefully the defaults are sufficient to translate from human to mouse.
 yeast_genes <- biomart_orthologs(some_ids, first_species='mmusculus', second_species='scerevisiae')

## End(Not run)
```

---

cbcb_batch_effect *A function suggested by Hector Corrada Bravo and Kwame Okrah for batch removal*

Description

During a lab meeting, the following function was suggested as a quick and dirty batch removal tool

Usage

```
cbcb_batch_effect(normalized_counts, model)
```

Arguments

normalized_counts	Data frame of log2cpm counts.
model	Balanced experimental model containing condition and batch factors.

Value

Dataframe of residuals after subtracting batch from the model.

See Also

limma voom lmFit

Examples

```
## Not run:
 newdata <- cbcb_batch_effect(counts, expt_model)

## End(Not run)
```

cbcb_filter_counts *Filter low-count genes from a data set using cpm data and a threshold.*

Description

This was a function written by Kwame Okrah and perhaps also Laura Dillon to remove low-count genes. It drops genes based on a cpm threshold and number of samples.

Usage

```
cbcb_filter_counts(count_table, threshold = 2, min_samples = 2)
```

Arguments

count_table	Data frame of (pseudo)counts by sample.
threshold	Lower threshold of counts for each gene.
min_samples	Minimum number of samples.

Value

Dataframe of counts without the low-count genes.

See Also

edgeR

Examples

```
## Not run:
 filtered_table <- cbcb_filter_counts(count_table)

## End(Not run)
```

choose_basic_dataset *Attempt to ensure that input data to basic_pairwise() is suitable.*

Description

basic_pairwise() assumes log2 data as input, use this to ensure that is true.

Usage

```
choose_basic_dataset(input, force = FALSE, ...)
```

Arguments

input	An expressionset containing expt to test and/or modify.
force	If we want to try out other distributed data sets, force it in using me.
...	future options, I think currently unused.

Value

data ready for basic_pairwise()

See Also

Biobase

Examples

```
## Not run:
 ready <- choose_basic_dataset(expt)

## End(Not run)
```

---

choose_binom_dataset *A sanity check that a given set of data is suitable for analysis by edgeR or DESeq2.*

Description

Take an expt and poke at it to ensure that it will not result in troubled results.

Usage

```
choose_binom_dataset(input, force = FALSE, ...)
```

Arguments

input	Expressionset containing expt object.
force	Ignore every warning and just use this data.
...	Extra arguments passed to arglist.

Details

Invoked by deseq_pairwise() and edger_pairwise().

Value

dataset suitable for limma analysis

See Also

DESeq2 edgeR

choose_dataset *Choose a suitable data set for Edger/DESeq*

Description

The _pairwise family of functions all demand data in specific formats. This tries to make that consistent.

Usage

```
choose_dataset(input, choose_for = "limma", force = FALSE, ...)
```

Arguments

input	Expt input.
choose_for	One of limma, deseq, edger, or basic. Defines the requested data state.
force	Force non-standard data?
...	More options for future expansion.

Details

Invoked by _pairwise().

Value

List the data, conditions, and batches in the data.

See Also

choose_binom_dataset choose_limma_dataset choose_basic_dataset

---

choose_limma_dataset *A sanity check that a given set of data is suitable for analysis by limma.*

Description

Take an expt and poke at it to ensure that it will not result in troubled limma results.

Usage

```
choose_limma_dataset(input, force = FALSE, which_voom = "limma", ...)
```

Arguments

input	Expressionset containing expt object.
force	Ingore warnings and use the provided data asis.
which_voom	Choose between limma'svoom, voomWithQualityWeights, or the hpgl equivalents.
...	Extra arguments passed to arglist.

Value

dataset suitable for limma analysis

See Also

limma

---

choose_model *Try out a few experimental models and return a likely working option.*

Description

The _pairwise family of functions all demand an experimental model. This tries to choose a consistent and useful model for all for them. This does not try to do multi-factor, interacting, nor dependent variable models, if you want those do them yourself and pass them off as alt_model.

Usage

```
choose_model(input, conditions, batches, model_batch = TRUE,
  model_cond = TRUE, model_intercept = TRUE, alt_model = NULL,
  alt_string = NULL, intercept = 0, reverse = FALSE, surrogates = "be",
  ...)
```

Arguments

input	Input data used to make the model.
conditions	Factor of conditions in the putative model.
batches	Factor of batches in the putative model.
model_batch	Try to include batch in the model?
model_cond	Try to include condition in the model? (Yes!)
model_intercept	Use an intercept model instead of cell-means?
alt_model	Use your own model.
alt_string	String describing an alternate model.
intercept	Choose an intercept for the model as opposed to 0.

reverse	Reverse condition/batch in the model? This shouldn't/doesn't matter but I wanted to test.
surrogates	Number of or method used to choose the number of surrogate variables.
...	Further options are passed to arglist.

Details

Invoked by the _pairwise() functions.

Value

List including a model matrix and strings describing cell-means and intercept models.

See Also

stats model.matrix

---

choose_orgdb *Load the appropriate orgDb environment for a given species.*

Description

Ok, so these are a bit more complex than I realized. The heirarchy as I now understand it (probably wrong) is that orgdb objects provide ID mappings among the various DBs. txdb objects provide the actual annotation information, and organismdbs acquire both (but only exist for a few species). Let's face it, I will never remember that the yeast orgdb is 'org.Sc.sgd.something'. This function is intended to make that process easier. Feed it a species name which makes sense: 'homo_sapiens' and it will assume you mean orgdb.whatever and load that into your environment. This should also make a reasonable attempt at installing the appropriate orgdb if it is not already in your R library tree.

Usage

```
choose_orgdb(species = "saccharomyces_cerevisiae")
```

Arguments

species	Human readable species name

Value

orgdb object for the relevant species, or an error if I don't have a mapping for it.

See Also

AnnotationDbi keytypes

Examples

```
## Not run:
 object <- choose_orgdb("homo_sapiens")

## End(Not run)
```

---

choose_txdb *Load the appropriate TxDb environment for a given species.*

Description

Ok, so these are a bit more complex than I realized. The heirarchy as I now understand it (probably wrong) is that orgdb objects provide ID mappings among the various DBs. txdb objects provide the actual annotation information, and organismdbs acquire both (but only exist for a few species). Let's face it, I will never remember that the yeast orgdb is 'org.Sc.sgd.something'. This function is intended to make that process easier. Feed it a species name which makes sense: 'homo_sapiens' and it will assume you mean orgdb.whatever and load that into your environment. This should also make a reasonable attempt at installing the appropriate orgdb if it is not already in your R library tree.

Usage

```
choose_txdb(species = "saccharomyces_cerevisiae")
```

Arguments

species	Human readable species name

Value

orgdb object for the relevant species, or an error if I don't have a mapping for it.

See Also

AnnotationDbi keytypes

Examples

```
## Not run:
 object <- choose_txdb("homo_sapiens")

## End(Not run)
```

circos_arc *Write arcs between chromosomes in circos.*

Description

Ok, so when I said I only do 1 chromosome images, I lied. This function tries to make writing arcs between chromosomes easier. It too works in 3 stages, It writes out a data file using cfgout as a basename and the data from df in the circos arc format into circos/data/bob_arc.txt It then writes out a configuration plot stanza in circos/conf/bob_arc.conf and finally adds an include to circos/bob.conf

Usage

```
circos_arc(df, cfgout = "circos/conf/default.conf", first_col = "chr1",
  second_col = "chr2", color = "blue", radius = 0.75, thickness = 3)
```

Arguments

df	Dataframe with starts/ends and the floating point information.
cfgout	Master configuration file to write.
first_col	Name of the first chromosome.
second_col	Name of the second chromosome.
color	Color of the chromosomes.
radius	Outer radius at which to add the arcs.
thickness	Integer thickness of the arcs.

Details

In its current implementation, this only understands two chromosomes. A minimal amount of logic and data organization will address this weakness.

Value

The file to which the arc configuration information was written.

circos_heatmap *Write tiles of arbitrary heat-mappable data in circos.*

Description

This function tries to make the writing circos heatmaps easier. Like circos_plus_minus() and circos_hist() it works in 3 stages, It writes out a data file using cfgout as a basename and the data from df in the circos histogram format into circos/data/bob_heatmap.txt It then writes out a configuration plot stanza in circos/conf/bob_heatmap.conf and finally adds an include to circos/bob.conf

Usage

```
circos_heatmap(df, annot_df, cfgout = "circos/conf/default.conf",
  colname = "logFC", chr = "chr1", colors = NULL, outer = 0.9,
  width = 0.08, spacing = 0)
```

Arguments

df	Dataframe with starts/ends and the floating point information.
annot_df	Annotation data frame with starts/ends.
cfgout	Master configuration file to write.
colname	Name of the column with the data of interest.
chr	Name of the chromosome (This currently assumes a bacterial chromosome).
colors	Colors of the heat map.
outer	Floating point radius of the circle into which to place the heatmap.
width	Width of each tile in the heatmap.
spacing	Radial distance between outer, inner, and inner to whatever follows.

Value

Radius after adding the histogram and the spacing.

circos_hist *Write histograms of arbitrary floating point data in circos.*

Description

This function tries to make the writing of histogram data in circos easier. Like circos_plus_minus() it works in 3 stages, It writes out a data file using cfgout as a basename and the data from df in the circos histogram format into circos/data/bob_hist.txt It then writes out a configuration plot stanza in circos/conf/bob_hist.conf and finally adds an include to circos/bob.conf

Usage

```
circos_hist(df, annot_df, cfgout = "circos/conf/default.conf",
  colname = "logFC", chr = "chr1", color = "blue", fill_color = "blue",
  outer = 0.9, width = 0.08, spacing = 0)
```

Arguments

df	Dataframe with starts/ends and the floating point information.
annot_df	Annotation data frame containing starts/ends.
cfgout	Master configuration file to write.
colname	Name of the column with the data of interest.
chr	Name of the chromosome (This currently assumes a bacterial chromosome).
color	Color of the plotted data.
fill_color	Guess!
outer	Floating point radius of the circle into which to place the data.
width	Radial width of each tile.
spacing	Distance between outer, inner, and inner to whatever follows.

Value

Radius after adding the histogram and the spacing.

---

circos_ideogram *Create the description of chromosome markings.*

Description

This function writes ideogram files for circos.

Usage

```
circos_ideogram(name = "default", conf_dir = "circos/conf",
  band_url = NULL)
```

Arguments

name	Name of the configuration file to which to add the ideogram.
conf_dir	Where does the configuration live?
band_url	Provide a url for making these imagemaps?

Value

The file to which the ideogram configuration was written.

`circos_karyotype` *Create the description of (a)chromosome(s) for circos.*

Description

This function tries to save me from having to get the lengths of arcs for bacterial chromosomes manually correct, and writes them as a circos compatible karyotype file. The outfile parameter was chosen to match the configuration directive outlined in circos_prefix(), however that will need to be changed in order for this to work in variable conditions. Next time I make one of these graphs I will do that I suspect. In addition, this currently only understands how to write bacterial chromosomes, that will likely be fixed when I am asked to write out a L.major karyotype. These defaults were chosen because I have a chromosome of this length that is correct.

Usage

```
circos_karyotype(name = "default", conf_dir = "circos/conf",
  length = NULL, chr_name = "chr1", segments = 6, color = "white",
  chr_num = 1, fasta = NULL)
```

Arguments

`name`	Name of the chromosome (This currently assumes a bacterial chromosome).
`conf_dir`	Where to put the circos configuration file(s).
`length`	Length of the chromosome (the default is mgas5005).
`chr_name`	Short name of the chromosome.
`segments`	How many segments to cut the chromosome into?
`color`	Color segments of the chromosomal arc?
`chr_num`	Number to record for each chromosome.
`fasta`	Fasta file to use to create the karyotype.

Value

The output filename.

`circos_make` *Write a simple makefile for circos.*

Description

I regenerate all my circos pictures with make(1). This is my makefile.

Usage

```
circos_make(target = "", output = "circos/Makefile", circos = "circos")
```

Arguments

target	Default make target.
output	Makefile to write.
circos	Location of circos. I have a copy in home/bin/circos and use that sometimes.

Value

a kitten

---

circos_plus_minus *Write tiles of bacterial ontology groups using the categories from microbesonline.org.*

Description

This function tries to save me from writing out ontology definitions and likely making mistakes. It uses the start/ends from the gff annotation along with the 1 letter GO-like categories from microbesonline.org. It then writes two data files circos/data/bob_plus_go.txt, circos/data/bob_minus_go.txt along with two configuration files circos/conf/bob_minus_go.conf and circos/conf/bob_plus_go.conf and finally adds an include to circos/bob.conf

Usage

```
circos_plus_minus(go_table, cfgout = "circos/conf/default.conf",
  chr = "chr1", outer = 1, width = 0.08, spacing = 0)
```

Arguments

go_table	Dataframe with starts/ends and categories.
cfgout	Master configuration file to write.
chr	Name of the chromosome.
outer	Floating point radius of the circle into which to place the plus-strand data.
width	Radial width of each tile.
spacing	Radial distance between outer, inner, and inner to whatever follows.

Value

Radius after adding the plus/minus information and the spacing between them.

circos_prefix *Write the beginning of a circos configuration file.*

Description

A few parameters need to be set when starting circos. This sets some of them and gets ready for plot stanzas.

Usage

```
circos_prefix(name = "mgas", conf_dir = "circos/conf", radius = 1800,
  band_url = NULL)
```

Arguments

name	Name of the map, called with 'make name'.
conf_dir	Directory containing the circos configuration data.
radius	Size of the image.
band_url	Place to imagemap link.

Details

In its current implementation, this really assumes that there will be no highlight stanzas and at most 1 link stanza. chromosomes. A minimal amount of logic and data organization will address these weaknesses.

Value

The master configuration file name.

circos_suffix *Write the end of a circos master configuration.*

Description

circos configuration files need an ending. This writes it.

Usage

```
circos_suffix(cfgout = "circos/conf/default.conf")
```

Arguments

cfgout	Master configuration file to write.

Value

The filename of the configuration.

`circos_tile` *Write tiles of arbitrary categorical point data in circos.*

Description

This function tries to make the writing circos tiles easier. Like circos_plus_minus() and circos_hist() it works in 3 stages, It writes out a data file using cfgout as a basename and the data from df in the circos histogram format into circos/data/bob_tile.txt It then writes out a configuration plot stanza in circos/conf/bob_tile.conf and finally adds an include to circos/bob.conf

Usage

```
circos_tile(df, annot_df, cfgout = "circos/conf/default.conf",
  colname = "logFC", chr = "chr1", colors = NULL, outer = 0.9,
  width = 0.08, spacing = 0)
```

Arguments

`df`	Dataframe with starts/ends and the floating point information.
`annot_df`	Annotation data frame defining starts/stops.
`cfgout`	Master configuration file to write.
`colname`	Name of the column with the data of interest.
`chr`	Name of the chromosome (This currently assumes a bacterial chromosome)
`colors`	Colors of the data.
`outer`	Floating point radius of the circle into which to place the categorical data.
`width`	Width of each tile.
`spacing`	Radial distance between outer, inner, and inner to whatever follows.

Value

Radius after adding the histogram and the spacing.

`cluster_trees` *Take clusterprofile group data and print it on a tree as per topGO.*

Description

TopGO's ontology trees can be very illustrative. This function shoe-horns clusterProfiler data into the format expected by topGO and uses it to make those trees.

Usage

```
cluster_trees(de_genes, cpdata, goid_map = "id2go.map", goids_df = NULL,
  score_limit = 0.2, overwrite = FALSE, selector = "topDiffGenes",
  pval_column = "adj.P.Val")
```

Arguments

`de_genes`	List of genes deemed 'interesting'.
`cpdata`	Data from simple_clusterprofiler().
`goid_map`	Mapping file of IDs to GO ontologies.
`goids_df`	Dataframe of mappings used to build goid_map.
`score_limit`	Scoring limit above which to ignore genes.
`overwrite`	Overwrite an existing goid mapping file?
`selector`	Name of a function for applying scores to the trees.
`pval_column`	Name of the column in the GO table from which to extract scores.

Value

plots! Trees! oh my!

See Also

Ramigo `showSigOfNodes`

Examples

```
## Not run:
 cluster_data <- simple_clusterprofiler(genes, stuff)
 ctrees <- cluster_trees(genes, cluster_data)

## End(Not run)
```

combine_de_table *Given a limma, edger, and deseq table, combine them into one.*

Description

This combines the outputs from the various differential expression tools and formalizes some column names to make them a little more consistent.

Usage

```
combine_de_table(li, ed, de, ba, table_name, annot_df = NULL,
  inverse = FALSE, adjp = TRUE, padj_type = "fdr", include_deseq = TRUE,
  include_edger = TRUE, include_limma = TRUE, include_basic = TRUE,
  fc_cutoff = 1, p_cutoff = 0.05, excludes = NULL)
```

Arguments

li	Limma output table.
ed	Edger output table.
de	Deseq2 output table.
ba	Basic output table.
table_name	Name of the table to merge.
annot_df	Add some annotation information?
inverse	Invert the fold changes?
adjp	Use adjusted p-values?
include_deseq	Include tables from deseq?
include_edger	Include tables from edger?
include_limma	Include tables from limma?
include_basic	Include the basic table?
fc_cutoff	Preferred logfoldchange cutoff.
p_cutoff	Preferred pvalue cutoff.
excludes	Set of genes to exclude from the output.
adjp_type	Add this consistent p-adjustment.

Value

List containing a) Dataframe containing the merged limma/edger/deseq/basic tables, and b) A summary of how many genes were observed as up/down by output table.

See Also

data.table openxlsx

combine_de_tables *Combine portions of deseq/limma/edger table output.*

Description

This hopefully makes it easy to compare the outputs from limma/DESeq2/EdgeR on a table-by-table basis.

Usage

```
combine_de_tables(all_pairwise_result, extra_annot = NULL, excel = NULL,
  excel_title = "Table SXXX: Combined Differential Expression of YYY",
  keepers = "all", excludes = NULL, adjp = TRUE, include_limma = TRUE,
  include_edger = TRUE, include_deseq = TRUE, include_basic = TRUE,
  add_plots = TRUE, loess = FALSE, plot_dim = 6, compare_plots = TRUE,
  padj_type = "fdr")
```

Arguments

all_pairwise_result	Output from all_pairwise().
extra_annot	Add some annotation information?
excel	Filename for the excel workbook, or null if not printed.
excel_title	Title for the excel sheet(s). If it has the string 'YYY', that will be replaced by the contrast name.
keepers	List of reformatted table names to explicitly keep certain contrasts in specific orders and orientations.
excludes	List of columns and patterns to use for excluding genes.
adjp	Perhaps you do not want the adjusted p-values for plotting?
include_limma	Include limma analyses in the table?
include_edger	Include edger analyses in the table?
include_deseq	Include deseq analyses in the table?
include_basic	Include my stupid basic logFC tables?
add_plots	Add plots to the end of the sheets with expression values?
loess	Add time intensive loess estimation to plots?
plot_dim	Number of inches squared for the plot if added.
compare_plots	In an attempt to save memory when printing to excel, make it possible to
adjp_type	Add a consistent p adjustment of this type. exclude comparison plots in the summary sheet.

Value

Table combining limma/edger/deseq outputs.

See Also

all_pairwise

Examples

```
## Not run:
 pretty = combine_de_tables(big_result, table='t12_vs_t0')
 pretty = combine_de_tables(big_result, table='t12_vs_t0', keepers=list("avsb" = c("a","b")))
 pretty = combine_de_tables(big_result, table='t12_vs_t0', keepers=list("avsb" = c("a","b")),
                            excludes=list("description" = c("sno","rRNA")))

## End(Not run)
```

---

compare_go_searches *Compare the results from different ontology tools*

Description

Combine the results from goseq, cluster profiler, topgo, and gostats; poke at them with a stick and see what happens. The general idea is to pull the p-value data from each tool and contrast that to the set of all possibile ontologies. This allows one to do a correlation coefficient between them. In addition, take the 1-pvalue for each ontology for each tool. Thus for strong p-values the score will be near 1 and so we can sum the scores for all the tools. Since topgo has 4 tools, the total possible is 7 if everything has a p-value equal to 0.

Usage

```
compare_go_searches(goseq = NULL, cluster = NULL, topgo = NULL,
  gostats = NULL)
```

Arguments

goseq	The goseq result from simple_goseq()
cluster	The result from simple_clusterprofiler()
topgo	Guess
gostats	Yep, ditto

Value

a summary of the similarities of ontology searches

See Also

goseq clusterProfiler topGO goStats

`compare_logfc_plots` *Compare logFC values from limma and friends*

Description

There are some peculiar discrepencies among these tools, what is up with that?

Usage

```
compare_logfc_plots(combined_tables)
```

Arguments

`combined_tables`
: The combined tables from limma et al.

Details

Invoked by combine_de_tables() in order to compare the results.

Value

Some plots

See Also

`plot_linear_scatter`

`compare_surrogate_estimates`
: *Perform a comparison of the surrogate estimators demonstrated by Jeff Leek.*

Description

This is entirely derivative, but seeks to provide similar estimates for one's own actual data and catch corner cases not taken into account in that document (for example if the estimators don't converge on a surrogate variable). This will attempt each of the surrogate estimators described by Leek: pca, sva supervised, sva unsupervised, ruv supervised, ruv residuals, ruv empirical. Upon completion it will perform the same limma expression analysis and plot the ranked t statistics as well as a correlation plot making use of the extracted estimators against condition/batch/whatever else. Finally, it does the same ranking plot against a linear fitting Leek performed and returns the whole pile of information as a list.

Usage

```
compare_surrogate_estimates(expt, extra_factors = NULL, do_catplots = FALSE,
  surrogates = "be")
```

Arguments

expt	Experiment containing a design and other information.
extra_factors	Character list of extra factors which may be included in the final plot of the data.
do_catplots	Include the catplots? They don't make a lot of sense yet, so probably no.
surrogates	Use 'be' or 'leek' surrogate estimates, or choose a number.

Value

List of the results.

See Also

get_model_adjust

---

compare_tables *See how similar are results from limma/deseq/edger.*

Description

limma, DEseq2, and EdgeR all make somewhat different assumptions. and choices about what makes a meaningful set of differentially. expressed genes. This seeks to provide a quick and dirty metric describing the degree to which they (dis)agree.

Usage

```
compare_tables(limma = NULL, deseq = NULL, edger = NULL, basic = NULL,
  include_basic = TRUE, annot_df = NULL, ...)
```

Arguments

limma	Data from limma_pairwise().
deseq	Data from deseq2_pairwise().
edger	Data from edger_pairwise().
basic	Data from basic_pairwise().
include_basic	include the basic data?
annot_df	Include annotation data?
...	More options!

Details

Invoked by all_pairwise().

Value

Heatmap showing how similar they are along with some correlations betwee the three players.

See Also

limma_pairwise edger_pairwise deseq2_pairwise

Examples

```
## Not run:
 l = limma_pairwise(expt)
 d = deseq_pairwise(expt)
 e = edger_pairwise(expt)
 fun = compare_tables(limma=l, deseq=d, edger=e)

## End(Not run)
```

---

concatenate_runs *Sum the reads/gene for multiple sequencing runs of a single condition/batch.*

Description

On occasion we have multiple technical replicates of a sequencing run. This can use a column in the experimental design to identify those replicates and sum the counts into a single column in the count tables.

Usage

```
concatenate_runs(expt, column = "replicate")
```

Arguments

expt	Experiment class containing the requisite metadata and count tables.
column	Column of the design matrix used to specify which samples are replicates.

Details

Untested as of 2016-12-01, but used in a couple of projects where sequencing runs got repeated.

Value

Expt with the concatenated counts, new design matrix, batches, conditions, etc.

See Also

Biobase exprs fData pData

Examples

```
## Not run:
 compressed <- concatenate_runs(expt)

## End(Not run)
```

---

convert_counts *Perform a cpm/rpkm/whatever transformation of a count table.*

Description

I should probably tell it to also handle a simple df/vector/list of gene lengths, but I haven't. cp_seq_m is a cpm conversion of the data followed by a rp-ish conversion which normalizes by the number of the given oligo. By default this oligo is 'TA' because it was used for tnseq which should be normalized by the number of possible transposition sites by mariner. It could, however, be used to normalize by the number of methionines, for example – if one wanted to do such a thing.

Usage

```
convert_counts(data, convert = "raw", ...)
```

Arguments

data	Matrix of count data.
convert	Type of conversion to perform: edgecpm/cpm/rpkm/cp_seq_m.
...	Options I might pass from other functions are dropped into arglist, used by rpkm (gene lengths) and divide_seq (genome, pattern to match, and annotation type).

Value

Dataframe of cpm/rpkm/whatever(counts)

See Also

edgeR Biobase cpm

Examples

```
## Not run:
 converted_table = convert_counts(count_table, convert='cbcbcpm')

## End(Not run)
```

counts_from_surrogates *A single place to extract count tables from a set of surrogate variables.*

Description

Given an initial set of counts and a series of surrogates, what would the resulting count table look like? Hopefully this function answers that question.

Usage

```
counts_from_surrogates(data, adjust, design = NULL)
```

Arguments

data	Original count table, may be an expt/expressionset or df/matrix.
adjust	Surrogates with which to adjust the data.
design	Experimental design if it is not included in the expressionset.

Value

A data frame of adjusted counts.

See Also

Biobase

count_nmer *Count n-mers in a given data set using Biostrings*

Description

This just calls PDict() and vcountPDict() on a sequence database given a pattern and number of mismatches. This may be used by divide_seq() normalization.

Usage

```
count_nmer(genome, pattern = "ATG", mismatch = 0)
```

Arguments

genome	Sequence database, genome in this case.
pattern	Count off this string.
mismatch	How many mismatches are acceptable?

Value

Set of counts by sequence.

`cp_options` *Set up appropriate option sets for clusterProfiler*

Description

This hard-sets some defaults for orgdb/kegg databases when using clusterProfiler.

Usage

```
cp_options(species)
```

Arguments

`species`	Currently it only works for humans and fruit flies.

`create_expt` *Wrap bioconductor's expressionset to include some other extraneous information.*

Description

It is worth noting that this function has a lot of logic used to find the count tables in the local filesystem. This logic has been superceded by simply adding a field to the .csv file called 'file'. create_expt() will then just read that filename, it may be a full pathname or local to the cwd of the project.

Usage

```
create_expt(metadata, gene_info = NULL, count_dataframe = NULL,
  sample_colors = NULL, title = NULL, notes = NULL,
  include_type = "all", include_gff = NULL, savefile = "expt",
  low_files = FALSE, ...)
```

Arguments

`metadata`	Comma separated file (or excel) describing the samples with information like condition, batch, count_filename, etc.
`gene_info`	Annotation information describing the rows of the data set, this often comes from a call to import.gff() or biomart or organismdbi.
`count_dataframe`	If one does not wish to read the count tables from the filesystem, they may instead be fed as a data frame here.

sample_colors	List of colors by condition, if not provided it will generate its own colors using colorBrewer.
title	Provide a title for the expt?
notes	Additional notes?
include_type	I have usually assumed that all gff annotations should be used, but that is not always true, this allows one to limit to a specific annotation type.
include_gff	Gff file to help in sorting which features to keep.
savefile	Rdata filename prefix for saving the data of the resulting expt.
low_files	Explicitly lowercase the filenames when searching the filesystem?
...	More parameters are fun!

Value

experiment an expressionset

See Also

Biobase pData fData exprs expt_read_counts as.list.hash

Examples

```
## Not run:
 new_experiment = create_expt("some_csv_file.csv", color_hash)
 ## Remember that this depends on an existing data structure of gene annotations.

## End(Not run)
```

---

default_norm *Perform a default normalization of some data*

Description

This just calls normalize expt with the most common arguments except log2 transformation, but that may be appended with 'transform=log2', so I don't feel bad. Indeed, it will allow you to overwrite any arguments if you wish. In our work, the most common normalization is: quantile(cpm(low-filter(data))).

Usage

```
default_norm(expt, ...)
```

Arguments

expt	An expressionset containing expt object
...	More options to pass to normalize_expt()

Value

The normalized expt

See Also

normalize_expt

---

deparse_go_value *Extract more easily readable information from a GOTERM datum.*

Description

The output from the GOTERM/GO.db functions is inconsistent, to put it nicely. This attempts to extract from that heterogeneous datatype something easily readable. Example: Synonym() might return any of the following: NA, NULL, "NA", "NULL", c("NA",NA,"GO:00001"), "GO:00002", c("Some text",NA, NULL, "GO:00003") This function will boil that down to 'not found', '', 'GO:00004', or "GO:0001, some text, GO:00004"

Usage

```
deparse_go_value(value)
```

Arguments

value	Result of try(as.character(somefunction(GOTERM[id])), silent=TRUE). somefunction would be 'Synonym' 'Secondary' 'Ontology', etc...

Value

something more sane (hopefully).

See Also

GO.db

Examples

```
## Not run:
 ## goterms = GOTERM[ids]
 ## sane_goterms = deparse_go_value(goterms)

## End(Not run)
```

deseq2_pairwise *Set up model matrices contrasts and do pairwise comparisons of all conditions using DESeq2.*

Description

Invoking DESeq2 is confusing, this should help.

Usage

```
deseq2_pairwise(input = NULL, conditions = NULL, batches = NULL,
  model_cond = TRUE, model_batch = TRUE, model_intercept = FALSE,
  alt_model = NULL, extra_contrasts = NULL, annot_df = NULL,
  force = FALSE, deseq_method = "long", ...)
```

Arguments

input	Dataframe/vector or expt class containing data, normalization state, etc.
conditions	Factor of conditions in the experiment.
batches	Factor of batches in the experiment.
model_cond	Is condition in the experimental model?
model_batch	Is batch in the experimental model?
model_intercept	Use an intercept model? DESeq seems to not be a fan of them.
alt_model	Provide an arbitrary model here.
extra_contrasts	Provide extra contrasts here.
annot_df	Include some annotation information in the results?
force	Force deseq to accept data which likely violates its assumptions.
deseq_method	The DESeq2 manual shows a few ways to invoke it, I make 2 of them available here.
...	Triple dots! Options are passed to arglist.

Details

Tested in test_24de_deseq.R Like the other _pairwise() functions, this attempts to perform all pairwise contrasts in the provided data set. The details are of course slightly different when using DESeq2. Thus, this uses the function choose_binom_dataset() to try to ensure that the incoming data is appropriate for DESeq2 (if one normalized the data, it will attempt to revert to raw counts, for example). It continues on to extract the conditions and batches in the data, choose an appropriate experimental model, and run the DESeq analyses as described in the manual. It defaults to using an experimental batch factor, but will accept a string like 'sva' instead, in which case it will use sva to estimate the surrogates, and append them to the experimental design. The deseq_method parameter may be used to apply different DESeq2 code paths as outlined in the manual. If you want to play with non-standard data, the force argument will round the data and shoe-horn it into DESeq2.

Value

List including the following information: run = the return from calling DESeq() denominators = list of denominators in the contrasts numerators = list of the numerators in the contrasts conditions = the list of conditions in the experiment coefficients = list of coefficients making the contrasts all_tables = list of DE tables

See Also

DESeq2 Biobase stats

Examples

```
## Not run:
 pretend = deseq2_pairwise(data, conditions, batches)

## End(Not run)
```

`deseq_pairwise` *deseq_pairwise() Because I can't be trusted to remember '2'.*

Description

This calls deseq2_pairwise(...) because I am determined to forget typing deseq2.

Usage

```
deseq_pairwise(...)
```

Arguments

...	I like cats.

Value

stuff deseq2_pairwise results.

See Also

deseq2_pairwise

de_venn *Create venn diagrams describing how well deseq/limma/edger agree.*

Description

The sets of genes provided by limma and friends would ideally always agree, but they do not. Use this to see out how much the (dis)agree.

Usage

```
de_venn(table, adjp = FALSE, euler = FALSE, p = 0.05, ...)
```

Arguments

table	Which table to query?
adjp	Use adjusted p-values
euler	Perform a euler plot
p	p-value cutoff, I forget what for right now.
...	More arguments are passed to arglist.

Value

A list of venn plots

See Also

venneuler Vennerable

Examples

```
## Not run:
 bunchovenns <- de_venn(pairwise_result)

## End(Not run)
```

disjunct_pvalues *Test for infected/control/beads – a placebo effect?*

Description

The goal is therefore to find responses different than beads The null hypothesis is (H0): (infected == uninfected) || (infected == beads) The alt hypothesis is (HA): (infected != uninfected) && (infected != beads)

Usage

```
disjunct_pvalues(contrast_fit, cellmeans_fit, conj_contrasts, disj_contrast)
```

Arguments

contrast_fit	The result of lmFit.
coef1	The first coefficient to query.
coef2	And the second.
...	Extra arguments are passed to arglist, but basically ignored.

---

divide_seq *Express a data frame of counts as reads per pattern per million.*

Description

This uses a sequence pattern rather than length to normalize sequence. It is essentially fancy pants rpkm.

Usage

```
divide_seq(counts, genome = NULL, ...)
```

Arguments

counts	Read count matrix.
genome	Genome to search (fasta/BSgenome).
...	Options I might pass from other functions are dropped into arglist.

Value

The RPseqM counts

See Also

edgeR Rsamtools FaFile rpkm

Examples

```
## Not run:
 cptam <- divide_seq(cont_table, fasta="mgas_5005.fasta.xz", gff="mgas_5005.gff.xz")

## End(Not run)
```

download_gbk *A genbank accession downloader scurrilously stolen from ape.*

Description

This takes and downloads genbank accessions.

Usage

```
download_gbk(accessions = "AE009949", write = TRUE)
```

Arguments

accessions	An accession – actually a set of them.
write	Write the files? Otherwise return a list of the strings

Details

Tested in test_40ann_biomartgenbank.R In this function I stole the same functionality from the ape package and set a few defaults so that it hopefully fails less often.

Value

A list containing the number of files downloaded and the character strings acquired.

See Also

ape

Examples

```
## Not run:
 gbk_file <- download_gbk(accessions=c("AE009949","AE009948"))

## End(Not run)
```

do_pairwise *Generalize pairwise comparisons*

Description

I want to multithread my pairwise comparisons, this is the first step in doing so.

Usage

```
do_pairwise(type, ...)
```

Arguments

type	Which type of pairwise comparison to perform
...	The set of arguments intended for limma_pairwise(), edger_pairwise(), and friends.

Details

Used to make parallel operations easier.

Value

The result from limma/deseq/edger/basic

See Also

limma_pairwise edger_pairwise deseq_pairwise basic_pairwise

---

edger_pairwise *Set up a model matrix and set of contrasts to do pairwise comparisons using EdgeR.*

Description

This function performs the set of possible pairwise comparisons using EdgeR.

Usage

```
edger_pairwise(input = NULL, conditions = NULL, batches = NULL,
  model_cond = TRUE, model_batch = TRUE, model_intercept = TRUE,
  alt_model = NULL, extra_contrasts = NULL, annot_df = NULL,
  force = FALSE, edger_method = "long", ...)
```

Arguments

input	Dataframe/vector or expt class containing data, normalization state, etc.
conditions	Factor of conditions in the experiment.
batches	Factor of batches in the experiment.
model_cond	Include condition in the experimental model?
model_batch	Include batch in the model? In most cases this is a good thing(tm).
model_intercept	Use cell means or intercept?
alt_model	Alternate experimental model to use?
extra_contrasts	Add some extra contrasts to add to the list of pairwise contrasts. This can be pretty neat, lets say one has conditions A,B,C,D,E and wants to do (C/B)/A and (E/D)/A or (E/D)/(C/B) then use this with a string like: "c_vs_b_ctrla = (C-B)-A, e_vs_d_ctrla = (E-D)-A, de_vs_cb = (E-D)-(C-B),"

annot_df	Annotation information to the data tables?
force	Force edgeR to accept inputs which it should not have to deal with.
edger_method	I found a couple/few ways of doing edger in the manual, choose with this.
...	The elipsis parameter is fed to write_edger() at the end.

Details

Tested in test_26de_edger.R Like the other _pairwise() functions, this attempts to perform all pairwise contrasts in the provided data set. The details are of course slightly different when using EdgeR. Thus, this uses the function choose_binom_dataset() to try to ensure that the incoming data is appropriate for EdgeR (if one normalized the data, it will attempt to revert to raw counts, for example). It continues on to extract the conditions and batches in the data, choose an appropriate experimental model, and run the EdgeR analyses as described in the manual. It defaults to using an experimental batch factor, but will accept a string like 'sva' instead, in which case it will use sva to estimate the surrogates, and append them to the experimental design. The edger_method parameter may be used to apply different EdgeR code paths as outlined in the manual. If you want to play with non-standard data, the force argument will round the data and shoe-horn it into EdgeR.

Value

List including the following information: contrasts = The string representation of the contrasts performed. lrt = A list of the results from calling glmLRT(), one for each contrast. contrast_list = The list of each call to makeContrasts() I do this to avoid running into the limit on # of contrasts addressable by topTags() all_tables = a list of tables for the contrasts performed.

See Also

edgeR

Examples

```
## Not run:
 pretend = edger_pairwise(data, conditions, batches)

## End(Not run)
```

---

expt_exclude_genes *Exclude some genes given a pattern match*

Description

Because I am too lazy to remember that expressionsets use matrix subsets for [gene,sample]

Usage

```
expt_exclude_genes(expt, column = "txtype", method = "remove",
  patterns = c("snRNA", "tRNA", "rRNA"), ...)
```

Arguments

expt	Expressionset containing expt object.
column	fData column to use for subsetting.
method	Either remove explicit rows, or keep them.
patterns	Character list of patterns to remove/keep
...	Extra arguments are passed to arglist, currently unused.

Value

A smaller expt

See Also

create_expt

---

expt_read_counts *Read a bunch of count tables and create a usable data frame from them.*

Description

It is worth noting that this function has some logic intended for the elsayed lab's data storage structure. It shouldn't interfere with other usages, but it attempts to take into account different ways the data might be stored.

Usage

```
expt_read_counts(ids, files, header = FALSE, include_summary_rows = FALSE,
  suffix = NULL, ...)
```

Arguments

ids	List of experimental ids.
files	List of files to read.
header	Whether or not the count tables include a header row.
include_summary_rows	Whether HTSeq summary rows should be included.
suffix	Optional suffix to add to the filenames when reading them.
...	More options for happy time!

Details

Used primarily in create_expt() This is responsible for reading count tables given a list of filenames. It tries to take into account upper/lowercase filenames and uses data.table to speed things along.

Value

Data frame of count tables.

See Also

data.table create_expt

Examples

```
## Not run:
 count_tables <- hpgl_read_files(as.character(sample_ids), as.character(count_filenames))

## End(Not run)
```

---

expt_snp *Gather snp information for an expt*

Description

I have some initial code for working with snps, but it seems that it will be getting more use, so make it testable etc.

Usage

```
expt_snp(expt, input_dir = "preprocessing/outputs",
  file_suffix = "_parsed_ratio.txt", bam_suffix = "_accepted_paired.bam",
  tolower = TRUE)
```

Arguments

expt	an expressionset from which to extract information.
input_dir	Directory to scan for snps output files.
file_suffix	What to add on the end of the files for the resulting output.
bam_suffix	How do we find the bam files?
tolower	Lowercase stuff like 'HPGL'?

Value

some stuff

`expt_subset` *Extract a subset of samples following some rule(s) from an experiment class.*

Description

Sometimes an experiment has too many parts to work with conveniently, this operation allows one to break it into smaller pieces.

Usage

```
expt_subset(expt, subset = NULL)
```

Arguments

`expt`	Expt chosen to extract a subset of data.
`subset`	Valid R expression which defines a subset of the design to keep.

Value

metadata Expt class which contains the smaller set of data.

See Also

Biobase `pData` `exprs` `fData`

Examples

```
## Not run:
 smaller_expt = expt_subset(big_expt, "condition=='control'")
 all_expt = expt_subset(expressionset, "")  ## extracts everything

## End(Not run)
```

`extract_abundant_genes` *Extract the sets of genes which are significantly more abundant than the rest.*

Description

Given the output of something_pairwise(), pull out the genes for each contrast which are the most/least abundant. This is in contrast to extract_significant_genes(). That function seeks out the most changed, statistically significant genes.

Usage

```
extract_abundant_genes(pairwise, according_to = "all", n = 100, z = NULL,
  unique = FALSE, least = FALSE, excel = "excel/abundant_genes.xlsx")
```

Arguments

pairwise	Output from _pairwise()().
according_to	What tool(s) define 'most?' One may use deseq, edger, limma, basic, all.
n	How many genes to pull?
z	Instead take the distribution of abundances and pull those past the given z score.
unique	One might want the subset of unique genes in the top-n which are unique in the set of available conditions. This will attempt to provide that.
least	Instead of the most abundant, do the least.
excel	Excel file to write.

Value

The set of most/least abundant genes by contrast/tool.

See Also

openxlsx

---

extract_coefficient_scatter

Perform a coefficient scatter plot of a limma/deseq/edger/basic table.

Description

Plot the gene abundances for two coefficients in a differential expression comparison. By default, genes past 1.5 z scores from the mean are colored red/green.

Usage

```
extract_coefficient_scatter(output, toptable = NULL, type = "limma",
  x = 1, y = 2, z = 1.5, p = NULL, fc = NULL, n = NULL,
  loess = FALSE, color_low = "#DD0000", color_high = "#7B9F35", ...)
```

Arguments

output	Result from the de_ family of functions, all_pairwise, or combine_de_tables().
toptable	Chosen table to query for abundances.
type	Query limma, deseq, edger, or basic outputs.
x	The x-axis column to use, either a number of name.

y	The y-axis column to use.
z	Define the range of genes to color (FIXME: extend this to p-value and fold-change).
p	Set a p-value cutoff for coloring the scatter plot (currently not supported).
fc	Set a fold-change cutoff for coloring points in the scatter plot (currently not supported.)
n	Set a top-n fold-change for coloring the points in the scatter plot (this should work, actually).
loess	Add a loess estimation (This is slow.)
color_low	Color for the genes less than the mean.
color_high	Color for the genes greater than the mean.
...	More arguments are passed to arglist.

See Also

ggplot2 plot_linear_scatter

Examples

```
## Not run:
 scatter_plot <- extract_coefficient_scatter(pairwise_output, type="deseq", x="uninfected", y="infected")

## End(Not run)
```

---

extract_de_ma *Make a MA plot of some limma output with pretty colors and shapes*

Description

Yay pretty colors and shapes!

Usage

```
extract_de_ma(pairwise, type = "edger", table = NULL, fc = 1,
  pval_cutoff = 0.05, ...)
```

Arguments

pairwise	The result from all_pairwise(), which should be changed to handle other invocations too.
type	Type of table to use: deseq, edger, limma, basic.
table	Result from edger to use, left alone it chooses the first.
fc	Cutoff for log2(fold-change) significant.
pval_cutoff	Cutoff to define 'significant' by p-value.
...	Extra arguments are passed to arglist.

Value

a plot!

See Also

plot_ma_de

Examples

```
## Not run:
 prettyplot <- edger_ma(all_aprwise) ## [sic, I'm witty! and can speel]

## End(Not run)
```

`extract_go` *Extract a set of geneID to GOID mappings from a suitable data source.*

Description

Like extract_lengths above, this is primarily intended to read gene ID and GO ID mappings from a OrgDb/OrganismDbi object.

Usage

```
extract_go(db, metadf = NULL, keytype = "ENTREZID")
```

Arguments

db	Data source containing mapping information.
metadf	Data frame containing extant information.
keytype	Keytype used for querying

Value

Dataframe of 2 columns: geneID and goID.

See Also

AnnotationDbi

extract_lengths *Take gene/exon lengths from a suitable data source (gff/TxDb/OrganismDbi)*

Description

Primarily goseq, but also other tools on occasion require a set of gene IDs and lengths. This function is resposible for pulling that data from either a gff, or TxDb/OrganismDbi.

Usage

```
extract_lengths(db = NULL, gene_list = NULL,
  type = "GenomicFeatures::transcripts", id = "TXID",
  possible_types = c("GenomicFeatures::genes", "GenomicFeatures::cds",
  "GenomicFeatures::transcripts"), ...)
```

Arguments

db	Object containing data, if it is a string then a filename is assumed to a gff file.
gene_list	Set of genes to query.
type	Function name used for extracting data from TxDb objects.
id	Column from the resulting data structure to extract gene IDs.
possible_types	Character list of types I have previously used.
...	More arguments are passed to arglist.

Value

Dataframe containing 2 columns: ID, length

See Also

GenomicFeatures

extract_siggenes *Alias for extract_significant_genes because I am dumb.*

Description

Alias for extract_significant_genes because I am dumb.

Usage

```
extract_siggenes(...)
```

Arguments

...	The parameters for extract_significant_genes()

Value

It should return a reminder for me to remember my function names or change them to something not stupid.

---

extract_significant_genes

Extract the sets of genes which are significantly up/down regulated from the combined tables.

Description

Given the output from combine_de_tables(), extract the genes in which we have the greatest likely interest, either because they have the largest fold changes, lowest p-values, fall outside a z-score, or are at the top/bottom of the ranked list.

Usage

```
extract_significant_genes(combined, according_to = "all", fc = 1,
  p = 0.05, sig_bar = TRUE, z = NULL, n = NULL, ma = TRUE,
  p_type = "adj", invert_barplots = FALSE,
  excel = "excel/significant_genes.xlsx", siglfc_cutoffs = c(0, 1, 2))
```

Arguments

combined	Output from combine_de_tables().
according_to	What tool(s) decide 'significant?' One may use the deseq, edger, limma, basic, meta, or all.
fc	Log fold change to define 'significant'.
p	(Adjusted)p-value to define 'significant'.
sig_bar	Add bar plots describing various cutoffs of 'significant'?
z	Z-score to define 'significant'.
n	Take the top/bottom-n genes.
ma	Add ma plots to the sheets of 'up' genes?
p_type	use an adjusted p-value?
invert_barplots	Invert the significance barplots as per Najib's request?
excel	Write the results to this excel file, or NULL.
siglfc_cutoffs	Set of cutoffs used to define levels of 'significant.'

Value

The set of up-genes, down-genes, and numbers therein.

See Also

combine_de_tables

`factor_rsquared` *Collect the r^2 values from a linear model fitting between a singular value decomposition and factor.*

Description

Collect the r^2 values from a linear model fitting between a singular value decomposition and factor.

Usage

```
factor_rsquared(svd_v, fact, type = "factor")
```

Arguments

svd_v	V' V = I portion of a fast.svd call.
fact	Experimental factor from the original data.
type	Make this categorical or continuous with factor/continuous.

Value

The r^2 values of the linear model as a percentage.

See Also

corpcor fast.svd

`features_greater_than` *Count the number of features(genes) greater than x in a data set.*

Description

Sometimes I am asked how many genes have >= x counts. Well, here you go.

Usage

```
features_greater_than(data, cutoff = 1, hard = TRUE)
```

Arguments

data	A dataframe/exprs/matrix/whatever of counts.
cutoff	Minimum number of counts.
hard	Greater-than is hard, greater-than-equals is not.

Details

Untested as of 2016-12-01 but used with Lucia. I think it would be interesting to iterate this function from small to large cutoffs and plot how the number of kept genes decreases.

Value

Number of genes.

See Also

Biobase

Examples

```
## Not run:
 features <- features_greater_than(expt)

## End(Not run)
```

---

filter_counts *Call various count filters.*

Description

This calls the various filtering functions in genefilter along with suggestions made in our lab meetings; defaulting to the threshold based filter suggested by Hector.

Usage

```
filter_counts(count_table, filter = "cbcb", p = 0.01, A = 1, k = 1,
  cv_min = 0.01, cv_max = 1000, thresh = 4, min_samples = 2, ...)
```

Arguments

count_table	Some counts to filter.
filter	Filtering method to apply (cbcb, pofa, kofa, cv right now).
p	Used by genefilter's pofa().
A	Also for pofa().
k	Used by genefilter's kofa().
cv_min	Used by genefilter's cv().

cv_max	Also used by cv().
thresh	Minimum threshold across samples for cbcb.
min_samples	Minimum number of samples for cbcb.
...	More options might be needed, especially if I fold cv/p/etc into ...

Value

Data frame of filtered counts.

See Also

genefilter

Examples

```
## Not run:
 new <- filter_counts(old)

## End(Not run)
```

`flanking_sequence` *Extract sequence flanking a set of annotations (generally coding sequences)*

Description

Given a set of annotations and genome, one might want to get the set of adjacent sequences.

Usage

```
flanking_sequence(bsgenome, annotation, distance = 200, type = "gene",
  prefix = "")
```

Arguments

bsgenome	Genome sequence
annotation	Set of annotations
distance	How far from each annotation is desired?
type	What type of annotation is desired?
prefix	Provide a prefix to the names to distinguish them from the existing annotations.

Value

A list of sequences before and after each sequence.

`gather_genes_orgdb` *Use the orgdb instances from clusterProfiler to gather annotation data for GO.*

Description

Since clusterprofiler no longer builds gomaps, I need to start understanding how to properly get information from orgDBs.

Usage

```
gather_genes_orgdb(goseq_data, orgdb_go, orgdb_ensembl)
```

Arguments

`goseq_data`	Some data from goseq and friends.
`orgdb_go`	The orgDb instance with GO data.
`orgdb_ensembl`	The orgDb instance with ensembl data.

Value

a go mapping

See Also

clusterProfiler

`gather_goseq_genes` *Given a set of goseq data from simple_goseq(), make a list of genes represented in each ontology.*

Description

This function uses the GO2ALLEG data structure to reverse map ontology categories to a list of genes represented. It therefore assumes that the GO2ALLEG.rda data structure has been deposited in pwd(). This in turn may be generated by clusterProfilers buildGOmap() function if it doesn't exist. For some species it may also be auto-generated. With little work this can be made much more generic, and it probably should.

Usage

```
gather_goseq_genes(goseq, ontology = NULL, pval = 0.1,
  include_all = FALSE, ...)
```

Arguments

goseq	List of goseq specific results as generated by simple_goseq().
ontology	Ontology to search (MF/BP/CC).
pval	Maximum accepted pvalue to include in the list of categories to cross reference.
include_all	Include all genes in the ontology search?
...	Extra options without a purpose just yet.

Value

Data frame of categories/genes.

See Also

goseq clusterProfiler simple_goseq

Examples

```
## Not run:
 data <- simple_goseq(sig_genes=limma_output, lengths=annotation_df, goids=goids_df)
 genes_in_cats <- gather_genes(data, ont='BP')

## End(Not run)
```

---

gbk2txdb *Given a genbank accession, make a txDb object along with sequences, etc.*

Description

Let us admit it, sometimes biomart is a pain. It also does not have easily accessible data for microbes. Genbank does!

Usage

```
gbk2txdb(accession = "AE009949", savetxdb = FALSE)
```

Arguments

accession	Accession to download and import
savetxdb	Save a txdb package from this? FIXME THIS DOES NOT WORK.

Details

Tested in test_40ann_biomartgenbank.R and test_70expt_spyogenes.R This just sets some defaults for the genbankr service in order to facilitate downloading genomes and such from genbank and dumping them into a local txdb instance.

Value

List containing a txDb, sequences, and some other stuff which I haven't yet finalized.

See Also

genbankr rentrez `import`

Examples

```
## Not run:
 txdb_result <- gbk2txdb(accession="AE009948", savetxdb=TRUE)

## End(Not run)
```

`gbk_annotations` *Extract some useful information from a gbk imported as a txDb.*

Description

Maybe this should get pulled into the previous function?

Usage

```
gbk_annotations(gbr)
```

Arguments

`gbr`	TxDb object to poke at.

Details

Tested in test_40ann_biomartgenbank.R This function should provide a quick reminder of how to use the AnnotationDbi select function if it does nothing else. It also (hopefully helpfully) returns a granges object containing the essential information one might want for printing out a gff or whatever.

Value

Granges data

See Also

AnnotationDbi GenomeInfoDb GenomicFeatures `select`

Examples

```
## Not run:
 annotations <- gbk_annotations("saureus_txdb")

## End(Not run)
```

genefilter_cv_counts *Filter genes from a dataset outside a range of variance.*

Description

This function from genefilter removes genes surpassing a variance cutoff. It is not therefore a low-count filter per se.

Usage

```
genefilter_cv_counts(count_table, cv_min = 0.01, cv_max = 1000)
```

Arguments

count_table	Input data frame of counts by sample.
cv_min	Minimum coefficient of variance.
cv_max	Maximum coefficient of variance.

Value

Dataframe of counts without the high/low variance genes.

See Also

genefilter kOverA

Examples

```
## Not run:
 filtered_table = genefilter_kofa_counts(count_table)

## End(Not run)
```

genefilter_kofa_counts

Filter low-count genes from a data set using genefilter's kOverA().

Description

This is the most similar to the function suggested by Hector I think.

Usage

```
genefilter_kofa_counts(count_table, k = 1, A = 1)
```

Arguments

count_table	Input data frame of counts by sample.
k	Minimum number of samples to have >A counts.
A	Minimum number of counts for each gene's sample in kOverA().

Value

Dataframe of counts without the low-count genes.

See Also

genefilter kOverA

Examples

```
## Not run:
 filtered_table = genefilter_kofa_counts(count_table)

## End(Not run)
```

---

genefilter_pofa_counts

Filter low-count genes from a data set using genefilter's pOverA().

Description

I keep thinking this function is pofa... oh well. Of the various tools in genefilter, this one to me is the most intuitive. Take the ratio of counts/samples and make sure it is >= a score.

Usage

```
genefilter_pofa_counts(count_table, p = 0.01, A = 100)
```

Arguments

count_table	Input data frame of counts by sample.
p	Minimum proportion of each gene's counts/sample to be greater than a minimum(A).
A	Minimum number of counts in the above proportion.

Value

Dataframe of counts without the low-count genes.

See Also

genefilter pOverA

Examples

```
## Not run:
 filtered_table = genefilter_pofa_counts(count_table)

## End(Not run)
```

`generate_gene_kegg_mapping` *Generate GENE/KEGG mapping.*

Description

This uses KEGGREST and related function kegg_to_ensembl() to associate genes to KEGG pathways.

Usage

```
generate_gene_kegg_mapping(pathways, org_abbreviation, verbose = FALSE)
```

Arguments

`pathways`	Vector of KEGG pathway IDs returned from call to keggLink() e.g. "path:mmu05134".
`org_abbreviation`	KEGG identifier for the species of interest (e.g. "hsa" for Homo sapiens).
`verbose`	talky talky?

Value

Df mapping kegg and gene IDs.

See Also

KEGGREST `keggLink`

Examples

```
## Not run:
 kegg_df <- generate_gene_kegg_mapping(path, org)

## End(Not run)
```

generate_kegg_pathway_mapping *Generate a KEGG PATHWAY / description mapping.*

Description

Make an easier to use df of KEGG -> descriptions using keggGet.

Usage

```
generate_kegg_pathway_mapping(pathways, verbose = FALSE)
```

Arguments

pathways	Vector of KEGG pathway identifiers.
verbose	talk talk?

Value

Data frame describing some kegg pathways

See Also

KEGGREST keggLink

Examples

```
## Not run:
 mapping <- generate_kegg_pathway_mapping(c("hsa00040", "hsa00100"))

## End(Not run)
```

genoplot_chromosome *Try plotting a chromosome (region)*

Description

genoplotr is cool, I don't yet understand it though

Usage

```
genoplot_chromosome(accession = "AE009949", start = NULL, end = NULL,
  title = "Genome plot")
```

Arguments

accession	An accession to plot, this will download it.
start	First segment to plot (doesn't quite work yet).
end	Final segment to plot (doesn't quite work yet).
title	Put a title on the resulting plot.

Value

Hopefully a pretty plot of a genome

See Also

genoPlotR

---

getEdgeWeights *Plot the ontology DAG.*

Description

This function was stolen from topgo in order to figure out where it was failing.

Usage

```
getEdgeWeights(graph)
```

Arguments

graph	Graph from topGO

Value

Weights!

`get_abundant_genes` *Find the set of most/least abundant genes according to limma and friends following a differential expression analysis.*

Description

Given a data set provided by limma, deseq, edger, etc; one might want to know what are the most and least abundant genes, much like get_sig_genes() does to find the most significantly different genes for each contrast.

Usage

```
get_abundant_genes(datum, type = "limma", n = NULL, z = NULL,
  unique = FALSE, least = FALSE)
```

Arguments

`datum`	Output from the _pairwise() functions.
`type`	Extract abundant genes according to what?
`n`	Perhaps take just the top/bottom n genes.
`z`	Or take genes past a given z-score.
`unique`	Unimplemented: take only the genes unique among the conditions surveyed.
`least`	When true, this finds the least abundant rather than most.

Value

List of data frames containing the genes of interest.

See Also

stats limma DESeq2 edgeR

`get_biomart_annotations` *Extract annotation information from biomart.*

Description

Biomart is an amazing resource of information, but using it is a bit annoying. This function hopes to alleviate some common headaches.

Usage

```
get_biomart_annotations(species = "hsapiens", overwrite = FALSE,
  do_save = TRUE, host = "dec2015.archive.ensembl.org",
  trymart = "ENSEMBL_MART_ENSEMBL", gene_requests = c("ensembl_gene_id",
  "ensembl_transcript_id", "description", "gene_biotype"),
  length_requests = c("ensembl_transcript_id", "cds_length",
  "chromosome_name", "strand", "start_position", "end_position"),
  include_lengths = TRUE)
```

Arguments

species	Choose a species.
overwrite	Overwite an existing save file?
do_save	Create a savefile of annotations for future runs?
host	Ensembl hostname to use.
trymart	Biomart has become a circular dependency, this makes me sad, now to list the marts, you need to have a mart loaded...
gene_requests	Set of columns to query for description-ish annotations.
length_requests	Set of columns to query for location-ish annotations.
include_lengths	Also perform a search on structural elements in the genome?

Details

Tested in test_40ann_biomart.R This goes to some lengths to find the relevant tables in biomart. But biomart is incredibly complex and one should carefully inspect the output if it fails to see if there are more appropriate marts, datasets, and columns to download.

Value

Df of some (by default) human annotations.

See Also

biomaRt listDatasets getBM

Examples

```
## Not run:
 tt = get_biomart_annotations()

## End(Not run)
```

get_biomart_ontologies *Extract gene ontology information from biomart.*

Description

I perceive that every time I go to acquire annotation data from biomart, they have changed something important and made it more difficult for me to find what I want. I recently found the *.archive.ensembl.org, and so this function uses that to try to keep things predictable, if not consistent.

Usage

```
get_biomart_ontologies(species = "hsapiens", overwrite = FALSE,
  do_save = TRUE, host = "dec2015.archive.ensembl.org",
  trymart = "ENSEMBL_MART_ENSEMBL", secondtry = "_gene",
  dl_rows = c("ensembl_gene_id", "go_accession"),
  dl_rowsv2 = c("ensembl_gene_id", "go_id"))
```

Arguments

species	Species to query.
overwrite	Overwrite existing savefile?
do_save	Create a savefile of the annotations? (if not false, then a filename.)
host	Ensembl hostname to use.
trymart	Default mart to try, newer marts use a different notation.
secondtry	The newer mart name.
dl_rows	List of rows from the final biomart object to download.
dl_rowsv2	A second list of potential rows.

Details

Tested in test_40ann_biomart.R This function makes a couple of attempts to pick up the correct tables from biomart. It is worth noting that it uses the archive.ensembl host(s) because of changes in table organization after December 2015 as well as an attempt to keep the annotation sets relatively consistent.

Value

Df of geneIDs and GOIDs.

See Also

biomaRt listMarts useDataset getBM

Examples

```
## Not run:
 tt = get_biomart_ontologies()

## End(Not run)
```

`get_eupath_config` *Grab some configuration data collated and used to make OrganismDbi/OrgDb/TxDb objects.*

Description

This function uses some data copied into inst/ to decide some parameters used for generating the various packages generated here.

Usage

```
get_eupath_config(cfg = NULL)
```

Arguments

`cfg`	Optional data frame

Details

Tested in test_46ann_tritrypdb.R This function is sort of stupid and perhaps will be removed. I keep a small csv file of some TriTrypDB specific metadata, things like data base version number, URL schemes, etc. This reads that and extracts the relevant information.

Value

Dataframe of configuration data, a few columns are required, run it with no args to see which ones.

`get_genelengths` *Grab gene lengths from a gff file.*

Description

This function attempts to be robust to the differences in output from importing gff2/gff3 files. But it certainly isn't perfect.

Usage

```
get_genelengths(gff, type = "gene", key = "ID", ...)
```

Arguments

gff	Gff file with (hopefully) IDs and widths.
type	Annotation type to use (3rd column).
key	Identifier in the 10th column of the gff file to use.
...	Extra arguments likely for gff2df

Value

Data frame of gene IDs and widths.

See Also

rtracklayer gff2df

Examples

```
## Not run:
 tt = get_genelengths('reference/fun.gff.gz')
 head(tt)
##           ID width
## 1   YAL069W   312
## 2   YAL069W   315
## 3   YAL069W     3
## 4 YAL068W-A   252
## 5 YAL068W-A   255
## 6 YAL068W-A     3

## End(Not run)
```

---

get_kegg_genes *Extract the set of geneIDs matching pathways for a given species.*

Description

This uses KEGGREST to extract the mappings for all genes for a species and pathway or 'all'. Because downloading them takes a while, it will save the results to kegg_species.rda. When run interactively, it will give some information regarding the number of genes observed in each pathway.

Usage

```
get_kegg_genes(pathway = "all", abbreviation = NULL,
  species = "leishmania major", savefile = NULL)
```

Arguments

pathway	Either a single pathway kegg id or 'all'.
abbreviation	Optional 3 letter species kegg id.
species	Stringified species name used to extract the 3 letter abbreviation.
savefile	Filename to which to save the relevant data.

Value

Dataframe of the various kegg data for each pathway, 1 row/gene.

See Also

KEGGREST

Examples

```
## Not run:
 kegg_info <- get_kegg_genes(species="Canis familiaris")

## End(Not run)
```

`get_kegg_sub` *Provide a set of simple substitutions to convert geneIDs from KEGG->TriTryDB*

Description

This function should provide 2 character lists which, when applied sequentially, will result in a hopefully coherent set of mapped gene IDs matching the TriTypDB/KEGG specifications.

Usage

```
get_kegg_sub(species = "lma")
```

Arguments

`species`	3 letter abbreviation for a given kegg type

Value

2 character lists containing the patterns and replace arguments for gsub(), order matters!

See Also

KEGGREST

get_loci_go *Extract the set of GO categories by microbesonline locus*

Description

The microbesonline is such a fantastic resource, it is a bit of a shame that it is such a pain to query.

Usage

```
get_loci_go(taxonid = "160490")
```

Arguments

taxonid	Which species to query.

Details

Tested in test_42ann_microbes.R I am not 100 At the very least, it does return a large number of them, which is a start.

Value

data frame of GO terms from pub.microbesonline.org

See Also

DBI dbSendQuery fetch

Examples

```
## Not run:
 go_df <- get_loci_go(taxonid="160490")

## End(Not run)
```

---

get_microbesonline_annotation
Skip the db and download all the text annotations for a given species.

Description

Like I said, the microbesonline mysqldb is rather more complex than I prefer. This shortcuts that process and just grabs a tsv copy of everything and loads it into a dataframe.

Usage

```
get_microbesonline_annotation(ids = "160490", species = NULL)
```

Arguments

ids	List of ids to query.
species	Species name(s) to use instead.

Details

Tested in test_70expt_spyogenes.R There is so much awesome information in microbesonline, but damn is it annoying to download. This function makes that rather easier, or so I hope at least.

Value

List of dataframes with the annotation information.

See Also

RCurl getURL

Examples

```
## Not run:
 annotations <- get_microbesonline_annotation(ids=c("160490","160491"))

## End(Not run)
```

---

get_microbesonline_ids

Use the publicly available microbesonline mysql instance to get species ids.

Description

The microbesonline mysql instance is more complex than I like. Their id system is reminiscent of KEGG's and similarly annoying. Though I haven't figured out how the tables interact, a query to get ids is simple enough.

Usage

```
get_microbesonline_ids(name = "Escherichia", exact = FALSE)
```

Arguments

name	Text string containing some part of the species name of interest.
exact	Use an exact species name?

Details

Tested in test_42ann_microbes.R This function sets the defaults required for getting a quick and dirty connection to the public microbesonline database and returning the ids associated with a given name.

Value

Dataframe of ids and names.

See Also

DBI dbSendQuery fetch

Examples

```
## Not run:
 microbes_ids <- get_microbesonline_ids(name="Streptococcus")

## End(Not run)
```

---

get_microbesonline_name

Use the publicly available microbesonline mysql instance to get species name(s).

Description

The microbesonline mysql instance is more complex than I like. Their id system is reminiscent of KEGG's and similarly annoying. Though I haven't figured out how the tables interact, a query to get ids is simple enough.

Usage

```
get_microbesonline_name(id = 316385)
```

Arguments

id	Text string containing some part of the species name of interest.

Details

Tested in test_42ann_microbesonline.R This is essentially covered in get_micrboesonline_ids(), but this works too.

Value

Dataframe of ids and names.

See Also

DBI dbSendQuery fetch

Examples

```
## Not run:
 names <- get_microbesonline_name(id=316385)

## End(Not run)
```

`get_model_adjust` *Extract some surrogate estimations from a raw data set using sva, ruv, and/or pca.*

Description

This applies the methodologies very nicely explained by Jeff Leek at https://github.com/jtleek/svaseq/blob/master/recount.Rm and attempts to use them to acquire estimates which may be applied to an experimental model by either EdgeR, DESeq2, or limma. In addition, it modifies the count tables using these estimates so that one may play with the modified counts and view the changes (with PCA or heatmaps or whatever). Finally, it prints a couple of the plots shown by Leek in his document. In other words, this is entirely derivative of someone much smarter than me.

Usage

```
get_model_adjust(data, design = NULL, estimate_type = "sva",
  surrogates = "be", ...)
```

Arguments

`data`	Expt or data frame to manipulate.
`design`	If the data is not an expt, provide experimental design here.
`estimate_type`	One of: sva_supervised, sva_unsupervised, ruv_empirical, ruv_supervised, ruv_residuals, or pca.
`surrogates`	Choose a method for getting the number of surrogates, be or leek, or a number.
`...`	Parameters fed to arglist.

Value

List including the adjustments for a model matrix, a modified count table, and 3 plots of the known batch, surrogates, and batch/surrogate.

See Also

Biobase sva EDASeq RUVseq edgeR

get_ncbi_taxonid *Use taxize to get ncbi taxon IDs*

Description

taxize looks like it might be awesome, but it is also pretty annoying

Usage

```
get_ncbi_taxonid(species = "Leishmania major")
```

Arguments

species	Human readable species name

Value

potential NCBI taxon IDs

See Also

taxize

Examples

```
## Not run:
 taxonid <- get_ncbi_taxonid(species="Trypanosoma cruzi")

## End(Not run)
```

get_pairwise_gene_abundances *A companion function for get_abundant_genes()*

Description

Instead of pulling to top/bottom abundant genes, get all abundances and variances or stderr.

Usage

```
get_pairwise_gene_abundances(datum, type = "limma")
```

Arguments

datum	Output from _pairwise() functions.
type	According to deseq/limma/ed ger/basic?

Value

A list containing the expression values and some metrics of variance/error.

See Also

limma

`get_sig_genes` *Get a set of up/down differentially expressed genes.*

Description

Take one or more criteria (fold change, rank order, (adj)p-value, z-score from median FC) and use them to extract the set of genes which are defined as 'differentially expressed.' If no criteria are provided, it arbitrarily chooses all genes outside of 1-z.

Usage

```
get_sig_genes(table, n = NULL, z = NULL, fc = NULL, p = NULL,
  column = "logFC", fold = "plusminus", p_column = "adj.P.Val")
```

Arguments

`table`	Table from limma/edger/deseq.
`n`	Rank-order top/bottom number of genes to take.
`z`	Number of z-scores >/< the median to take.
`fc`	Fold-change cutoff.
`p`	P-value cutoff.
`column`	Table's column used to distinguish top vs. bottom.
`fold`	Identifier reminding how to get the bottom portion of a fold-change (plusminus says to get the negative of the positive, otherwise 1/positive is taken). This effectively tells me if this is a log fold change or not.
`p_column`	Table's column containing (adjusted or not)p-values.

Details

Tested in test_29de_shared.R

Value

Subset of the up/down genes given the provided criteria.

See Also

`extract_significant_genes`

gff2df *Extract annotation information from a gff file into a df*

Description

Try to make import.gff a little more robust; I acquire (hopefully) valid gff files from various sources: yeastgenome.org, microbesonline, tritrypdb, ucsc, ncbi. To my eyes, they all look like reasonably good gff3 files, but some of them must be loaded with import.gff2, import.gff3, etc. That is super annoying. Also, I pretty much always just do as.data.frame() when I get something valid from rtracklayer, so this does that for me, I have another function which returns the iranges etc. This function wraps import.gff/import.gff3/import.gff2 calls in try() because sometimes those functions fail in unpredictable ways.

Usage

```
gff2df(gff, type = NULL, id_col = "ID", second_id_col = "locus_tag",
  try = NULL)
```

Arguments

gff	Gff filename.
type	Subset the gff file for entries of a specific type.
id_col	Column in a successful import containing the IDs of interest.
second_id_col	Second column to check.
try	Give your own function call to use for importing.

Value

Dataframe of the annotation information found in the gff file.

See Also

rtracklayer GenomicRanges import.gff

Examples

```
## Not run:
 funkytown <- gff2df('reference/gff/saccharomyces_cerevsiae.gff.xz')

## End(Not run)
```

`gff2irange` *Extract annotation information from a gff file into an irange object.*

Description

Try to make import.gff a little more robust; I acquire (hopefully) valid gff files from various sources: yeastgenome.org, microbesonline, tritrypdb, ucsc, ncbi. To my eyes, they all look like reasonably good gff3 files, but some of them must be loaded with import.gff2, import.gff3, etc. That is super annoying. Also, I pretty much always just do as.data.frame() when I get something valid from rtracklayer, so this does that for me, I have another function which returns the iranges etc. This function wraps import.gff/import.gff3/import.gff2 calls in try() because sometimes those functions fail in unpredictable ways.

Usage

```
gff2irange(gff, type = NULL)
```

Arguments

`gff`	Gff filename.
`type`	Subset to extract.

Details

This is essentially gff2df(), but returns data suitable for getSet()

Value

Iranges! (useful for getSeq().)

See Also

rtracklayer gff2df **Biostrings** `import.gff`

Examples

```
## Not run:
 library(BSgenome.Tcruzi.clbrener.all)
 tc_clb_all <- BSgenome.Tcruzi.clbrener.all
 cds_ranges <- gff2irange('reference/gff/tcruzi_clbrener.gff.xz', type='CDS')
 cds_sequences <- Biostrings::getSeq(tc_clb_all, cds_ranges)

## End(Not run)
```

ggplot2_heatmap *Taken from https://plot.ly/ggplot2/ggdendro-dendrograms/*

Description

Check out the following link for a neat dendrogram library. http://www.sthda.com/english/wiki/beautiful-dendrogram-visualizations-in-r-5-must-known-methods-unsupervised-machine-learning

Usage

```
ggplot2_heatmap(some_df)
```

Arguments

some_df	A data frame to heatmap using ggplot2.

Value

putatively a heatmap!

godef *Get a go long-form definition from an id.*

Description

Sometimes it is nice to be able to read the full definition of some GO terms.

Usage

```
godef(go = "GO:0032432")
```

Arguments

go	GO ID, this may be a character or list (assuming the elements are goids).

Value

Some text providing the long definition of each provided GO id.

See Also

GOTermsAnnDbBimap

Examples

```
## Not run:
 godef("GO:0032432")
 ## > GO:0032432
 ## > "An assembly of actin filaments that are on the same axis but may be oriented with the
 ## > same or opposite polarities and may be packed with different levels of tightness."

## End(Not run)
```

---

golev *Get a go level approximation from an ID.*

Description

Sometimes it is useful to know how far up/down the ontology tree a given id resides. This attmepts to answer that question.

Usage

```
golev(go)
```

Arguments

go	GO id, this may be a character or list (assuming the elements are goids).

Value

Set of numbers corresponding to approximate tree positions of the GO ids.

See Also

GOTermsAnnDbBimap

Examples

```
## Not run:
 golev("GO:0032559")
 ## > 3

## End(Not run)
```

golevel *Get a go level approximation from a set of IDs.*

Description

This just wraps golev() in mapply.

Usage

```
golevel(go = c("GO:0032559", "GO:0000001"))
```

Arguments

go	Character list of IDs.

Value

Set pf approximate levels within the onlogy.

See Also

GOTermsAnnDbBimap

Examples

```
## Not run:
 golevel(c("GO:0032559", "GO:0000001")
 ## > 3 4

## End(Not run)
```

golevel_df *Extract a dataframe of golevels using getGOLevel() from clusterProfiler.*

Description

This function is way faster than my previous iterative golevel function. That is not to say it is very fast, so it saves the result to ontlevel.rda for future lookups.

Usage

```
golevel_df(ont = "MF", savefile = "ontlevel.rda")
```

Arguments

ont	the ontology to recurse.
savefile	a file to save the results for future lookups.

Value

golevels a dataframe of goids<->highest level

See Also

clusterProfiler

---

goont *Get a go ontology name from an ID.*

Description

Get a go ontology name from an ID.

Usage

```
goont(go = c("GO:0032432", "GO:0032433"))
```

Arguments

go	GO id, this may be a character or list (assuming the elements are goids).

Value

The set of ontology IDs associated with the GO ids, thus 'MF' or 'BP' or 'CC'.

See Also

GOTermsAnnDbBimap

Examples

```
## Not run:
 goont(c("GO:0032432", "GO:0032433"))
 ## > GO:0032432 GO:0032433
 ## > "CC" "CC"

## End(Not run)
```

gosec *Get a GO secondary ID from an id.*

Description

Unfortunately, GOTERM's returns for secondary IDs are not consistent, so this function has to have a whole bunch of logic to handle the various outputs.

Usage

```
gosec(go = "GO:0032432")
```

Arguments

go	GO ID, this may be a character or list(assuming the elements, not names, are goids).

Value

Some text comprising the secondary GO id(s).

See Also

GOTermsAnnDbBimap

Examples

```
## Not run:
 gosec("GO:0032432")
 ## > GO:0032432
 ## > "GO:0000141" "GO:0030482"

## End(Not run)
```

goseq_table *Enhance the goseq table of gene ontology information.*

Description

While goseq has some nice functionality, the table of outputs it provides is somewhat lacking. This attempts to increase that with some extra helpful data like ontology categories, definitions, etc.

Usage

```
goseq_table(df, file = NULL)
```

Arguments

df	Dataframe of ontology information. This is intended to be the output from goseq including information like numbers/category, GOids, etc. It requires a column 'category' which contains: GO:000001 and such.
file	Csv file to which to write the table.

Value

Ontology table with annotation information included.

See Also

goseq

Examples

```
## Not run:
 annotated_go = goseq_table(go_ids)
 head(annotated_go, n=1)
 ## >        category numDEInCat numInCat over_represented_pvalue
 ## > 571  GO:0006364          9       26            4.655108e-08
 ## >      under_represented_pvalue       qvalue ontology
 ## > 571                 1.0000000 6.731286e-05       BP
 ## >                               term
 ## > 571                 rRNA processing
 ## >                              synonym
 ## > 571        "35S primary transcript processing, GO:0006365"
 ## >        secondary    definition
 ## > 571    GO:0006365   Any process involved in the conversion of a primary ribosomal
 ##          RNA (rRNA) transcript into one or more mature rRNA molecules.

## End(Not run)
```

---

goseq_trees *Make fun trees a la topgo from goseq data.*

Description

This seeks to force goseq data into a format suitable for topGO and then use its tree plotting function to make it possible to see significantly increased ontology trees.

Usage

```
goseq_trees(goseq, goid_map = "id2go.map", score_limit = 0.01,
  overwrite = FALSE, selector = "topDiffGenes", pval_column = "adj.P.Val")
```

Arguments

goseq	Data from goseq.
goid_map	File to save go id mapping.
score_limit	Score limit for the coloring.
overwrite	Overwrite the trees?
selector	Function for choosing genes.
pval_column	Column to acquire pvalues.

Value

A plot!

See Also

Ramigo

---

gostats_kegg *Use gostats() against kegg pathways.*

Description

This sets up a GSEABase analysis using KEGG pathways rather than gene ontologies. Does this even work? I don't think I have ever tested it yet. oh, it sort of does, maybe if I export it I will rembmer it.

Usage

```
gostats_kegg(organism = "Homo sapiens", pathdb = "org.Hs.egPATH",
  godb = "org.Hs.egGO")
```

Arguments

organism	The organism used to make the KEGG frame, human readable no taxonomic.
pathdb	Name of the pathway database for this organism.
godb	Name of the ontology database for this organism.

Value

Results from hyperGTest using the KEGG pathways.

See Also

AnnotationDbi GSEABase Category

gostats_trees *Take gostats data and print it on a tree as topGO does.*

Description

This shoehorns gostats data into a format acceptable by topgo and uses it to print pretty ontology trees showing the over represented ontologies.

Usage

```
gostats_trees(de_genes, mf_over, bp_over, cc_over, mf_under, bp_under, cc_under,
  goid_map = "id2go.map", score_limit = 0.01, goids_df = NULL,
  overwrite = FALSE, selector = "topDiffGenes", pval_column = "adj.P.Val")
```

Arguments

de_genes	Some differentially expressed genes.
mf_over	Mfover data.
bp_over	Bpover data.
cc_over	Ccover data.
mf_under	Mfunder data.
bp_under	Bpunder data.
cc_under	Ccunder expression data.
goid_map	Mapping of IDs to GO in the Ramigo expected format.
score_limit	Maximum score to include as 'significant'.
goids_df	Dataframe of available goids (used to generate goid_map).
overwrite	Overwrite the goid_map?
selector	Function to choose differentially expressed genes in the data.
pval_column	Column in the data to be used to extract pvalue scores.

Value

plots! Trees! oh my!

See Also

topGO gostats

gosyn *Get a go synonym from an ID.*

Description

I think I will need to do similar parsing of the output for this function as per gosec() In some cases this also returns stuff like c("some text", "GO:someID") versus "some other text" versus NULL versus NA. This function just goes a mapply(gosn, go).

Usage

```
gosyn(go = "GO:0000001")
```

Arguments

go	GO id, this may be a character or list(assuming the elements are goids).

Value

Some text providing the synonyms for the given id(s).

See Also

GOTermsAnnDbBimap

Examples

```
## Not run:
 text =  gosyn("GO:0000001")
 text
 ## > GO:000001
 ## > "mitochondrial inheritance"

## End(Not run)
```

goterm *Get a go term from ID.*

Description

Get a go term from ID.

Usage

```
goterm(go = "GO:0032559")
```

Arguments

go	GO id or a list thereof, this may be a character or list(assuming the elements, not names, are goids).

Value

Some text containing the terms associated with GO id(s).

See Also

GOTermsAnnDbBimap

Examples

```
## Not run:
 goterm("GO:0032559")
 ## > GO:0032559
 ## > "adenyl ribonucleotide binding"

## End(Not run)
```

---

gotest *Test GO ids to see if they are useful.*

Description

This just wraps gotst in mapply.

Usage

```
gotest(go)
```

Arguments

go	go IDs as characters.

Value

Some text

See Also

GOTermsAnnDbBimap

Examples

```
## Not run:
 gotest("GO:0032559")
 ## > 1
 gotest("GO:0923429034823904")
 ## > 0

## End(Not run)
```

---

graph_metrics *Make lots of graphs!*

Description

Plot out a set of metrics describing the state of an experiment including library sizes, # non-zero genes, heatmaps, boxplots, density plots, pca plots, standard median distance/correlation, and qq plots.

Usage

```
graph_metrics(expt, cormethod = "pearson", distmethod = "euclidean",
  title_suffix = NULL, qq = NULL, ma = NULL, ...)
```

Arguments

expt	an expt to process
cormethod	the correlation test for heatmaps.
distmethod	define the distance metric for heatmaps.
title_suffix	text to add to the titles of the plots.
qq	include qq plots
ma	include pairwise ma plots
...	extra parameters optionally fed to the various plots

Value

a looooong list of plots including the following:

1. nonzero = a ggplot2 plot of the non-zero genes vs library size
2. libsize = a ggplot2 bar plot of the library sizes
3. boxplot = a ggplot2 boxplot of the raw data
4. corheat = a recordPlot()ed pairwise correlation heatmap of the raw data
5. smc = a recordPlot()ed view of the standard median pairwise correlation of the raw data
6. disheat = a recordPlot()ed pairwise euclidean distance heatmap of the raw data
7. smd = a recordPlot()ed view of the standard median pairwise distance of the raw data

8. pcaplot = a recordPlot()ed PCA plot of the raw samples
9. pcatable = a table describing the relative contribution of condition/batch of the raw data
10. pcares = a table describing the relative contribution of condition/batch of the raw data
11. pcavar = a table describing the variance of the raw data
12. qq = a recordPlotted() view comparing the quantile/quantiles between the mean of all data and every raw sample
13. density = a ggplot2 view of the density of each raw sample (this is complementary but more fun than a boxplot)

See Also

Biobase ggplot2 grDevices gplots exprs hpgl_norm plot_nonzero plot_libsize plot_boxplot plot_corheat plot_sm plot_disheat plot_pca plot_qq_all plot_pairwise_ma

Examples

```
## Not run:
 toomany_plots <- graph_metrics(expt)
 toomany_plots$pcaplot
 norm <- normalize_expt(expt, convert="cpm", batch=TRUE, filter_low=TRUE,
                        transform="log2", norm="rle")
 holy_asscrackers <- graph_metrics(norm, qq=TRUE, ma=TRUE)
 ## good luck, you are going to be waiting a while for the ma plots to print!

## End(Not run)
```

---

heatmap.3 *a minor change to heatmap.2 makes heatmap.3*

Description

heatmap.2 is the devil.

Usage

```
heatmap.3(x, Rowv = TRUE, Colv = if (symm) "Rowv" else TRUE,
  distfun = dist, hclustfun = hclust, dendrogram = c("both", "row",
  "column", "none"), reorderfun = function(d, w) reorder(d, w),
  symm = FALSE, scale = c("none", "row", "column"), na.rm = TRUE,
  revC = identical(Colv, "Rowv"), add.expr, breaks, symbreaks = min(x < 0,
  na.rm = TRUE) || scale != "none", col = "heat.colors", colsep, rowsep,
  sepcolor = "white", sepwidth = c(0.05, 0.05), cellnote, notecex = 1,
  notecol = "cyan", na.color = par("bg"), trace = c("column", "row",
  "both", "none"), tracecol = "cyan", hline = median(breaks),
  vline = median(breaks), linecol = tracecol, margins = c(5, 5),
  ColSideColors, RowSideColors, cexRow = 0.2 + 1/log10(nr), cexCol = 0.2 +
  1/log10(nc), labRow = NULL, labCol = NULL, srtRow = NULL,
```

```
srtCol = NULL, adjRow = c(0, NA), adjCol = c(NA, 0), offsetRow = 0.5,
offsetCol = 0.5, key = TRUE, keysize = 1.5,
density.info = c("histogram", "density", "none"), denscol = tracecol,
symkey = min(x < 0, na.rm = TRUE) || symbreaks, densadj = 0.25,
key.title = NULL, key.xlab = NULL, key.ylab = NULL,
key.xtickfun = NULL, key.ytickfun = NULL, key.par = list(),
main = NULL, xlab = NULL, ylab = NULL, lmat = NULL, lhei = NULL,
lwid = NULL, extrafun = NULL, linewidth = 1, ...)
```

Arguments

x	data
Rowv	add rows?
Colv	add columns?
distfun	distance function to use
hclustfun	clustering function to use
dendrogram	which axes to put trees on
reorderfun	reorder the rows/columns?
symm	symmetrical?
scale	add the scale?
na.rm	remove nas from the data?
revC	reverse the columns?
add.expr	no clue
breaks	also no clue
symbreaks	still no clue
col	colors!
colsep	column separator
rowsep	row separator
sepcolor	color to put between columns/rows
sepwidth	how much to separate
cellnote	mur?
notecex	size of the notes
notecol	color of the notes
na.color	a parameter call to bg
trace	do a trace for rows/columns?
tracecol	color of the trace
hline	the hline
vline	the vline
linecol	the line color
margins	margins are good

ColSideColors	colors for the columns as annotation
RowSideColors	colors for the rows as annotation
cexRow	row size
cexCol	column size
labRow	hmmmm
labCol	still dont know
srtRow	srt the row?
srtCol	srt the column?
adjRow	adj the row?
adjCol	adj the column?
offsetRow	how far to place the text from the row
offsetCol	how far to place the text from the column
key	add a key?
keysize	if so, how big?
density.info	for the key, what information to add
denscol	tracecol hmm ok
symkey	I like keys
densadj	adj the dens?
key.title	title for the key
key.xlab	text for the x axis of the key
key.ylab	text for the y axis of the key
key.xtickfun	add text to the ticks of the key x axis
key.ytickfun	add text to the ticks of the key y axis
key.par	parameters for the key
main	the main title of the plot
xlab	main x label
ylab	main y label
lmat	the lmat
lhei	the lhei
lwid	the lwid
extrafun	I do enjoy me some extra fun
linewidth	the width of lines
...	because this function did not already have enough options

Value

a heatmap!

See Also

heatmap.2

hpgltools *hpgltools: a suite of tools to make our analyses easier*

Description

This provides a series of helpers for working with sequencing data

Details

It falls under a few main topics

- Data exploration, look for trends in sequencing data and identify batch effects or skewed distributions.
- Differential expression analyses, use DESeq2/limma/EdgeR in a hopefully robust and flexible fashion.
- Ontology analyses, use goseq/clusterProfiler/topGO/GOStats/gProfiler in hopefully robust ways.
- Perform some simple TnSeq analyses.

To see examples of this inaction, check out the vignettes: `browseVignettes(package = 'hpgltools')`

hpgl_arescore *Implement the arescan function in R*

Description

This function was taken almost verbatim from AREScore() in SeqTools Available at: https://github.com/lianos/seqtools.git At least on my computer I could not make that implementation work So I rewrapped its apply() calls and am now hoping to extend its logic a little to make it more sensitive and get rid of some of the spurious parameters or at least make them more transparent.

Usage

```
hpgl_arescore(x, basal = 1, overlapping = 1.5, d1.3 = 0.75, d4.6 = 0.4,
  d7.9 = 0.2, within.AU = 0.3, aub.min.length = 10,
  aub.p.to.start = 0.8, aub.p.to.end = 0.55)
```

Arguments

`x`	DNA/RNA StringSet containing the UTR sequences of interest
`basal`	I dunno.
`overlapping`	default=1.5
`d1.3`	default=0.75 These parameter names are so stupid, lets be realistic
`d4.6`	default=0.4

d7.9	default=0.2
within.AU	default=0.3
aub.min.length	default=10
aub.p.to.start	default=0.8
aub.p.to.end	default=0.55

Details

Note that I did this two months ago and haven't touched it since...

Value

a DataFrame of scores

See Also

IRanges Biostrings

Examples

```
## Not run:
 ## Extract all the genes from my genome, pull a static region 120nt following the stop
 ## and test them for potential ARE sequences.
 ## FIXME: There may be an error in this example, another version I have handles the +/- strand
 ## genes separately, I need to return to this and check if it is providing the 5' UTR for 1/2
 ## the genome, which would be unfortunate -- but the logic for testing remains the same.
 are_candidates <- hpgl_arescore(genome)
 utr_genes <- subset(lmajor_annotations, type == 'gene')
 threep <- GenomicRanges::GRanges(seqnames=Rle(utr_genes[,1]),
                                  ranges=IRanges(utr_genes[,3], end=(utr_genes[,3] + 120)),
                                     strand=Rle(utr_genes[,5]),
                                     name=Rle(utr_genes[,10]))
 threep_seqstrings <- Biostrings::getSeq(lm, threep)
 are_test <- hpgltools:::hpgl_arescore(x=threep_seqstrings)
 are_genes <- rownames(are_test[ which(are_test$score > 0), ])

## End(Not run)
```

---

hpgl_combatMod *A modified version of comBatMod.*

Description

This is a hack of Kwame Okrah's combatMod to make it not fail on corner-cases. This was mostly copy/pasted from https://github.com/kokrah/cbcbSEQ/blob/master/R/transform.R

Usage

```
hpgl_combatMod(dat, batch, mod, noScale = TRUE, prior.plots = FALSE, ...)
```

Arguments

dat	Df to modify.
batch	Factor of batches.
mod	Factor of conditions.
noScale	The normal 'scale' option squishes the data too much, so this defaults to TRUE.
prior.plots	Print out prior plots?
...	Extra options are passed to arglist

Value

Df of batch corrected data

See Also

sva ComBat

Examples

```
## Not run:
 df_new = hpgl_combatMod(df, batches, model)

## End(Not run)
```

---

hpgl_cor *Wrap cor() to include robust correlations.*

Description

Take covRob's robust correlation coefficient and add it to the set of correlations available when one calls cor().

Usage

```
hpgl_cor(df, method = "pearson", ...)
```

Arguments

df	Data frame to test.
method	Correlation method to use. Includes pearson, spearman, kendal, robust.
...	Other options to pass to stats::cor().

Value

Some fun correlation statistics.

See Also

robust cor cov covRob

Examples

```
## Not run:
 hpgl_cor(df=df)
 hpgl_cor(df=df, method="robust")

## End(Not run)
```

---

hpgl_GOplot *A minor hack of the topGO GOplot function.*

Description

This allows me to change the line widths from the default.

Usage

```
hpgl_GOplot(dag, sigNodes, dag.name = "GO terms", edgeTypes = TRUE,
  nodeShape.type = c("box", "circle", "ellipse", "plaintext")[3],
  genNodes = NULL, wantedNodes = NULL, showEdges = TRUE,
  useFullNames = TRUE, oldSigNodes = NULL, nodeInfo = NULL,
  maxchars = 30)
```

Arguments

dag	DAG tree of ontologies.
sigNodes	Set of significant ontologies (with p-values).
dag.name	Name for the graph.
edgeTypes	Types of the edges for graphviz.
nodeShape.type	Shapes on the tree.
genNodes	Generate the nodes?
wantedNodes	Subset of the ontologies to plot.
showEdges	Show the arrows?
useFullNames	Full names of the ontologies (they can get long).
oldSigNodes	I dunno.
nodeInfo	Hmm.
maxchars	Maximum characters per line inside the shapes.

Value

Topgo plot!

See Also

topGO

`hpgl_GroupDensity` *A hack of topGO's groupDensity()*

Description

This just adds a couple wrappers to avoid errors in groupDensity.

Usage

```
hpgl_GroupDensity(object, whichGO, ranks = TRUE, rm.one = FALSE)
```

Arguments

`object`	TopGO enrichment object.
`whichGO`	Individual ontology group to compare against.
`ranks`	Rank order the set of ontologies?
`rm.one`	Remove pvalue=1 groups?

Value

plot of group densities.

`hpgl_log2cpm` *Converts count matrix to log2 counts-per-million reads.*

Description

Based on the method used by limma as described in the Law et al. (2014) voom paper.

Usage

```
hpgl_log2cpm(counts, lib.size = NULL)
```

Arguments

`counts`	Read count matrix.
`lib.size`	Library size.

Value

log2-CPM read count matrix.

See Also

edgeR

Examples

```
## Not run:
 l2cpm <- hpgl_log2cpm(counts)

## End(Not run)
```

`hpgl_norm` *Normalize a dataframe/expt, express it, and/or transform it*

Description

There are many possible options to this function. Refer to normalize_expt() for a more complete list.

Usage

```
hpgl_norm(data, ...)
```

Arguments

`data`	Some data as a df/expt/whatever.
`...`	I should put all those other options here

Value

edgeR's DGEList expression of a count table. This seems to me to be the easiest to deal with.

See Also

edgeR DESeq2 `cpm` `rpkm` `hpgl_rpkm` `DESeqDataSetFromMatrix` `estimateSizeFactors` `DGEList` `calcNormFactors`

Examples

```
## Not run:
 df_raw = hpgl_norm(expt=expt)  ## Only performs low-count filtering
 df_raw = hpgl_norm(df=a_df, design=a_design) ## Same, but using a df
 df_ql2rpkm = hpgl_norm(expt=expt, norm='quant', transform='log2',
                        convert='rpkm')  ## Quantile, log2, rpkm
 count_table = df_ql2rpkm$counts

## End(Not run)
```

hpgl_pathview *Print some data onto KEGG pathways.*

Description

KEGGREST and pathview provide neat functions for coloring molecular pathways with arbitrary data. Unfortunately they are somewhat evil to use. This attempts to alleviate that.

Usage

```
hpgl_pathview(path_data, indir = "pathview_in", outdir = "pathview",
  pathway = "all", species = "lma", from_list = NULL, to_list = NULL,
  suffix = "_colored", filenames = "id", fc_column = "limma_logfc",
  format = "png", verbose = TRUE)
```

Arguments

path_data	Some differentially expressed genes.
indir	Directory into which the unmodified kegg images will be downloaded (or already exist).
outdir	Directory which will contain the colored images.
pathway	Perform the coloring for a specific pathway?
species	Kegg identifier for the species of interest.
from_list	Regex to help in renaming KEGG categories/gene names from one format to another.
to_list	Regex to help in renaming KEGG categories/gene names from one format to another.
suffix	Add a suffix to the completed, colored files.
filenames	Name the final files by id or name?
fc_column	What is the name of the fold-change column to extract?
format	Format of the resulting images, I think only png really works well.
verbose	When on, this function is quite chatty.

Value

A list of some information for every KEGG pathway downloaded/examined. This information includes: a. The filename of the final image for each pathway. b. The number of genes which were found in each pathway image. c. The number of genes in the 'up' category d. The number of genes in the 'down' category

See Also

Ramigo pathview

Examples

```
## Not run:
 thy_el_comp2_path = hpgl_pathview(thy_el_comp2_kegg, species="spz", indir="pathview_in",
                                   outdir="kegg_thy_el_comp2", string_from="_Spy",
                                   string_to="_Spy_", filenames="pathname")

## End(Not run)
```

`hpgl_qshrink` *A hacked copy of Kwame's qsmooth/qstats code.*

Description

I made a couple small changes to Kwame's qstats() function to make it not fail when on corner-cases. I sent him a diff, but haven't checked to see if it was useful yet.

Usage

```
hpgl_qshrink(data = NULL, groups = NULL, refType = "mean",
  groupLoc = "mean", window = 99, groupCol = NULL, plot = TRUE, ...)
```

Arguments

`data`	Count table to modify
`groups`	Factor of the experimental conditions
`refType`	Method for grouping conditions
`groupLoc`	Method for grouping groups
`window`	Window, for looking!
`groupCol`	Column to define conditions
`plot`	Plot the quantiles?
`...`	More options

Value

New data frame of normalized counts

See Also

qsmooth

Examples

```
## Not run:
 df <- hpgl_qshrink(data)

## End(Not run)
```

hpgl_qstats *A hacked copy of Kwame's qsmooth/qstats code.*

Description

I made a couple small changes to Kwame's qstats() function to make it not fail when on corner-cases. I sent him a diff, but haven't checked to see if it was useful yet.

Usage

```
hpgl_qstats(data, groups, refType = "mean", groupLoc = "mean",
  window = 99)
```

Arguments

data	Initial count data
groups	Experimental conditions as a factor.
refType	Method to separate groups, mean or median.
groupLoc	I don't remember what this is for.
window	Window for basking!

Value

Some new data.

See Also

matrixStats

Examples

```
## Not run:
 qstatted <- hpgl_qstats(data, conditions)

## End(Not run)
```

hpgl_rpkm *Reads/(kilobase(gene) * million reads)*

Description

Express a data frame of counts as reads per kilobase(gene) per million(library). This function wraps EdgeR's rpkm in an attempt to make sure that the required gene lengths get sent along.

Usage

```
hpgl_rpkm(df, ...)
```

Arguments

df	Data frame of counts, alternately an edgeR DGEList.
...	extra options including annotations for defining gene lengths.

Value

Data frame of counts expressed as rpkm.

See Also

edgeR cpm rpkm

Examples

```
## Not run:
 rpkm_df = hpgl_rpkm(df, annotations=gene_annotations)

## End(Not run)
```

hpgl_voom *A slight modification of limma's voom().*

Description

Estimate mean-variance relationship between samples and generate 'observational-level weights' in preparation for linear modeling RNAseq data. This particular implementation was primarily scabbed from cbcbSEQ, but changes the mean-variance plot slightly and attempts to handle corner cases where the sample design is confounded by setting the coefficient to 1 for those samples rather than throwing an unhelpful error. Also, the Elist output gets a 'plot' slot which contains the plot rather than just printing it.

Usage

```
hpgl_voom(dataframe, model = NULL, libsize = NULL,
  normalize.method = "none", span = 0.5, stupid = FALSE, logged = FALSE,
  converted = FALSE, ...)
```

Arguments

dataframe	Dataframe of sample counts which have been normalized and log transformed.
model	Experimental model defining batches/conditions/etc.
libsize	Size of the libraries (usually provided by edgeR).
normalize.method	Normalization method used in voom().
span	The span used in voom().
stupid	Cheat when the resulting matrix is not solvable?
logged	Is the input data is known to be logged?
converted	Is the input data is known to be cpm converted?
...	Extra arguments are passed to arglist.

Value

EList containing the following information: E = The normalized data weights = The weights of said data design = The resulting design lib.size = The size in pseudocounts of the library plot = A ggplot of the mean/variance trend with a blue loess fit and red trend fit

See Also

limma ggplot2

Examples

```
## Not run:
 funkytown = hpgl_voom(samples, model)

## End(Not run)
```

---

hpgl_voomweighted *A minor change to limma's voom with quality weights to attempt to address some corner cases.*

Description

This copies the logic employed in hpgl_voom(). I suspect one should not use it.

Usage

```
hpgl_voomweighted(data, fun_model, libsize = NULL,
  normalize.method = "none", plot = TRUE, span = 0.5, var.design = NULL,
  method = "genebygene", maxiter = 50, tol = 1e-10, trace = FALSE,
  replace.weights = TRUE, col = NULL, ...)
```

Arguments

data	Some data!
fun_model	A model for voom() and arrayWeights()
libsize	Library sizes passed to voom().
normalize.method	Passed to voom()
plot	Do the plot of mean variance?
span	yes
var.design	maybe
method	kitty!
maxiter	50 is good
tol	I have no tolerance.
trace	no trace for you.
replace.weights	Replace the weights?
col	yay columns!
...	more arguments!

Value

a voom return

See Also

limma

Examples

```
## Not run:
## No seriously, dont run this, I think it is wiser to use the functions provided by limma.
## But this provides a place to test stuff out.
 voom_result <- hpgl_voomweighted(dataset, model)

## End(Not run)
```

kegg_get_orgn *Search KEGG identifiers for a given species name.*

Description

KEGG identifiers do not always make sense. For example, how am I supposed to remember that Leishmania major is lmj? This takes in a human readable string and finds the KEGG identifiers that match it.

Usage

```
kegg_get_orgn(species = "Leishmania", short = TRUE)
```

Arguments

species	Search string (Something like 'Homo sapiens').
short	Only pull the orgid?

Value

Data frame of possible KEGG identifier codes, genome ID numbers, species, and phylogenetic classifications.

See Also

RCurl

Examples

```
## Not run:
 fun = kegg_get_orgn('Canis')
 ## >     Tid     orgid      species                   phylogeny
 ## >  17 T01007   cfa Canis familiaris (dog) Eukaryotes;Animals;Vertebrates;Mammals

## End(Not run)
```

kegg_to_ensembl *Maps KEGG identifiers to ENSEMBL gene ids.*

Description

Takes a list of KEGG gene identifiers and returns a list of ENSEMBL ids corresponding to those genes.

Usage

```
kegg_to_ensembl(kegg_ids)
```

Arguments

kegg_ids	List of KEGG identifiers to be mapped.

Value

Ensembl IDs as a character list.

See Also

KEGGREST keggGet

Examples

```
## Not run:
ensembl_list <- kegg_to_ensembl("a")

## End(Not run)
```

---

kmeans_testing *This is for the moment just a code dump of some arbitrarily chosen kmeans clustering stuff*

Description

Fill this in asap with real code for Ginger's search of gene sets which have similar profiles over time.

Usage

```
kmeans_testing(gene_ids = get0("gene_ids"))
```

Arguments

gene_ids	A set of gene IDs to query.

limma_pairwise *Set up a model matrix and set of contrasts for pairwise comparisons using voom/limma.*

Description

Creates the set of all possible contrasts and performs them using voom/limma.

Usage

```
limma_pairwise(input = NULL, conditions = NULL, batches = NULL,
  model_cond = TRUE, model_batch = TRUE, model_intercept = TRUE,
  alt_model = NULL, extra_contrasts = NULL, annot_df = NULL,
  libsize = NULL, force = FALSE, ...)
```

Arguments

input	Dataframe/vector or expt class containing count tables, normalization state, etc.
conditions	Factor of conditions in the experiment.
batches	Factor of batches in the experiment.
model_cond	Include condition in the model?
model_batch	Include batch in the model? This is hopefully TRUE.
model_intercept	Perform a cell-means or intercept model? A little more difficult for me to understand. I have tested and get the same answer either way.
alt_model	Separate model matrix instead of the normal condition/batch.
extra_contrasts	Some extra contrasts to add to the list. This can be pretty neat, lets say one has conditions A,B,C,D,E and wants to do (C/B)/A and (E/D)/A or (E/D)/(C/B) then use this with a string like: "c_vs_b_ctrla = (C-B)-A, e_vs_d_ctrla = (E-D)-A, de_vs_cb = (E-D)-(C-B),"
annot_df	Data frame for annotations.
libsize	I've recently figured out that libsize is far more important than I previously realized. Play with it here.
force	Force data which may not be appropriate for limma into it?
...	Use the elipsis parameter to feed options to write_limma().

Value

List including the following information: macb = the mashing together of condition/batch so you can look at it macb_model = The result of calling model.matrix(~0 + macb) macb_fit = The result of calling lmFit(data, macb_model) voom_result = The result from voom() voom_design = The design from voom (redundant from voom_result, but convenient) macb_table = A table of the number of times each condition/batch pairing happens cond_table = A table of the number of times

each condition appears (the denominator for the identities) batch_table = How many times each batch appears identities = The list of strings defining each condition by itself all_pairwise = The list of strings defining all the pairwise contrasts contrast_string = The string making up the makeContrasts() call pairwise_fits = The result from calling contrasts.fit() pairwise_comparisons = The result from eBayes() limma_result = The result from calling write_limma()

See Also

limma Biobase write_limma

Examples

```
## Not run:
 pretend <- limma_pairwise(expt)

## End(Not run)
```

`limma_scatter` *Plot arbitrary data from limma as a scatter plot.*

Description

Extract the adjusted abundances for the two conditions used in the pairw

Usage

```
limma_scatter(all_pairwise_result, first_table = 1, first_column = "logFC",
  second_table = 2, second_column = "logFC", type = "linear_scatter", ...)
```

Arguments

`all_pairwise_result`	Result from calling balanced_pairwise().
`first_table`	First table from all_pairwise_result$limma_result to look at (may be a name or number).
`first_column`	Name of the column to plot from the first table.
`second_table`	Second table inside all_pairwise_result$limma_result (name or number).
`second_column`	Column to compare against.
`type`	Type of scatter plot (linear model, distance, vanilla).
`...`	Use the elipsis to feed options to the html graphs.

Value

plot_linear_scatter() set of plots comparing the chosen columns. If you forget to specify tables to compare, it will try the first vs the second.

See Also

limma plot_linear_scatter

Examples

```
## Not run:
 compare_logFC <- limma_scatter(all_pairwise, first_table="wild_type", second_column="mutant",
                                first_table="AveExpr", second_column="AveExpr")
 compare_B <- limma_scatter(all_pairwise, first_column="B", second_column="B")

## End(Not run)
```

---

loadme *Load a backup rdata file*

Description

I often use R over a sshfs connection, sometimes with significant latency, and I want to be able to save/load my R sessions relatively quickly. Thus this function uses my backup directory to load its R environment.

Usage

```
loadme(directory = "savefiles", filename = "Rdata.rda.xz")
```

Arguments

directory	Directory containing the RData.rda.xz file.
filename	Filename to which to save.

Value

a bigger global environment

See Also

saveme load save

Examples

```
## Not run:
 loadme()

## End(Not run)
```

load_annotations *Load organism annotation data (parasite).*

Description

Creates a dataframe gene and transcript information for a given set of gene ids using the OrganismDbi interface.

Usage

```
load_annotations(orgdb, gene_ids = NULL, include_go = FALSE,
  keytype = "ENSEMBL", fields = NULL, sum_exons = FALSE)
```

Arguments

orgdb	OrganismDb instance.
gene_ids	Gene identifiers for retrieving annotations.
include_go	Ask the Dbi for gene ontology information?
keytype	mmm the key type used?
fields	Columns included in the output.
sum_exons	Perform a sum of the exons in the data set?

Details

Tested in test_45ann_organdb.R This defaults to a few fields which I have found most useful, but the brave can pass it 'all'.

Value

Table of geneids, chromosomes, descriptions, strands, types, and lengths.

See Also

AnnotationDbi GenomicFeatures BiocGenerics columns keytypes select exonsBy

Examples

```
## Not run:
 one_gene <- load_annotations(org, c("LmJF.01.0010"))

## End(Not run)
```

load_go_terms *Retrieve GO terms associated with a set of genes.*

Description

AnnotationDbi provides a reasonably complete set of GO mappings between gene ID and ontologies. This will extract that table for a given set of gene IDs.

Usage

```
load_go_terms(orgdb, gene_ids, keytype = "ENSEMBL")
```

Arguments

orgdb	OrganismDb instance.
gene_ids	Identifiers of the genes to retrieve annotations.
keytype	the mysterious keytype returns yet again to haunt my dreams

Details

Tested in test_45ann_organdb.R This is a nice way to extract GO data primarily because the Orgdb data sets are extremely fast and flexible, thus by changing the keytype argument, one may use a lot of different ID types and still score some useful ontology data.

Value

Data frame of gene IDs, go terms, and names.

See Also

AnnotationDbi GO.db magrittr select tbl_df

Examples

```
## Not run:
 go_terms <- load_go_terms(org, c("a","b"))

## End(Not run)
```

load_host_annotations *Load organism annotation data (mouse/human).*

Description

Creates a dataframe gene and transcript information for a given set of gene ids using the OrganismDbi interface.

Usage

```
load_host_annotations(orgdb, gene_ids = NULL, keytype = "ENSEMBL",
  fields = c("TXCHROM", "GENENAME", "TXSTRAND", "TXSTART", "TXEND"),
  biomart_dataset = "hsapiens_gene_ensembl")
```

Arguments

orgdb	OrganismDb instance.
gene_ids	Gene identifiers for retrieving annotations.
keytype	a, umm keytype? I need to properly read this code.
fields	Columns to include in the output.
biomart_dataset	Name of the biomaRt dataset to query for gene type.

Value

a table of gene information

See Also

AnnotationDbi dplyr biomaRt select keytypes

Examples

```
## Not run:
 host <- load_host_annotations(org, c("a","b"))

## End(Not run)
```

load_kegg_mapping *Creates a gene/KEGG mapping dataframe.*

Description

In much the same way AnnotationDbi provides GO data, it also provides KEGG data.

Usage

```
load_kegg_mapping(orgdb, gene_ids = NULL, keytype = "ENSEMBL",
  columns = c("KEGG_PATH"))
```

Arguments

orgdb	OrganismDb instance.
gene_ids	Identifiers of the genes to retrieve annotations.
keytype	The keytype, eg. the primary key used to query the orgdb.
columns	Columns to extract.

Details

Tested in test_45ann_organdb.R Perhaps this function should be merged with the GO above?

Value

Df of kegg mappings

See Also

AnnotationDbi dplyr select tbl_df

Examples

```
## Not run:
 kegg_data <- load_kegg_mapping(org, c("a","b"))

## End(Not run)
```

load_kegg_pathways *Creates a KEGG pathway/description mapping dataframe.*

Description

Use AnnotationDbi to map descriptions of KEGG pathways to gene IDs.

Usage

```
load_kegg_pathways(orgdb, gene_ids, keytype = "ENSEMBL")
```

Arguments

orgdb	OrganismDb instance.
gene_ids	Identifiers of the genes to retrieve annotations.
keytype	as per the previous functions, I don't know what this does yet

Value

Character list of pathways.

See Also

AnnotationDbi

Examples

```
## Not run:
 pathnames <- load_kegg_pathways(org, c("a","b","c")

## End(Not run)
```

load_parasite_annotations *I see no reason to have load_host_annotations and load_parasite_annotations.*

Description

Thus I am making them both into aliases to load_annotations.

Usage

```
load_parasite_annotations(...)
```

Arguments

...	Arguments to be passed to load_annotations.

local_get_value *Perform a get_value for delimited files*

Description

Keith wrote this as .get_value() but functions which start with . trouble me.

Usage

```
local_get_value(x, delimiter = ": ")
```

Arguments

x	Some stuff to split
delimiter	The tritrypdb uses ': ' ergo the default.

Value

A value!

make_exampledata *Small hack of limma's exampleData() to allow for arbitrary data set sizes.*

Description

exampleData has a set number of genes/samples it creates. This relaxes that restriction.

Usage

```
make_exampledata(ngenes = 1000, columns = 5)
```

Arguments

ngenes	How many genes in the fictional data set?
columns	How many samples in this data set?

Value

Matrix of pretend counts.

See Also

limma stats DESeq

Examples

```
## Not run:
 pretend = make_exampledata()

## End(Not run)
```

`make_id2gomap` *Make a go mapping from IDs in a format suitable for topGO.*

Description

When using a non-supported organism, one must write out mappings in the format expected by topgo. This handles that process and gives a summary of the new table.

Usage

```
make_id2gomap(goid_map = "reference/go/id2go.map", goids_df = NULL,
  overwrite = FALSE)
```

Arguments

`goid_map`	TopGO mapping file.
`goids_df`	If there is no goid_map, create it with this data frame.
`overwrite`	Rewrite the mapping file?

Value

Summary of the new goid table.

See Also

topGO

`make_limma_tables` *Writes out the results of a limma search using toptable().*

Description

However, this will do a couple of things to make one's life easier: 1. Make a list of the output, one element for each comparison of the contrast matrix 2. Write out the toptable() output for them in separate .csv files and/or sheets in excel 3. Since I have been using qvalues a lot for other stuff, add a column for them.

Usage

```
make_limma_tables(data, adjust = "fdr", n = 0, coef = NULL,
  workbook = "excel/limma.xls", excel = FALSE, csv = FALSE,
  annot_df = NULL)
```

Arguments

data	Output from eBayes().
adjust	Pvalue adjustment chosen.
n	Number of entries to report, 0 says do them all.
coef	Which coefficients/contrasts to report, NULL says do them all.
workbook	Excel filename into which to write the data.
excel	Write an excel workbook?
csv	Write out csv files of the tables?
annot_df	Optional data frame including annotation information to include with the tables.

Value

List of data frames comprising the toptable output for each coefficient, I also added a qvalue entry to these toptable() outputs.

See Also

limma qvalue write_xls topTable

Examples

```
## Not run:
 finished_comparison = eBayes(limma_output)
 data_list = write_limma(finished_comparison, workbook="excel/limma_output.xls")

## End(Not run)
```

---

make_organ *Create an organismDbi object by joining a txdb and orgdb together.*

Description

This function is a bit more fragile than I would like.

Usage

```
make_organ(txdb, keytype = NA, orgdb = NA)
```

Arguments

txdb	Txdb input to merge
keytype	When merging to an orgdb, what key to use?
orgdb	The orgdb to help create the OrganismDbi instance.

Value

An OrganismDb instance

See Also

S4Vectors GenomicFeatures AnnotationDbi OrganismDbi makePackageName

Examples

```
## Not run:
 orgdbi <- make_organ(Tcruzi_txdb, orgdb=Tcruzi_orgdb)

## End(Not run)
```

---

make_organismdbi *Create an OrganismDbi for a species at the TriTrypDb*

Description

OrganismDbi instances are pretty neat, they pull together OrgDb and TxDb. With any luck, this function provides the ability to pull together all the data from the TriTrypDb, GO.db, and KEGGREST in order to accomplish these peculiar tasks.

Usage

```
make_organismdbi(id = "lmajor_friedlin", cfg = NULL,
  output_dir = "organismdbi", ...)
```

Arguments

id	Unique tritrypdb identifier.
cfg	A configuration dataframe, when null it will be replaced by reading a csv file in inst/extdata.
output_dir	The directory into which to put the various intermediate files, including downloads from the TriTrypdb, the created OrgDb and TxDb instances, and the final OrganismDbi.
...	Extra arguments including a boolean for whether to include kegg.

Value

A path, some data files, and a kitty!

See Also

AnnotationForge OrganismDbi

Examples

```
## Not run:
 crazytown <- make_organismdbi()  ## wait a loong time

## End(Not run)
```

`make_orgdb` *Make an orgDb object from some information provided by make_orgdb_info()*

Description

An orgDb object should provide some useful annotation data including fun stuff like gene ontology, kegg, etc. In the case of the species at the TriTrypDb, much of this information is available in the species .txt file. This function takes that data and collates it into the final orgDb objects using AnnotationForge. It then makes some attempts to ensure that the resulting material created in the filesystem conforms to specifications which allow one to have multiple strains, etc. Finally, if everything goes according to plan, it calls devtools::install() and installs the resulting package.

Usage

```
make_orgdb(orgdb_info, id = "lmajor_friedlin", cfg = NULL, kegg = TRUE,
  output_dir = "organismdbi", ...)
```

Arguments

`orgdb_info`	List of data frames generated by make_orgdb_info()
`id`	Human readable species identifier, keys off the cfg data frame.
`cfg`	Configuration data extracted either from inst/eupath_configuration.csv or provided by the user.
`kegg`	Attempt adding kegg data?
`output_dir`	Base output directory for the resulting packages.
`...`	Args to pass through.

Value

List of the resulting package name(s) and whether they installed.

See Also

AnnotationForge devtools `makeOrgPackage`

Examples

```
## Not run:
 orgdb_installedp <- make_orgdb(id="tcruzi_clbrener")

## End(Not run)
```

`make_orgdb_info` *Generate the (large) set of data frames required to make functional OrgDb/TxDb/OrganismDbi objects.*

Description

This function should probably be split into a few more pieces as it is pretty unwieldy at the moment.

Usage

```
make_orgdb_info(gff, txt, kegg = TRUE)
```

Arguments

`gff`	File to read gff annotations from.
`txt`	File to read txt annotations from.
`kegg`	Boolean deciding whether to try for KEGG data.

Value

List containing gene information (likely from the txt file), chromosome information (gff file), gene types (gff file), gene ontology information, and potentially kegg information.

See Also

rtracklayer GenomicRanges

Examples

```
## Not run:
 orgdb_data <- make_orgdb_info(gff="lmajor.gff", txt="lmajor.txt")

## End(Not run)
```

`make_pairwise_contrasts` *Run makeContrasts() with all pairwise comparisons.*

Description

In order to have uniformly consistent pairwise contrasts, I decided to avoid potential human erors(sic) by having a function generate all contrasts.

Usage

```
make_pairwise_contrasts(model, conditions, do_identities = TRUE,
  do_pairwise = TRUE, extra_contrasts = NULL)
```

Arguments

`model`	Describe the conditions/batches/etc in the experiment.
`conditions`	Factor of conditions in the experiment.
`do_identities`	Include all the identity strings? Limma can use this information while edgeR can not.
`do_pairwise`	Include all pairwise strings? This shouldn't need to be set to FALSE, but just in case.
`extra_contrasts`	Optional string of extra contrasts to include.

Details

Invoked by the _pairwise() functions.

Value

List including the following information:

1. all_pairwise_contrasts = the result from makeContrasts(...)
2. identities = the string identifying each condition alone
3. all_pairwise = the string identifying each pairwise comparison alone
4. contrast_string = the string passed to R to call makeContrasts(...)
5. names = the names given to the identities/contrasts

See Also

limma `makeContrasts`

Examples

```
## Not run:
 pretend = make_pairwise_contrasts(model, conditions)

## End(Not run)
```

`make_report` *Make a knitr report with some defaults set a priori.*

Description

I keep forgetting to set appropriate options for knitr. This tries to set them.

Usage

```
make_report(name = "report", type = "pdf")
```

Arguments

`name`	Name the document!
`type`	Html or pdf reports?

Value

Dated report file.

See Also

knitr rmarkdown knitrBootstrap

`make_tooltips` *Create a simple df from a gff which contains tooltips usable in google-Vis graphs.*

Description

The tooltip column is a handy proxy for more thorough anontations information when it would otherwise be too troublesome to acquire.

Usage

```
make_tooltips(annotations, desc_col = "description", type = "gene",
  id_col = "ID", ...)
```

Arguments

annotations	Either a gff file or annotation data frame (which likely came from a gff file.).
desc_col	Gff column from which to gather data.
type	Gff type to use as the master key.
id_col	Which annotation column to cross reference against?
...	Extra arguments dropped into arglist.

Value

Df of tooltip information or name of a gff file.

See Also

googleVis gff2df

Examples

```
## Not run:
 tooltips <- make_tooltips('reference/gff/saccharomyces_cerevisiae.gff.gz')

## End(Not run)
```

---

make_txdb *Create a TxDb object given data provided by make_orgdb_info()*

Description

Much like make_orgdb() above, this uses the same data to generate a TxDb object.

Usage

```
make_txdb(orgdb_info, cfg_line, gff = NULL, from_gff = FALSE,
  output_dir = "organismdbi", ...)
```

Arguments

orgdb_info	List of data frames generated by make_orgdb_info().
cfg_line	Configuration data frame as per make_orgdb.
gff	File to read
from_gff	Use a gff file?
output_dir	Place to put rda intermediates.
...	Extra arguments to pass through.

Value

List of the resulting txDb package and whether it installed.

See Also

GenomicFeatures Biobase devtools createPackage

Examples

```
## Not run:
 txdb <- make_txdb(orgdb_output)

## End(Not run)
```

---

mdesc_table *Get the description of a microbesonline genomics table*

Description

This at least in theory is only used by get_microbesonline, but if one needs a quick and dirty SQL query it might prove useful.

Usage

```
mdesc_table(table = "Locus2Go")
```

Arguments

table	Choose a table to query.

Value

Data frame describing the relevant table

See Also

DBI dbSendQuery fetch

Examples

```
## Not run:
 description <- mdesc_table(table="Locus2Go")

## End(Not run)
```

`median_by_factor` *Create a data frame of the medians of rows by a given factor in the data.*

Description

This assumes of course that (like expressionsets) there are separate columns for each replicate of the conditions. This will just iterate through the levels of a factor describing the columns, extract them, calculate the median, and add that as a new column in a separate data frame.

Usage

```
median_by_factor(data, fact = "condition")
```

Arguments

`data`	Data frame, presumably of counts.
`fact`	Factor describing the columns in the data.

Details

Used in write_expt() as well as a few random collaborations.

Value

Data frame of the medians.

See Also

Biobase matrixStats

Examples

```
## Not run:
 compressed = median_by_factor(data, experiment$condition)

## End(Not run)
```

`model_test` *Make sure a given experimental factor and design will play together.*

Description

Have you ever wanted to set up a differential expression analysis and after minutes of the computer churning away it errors out with some weird error about rank? Then this is the function for you!

Usage

```
model_test(design, goal = "condition", factors = NULL, ...)
```

Arguments

`design`	Dataframe describing the design of the experiment.
`goal`	Experimental factor you actually want to learn about.
`factors`	Experimental factors you rather wish would just go away.
`...`	I might decide to add more options from other functions.

Value

List of booleans telling if the factors + goal will work.

See Also

`model.matrix` `qr`

`mytaxIdToOrgDb` *Create an orgdb from an taxonID*

Description

This function is a bit more fragile than I would like. I am not completely sold on AnnotationHub yet.

Usage

```
mytaxIdToOrgDb(taxid)
```

Arguments

`taxid`	TaxonID from AnnotationHub

Value

An Orgdb instance

See Also

AnnotationHub S4Vectors

Examples

```
## Not run:
 orgdbi <- mytaxIdToOrgDb(taxid)

## End(Not run)
```

`my_identifyAUBlocks` *copy/paste the function from SeqTools and figure out where it falls on its ass.*

Description

Yeah, I do not remember what I changed in this function.

Usage

```
my_identifyAUBlocks(x, min.length = 20, p.to.start = 0.8, p.to.end = 0.55)
```

Arguments

`x`	Sequence object
`min.length`	I dunno.
`p.to.start`	P to start of course
`p.to.end`	The p to end – wtf who makes names like this?

Value

a list of IRanges which contain a bunch of As and Us.

`normalize_counts` *Perform a simple normalization of a count table.*

Description

This provides shortcut interfaces for normalization functions from deseq2/edger and friends.

Usage

```
normalize_counts(data, design = NULL, norm = "raw", ...)
```

Arguments

data	Matrix of count data.
design	Dataframe describing the experimental design. (conditions/batches/etc)
norm	Normalization to perform: 'sf|quant|qsmooth|tmm|upperquartile|tmm|rle' I keep wishy-washing on whether design is a required argument.
...	More arguments might be necessary.

Value

Dataframe of normalized(counts)

See Also

edgeR limma DESeq2

Examples

```
## Not run:
 norm_table = normalize_counts(count_table, design=design, norm='qsmooth')

## End(Not run)
```

---

normalize_expt *Normalize the data of an expt object. Save the original data, and note what was done.*

Description

It is the responsibility of normalize_expt() to perform any arbitrary normalizations desired as well as to ensure that the data integrity is maintained. In order to do this, it writes the actions performed in expt$state and saves the intermediate steps of the normalization in expt$intermediate_counts. Furthermore, it should tell you every step of the normalization process, from count filtering, to normalization, conversion, transformation, and batch correction.

Usage

```
normalize_expt(expt, transform = "raw", norm = "raw", convert = "raw",
  batch = "raw", filter = FALSE, annotations = NULL, fasta = NULL,
  entry_type = "gene", use_original = FALSE, batch1 = "batch",
  batch2 = NULL, batch_step = 5, low_to_zero = FALSE, thresh = 2,
  min_samples = 2, p = 0.01, A = 1, k = 1, cv_min = 0.01,
  cv_max = 1000, ...)
```

Arguments

expt	Original expt.
transform	Transformation desired, usually log2.
norm	How to normalize the data? (raw, quant, sf, upperquartile, tmm, rle)
convert	Conversion to perform? (raw, cpm, rpkm, cp_seq_m)
batch	Batch effect removal tool to use? (limma sva fsva ruv etc)
filter	Filter out low/undesired features? (cbcb, pofa, kofa, others?)
annotations	Used for rpkm – probably not needed as this is in fData now.
fasta	Fasta file for cp_seq_m counting of oligos.
entry_type	For getting genelengths by feature type (rpkm or cp_seq_m).
use_original	Use the backup data in the expt class?
batch1	Experimental factor to extract first.
batch2	Second factor to remove (only with limma's removebatcheffect()).
batch_step	From step 1-5, when should batch correction be applied?
low_to_zero	When log transforming, change low numbers (< 0) to 0 to avoid NaN?
thresh	Used by cbcb_lowfilter().
min_samples	Also used by cbcb_lowfilter().
p	Used by genefilter's pofa().
A	Also used by genefilter's pofa().
k	Used by genefilter's kofa().
cv_min	Used by genefilter's cv().
cv_max	Also used by genefilter's cv().
...	more options

Value

Expt object with normalized data and the original data saved as 'original_expressionset'

See Also

genefilter limma sva edgeR DESeq2

Examples

```
## Not run:
 normed <- normalize_expt(exp, transform='log2', norm='rle', convert='cpm',
                          batch='raw', filter='pofa')
 normed_batch <- normalize_expt(exp, transform='log2', norm='rle', convert='cpm',
                                batch='sva', filter='pofa')

## End(Not run)
```

orgdb_idmap *Load organism annotation data (mouse/human).*

Description

Creates a dataframe gene and transcript information for a given set of gene ids using the OrganismDbi interface.

Usage

```
orgdb_idmap(orgdb, gene_ids = NULL, mapto = c("ensembl"),
  keytype = "geneid")
```

Arguments

orgdb	OrganismDb instance.
gene_ids	Gene identifiers for retrieving annotations.
mapto	Key to map the IDs against.
keytype	Choose a keytype, this will yell if it doesn't like your choice.

Value

a table of gene information

See Also

AnnotationDbi select keytypes

Examples

```
## Not run:
 host <- load_host_annotations(org, c("a","b"))

## End(Not run)
```

parse_gene_go_terms *TriTrypDB gene information table GO term parser*

Description

TriTrypDB gene information table GO term parser

Usage

```
parse_gene_go_terms(filepath, verbose = FALSE)
```

Arguments

filepath	Location of TriTrypDB gene information table.
verbose	Whether or not to enable verbose output.

Value

Returns a dataframe where each line includes a gene/GO terms pair along with some addition information about the GO term. Note that because each gene may have multiple GO terms, a single gene ID may appear on multiple lines.

Author(s)

Keith Hughitt

---

parse_gene_info_table *TriTrypDB gene information table parser*

Description

An example input file is the T. brucei Lister427 gene information table available at: http://tritrypdb.org/common/downloads/C
5.0_TbruceiLister427Gene.txt

Usage

```
parse_gene_info_table(file, verbose = FALSE)
```

Arguments

file	Location of TriTrypDB gene information table.
verbose	Whether or not to enable verbose output.

Value

Returns a dataframe of gene info.

Author(s)

Keith Hughitt

parse_go_terms *EuPathDB gene information table GO term parser*

Description

Note: EuPathDB currently includes some GO annotations corresponding to obsolete terms. For example, the L. major gene LmjF.19.1390 (http://tritrypdb.org/tritrypdb/showRecord.do?name=GeneRecordClasses.GeneReco includes the term "GO:0003702" on the website and txt data file. The term has been deprecated, and does not have a category associated with it on the website. These will not be included in the final database.

Usage

```
parse_go_terms(filepath)
```

Arguments

filepath	Location of TriTrypDB gene information table.

Value

Returns a dataframe where each line includes a gene/GO terms pair along with some addition information about the GO term. Note that because each gene may have multiple GO terms, a single gene ID may appear on multiple lines.

Author(s)

Keith Hughitt

---

parse_interpro_domains *EuPathDB gene information table InterPro domain parser*

Description

EuPathDB gene information table InterPro domain parser

Usage

```
parse_interpro_domains(filepath)
```

Arguments

filepath	Location of TriTrypDB gene information table.

Value

Returns a dataframe where each line includes a gene/domain pairs.

Author(s)

Keith Hughitt

`pattern_count_genome` *Find how many times a given pattern occurs in every gene of a genome.*

Description

There are times when knowing how many times a given string appears in a genome/CDS is helpful. This function provides that information and is primarily used by cp_seq_m().

Usage

```
pattern_count_genome(fasta, gff = NULL, pattern = "TA", type = "gene",
  key = "locus_tag")
```

Arguments

`fasta`	Genome sequence.
`gff`	Gff of annotation information from which to acquire CDS (if not provided it will just query the entire genome).
`pattern`	What to search for? This was used for tnseq and TA is the mariner insertion point.
`type`	Column to use in the gff file.
`key`	What type of entry of the gff file to key from?

Value

Data frame of gene names and number of times the pattern appears/gene.

See Also

Biostrings Rsamtools Rsamtools `FaFile` `getSeq` `PDict` `vcountPDict`

Examples

```
## Not run:
 num_pattern = pattern_count_genome('mgas_5005.fasta', 'mgas_5005.gff')

## End(Not run)
```

pca_highscores *Get the highest/lowest scoring genes for every principle component.*

Description

This function uses princomp to acquire a principle component biplot for some data and extracts a dataframe of the top n genes for each component by score.

Usage

```
pca_highscores(df = NULL, conditions = NULL, batches = NULL, n = 20)
```

Arguments

df	a dataframe of (pseudo)counts
conditions	a factor or character of conditions in the experiment.
batches	a factor or character of batches in the experiment.
n	the number of genes to extract.

Value

a list including the princomp biplot, histogram, and tables of top/bottom n scored genes with their scores by component.

See Also

stats princomp

Examples

```
## Not run:
 information <- pca_highscores(df=df, conditions=cond, batches=bat)
 information$pca_bitplot  ## oo pretty

## End(Not run)
```

pca_information *Gather information about principle components.*

Description

Calculate some information useful for generating PCA plots. pca_information seeks to gather together interesting information to make principle component analyses easier, including: the results from (fast.)svd, a table of the r^2 values, a table of the variances in the data, coordinates used to make a pca plot for an arbitrarily large set of PCs, correlations and fstats between experimental factors and the PCs, and heatmaps describing these relationships. Finally, it will provide a plot showing how much of the variance is provided by the top-n genes and (optionally) the set of all PCA plots with respect to one another. (PCx vs. PCy)

Usage

```
pca_information(expt_data, expt_design = NULL, expt_factors = c("condition",
  "batch"), num_components = NULL, plot_pcas = FALSE)
```

Arguments

expt_data	the data to analyze (usually exprs(somedataset)).
expt_design	a dataframe describing the experimental design, containing columns with useful information like the conditions, batches, number of cells, whatever...
expt_factors	a character list of experimental conditions to query for R^2 against the fast.svd of the data.
num_components	a number of principle components to compare the design factors against. If left null, it will query the same number of components as factors asked for.
plot_pcas	plot the set of PCA plots for every pair of PCs queried.

Value

a list of fun pca information: svd_u/d/v: The u/d/v parameters from fast.svd rsquared_table: A table of the rsquared values between each factor and principle component pca_variance: A table of the pca variances pca_data: Coordinates for a pca plot pca_cor: A table of the correlations between the factors and principle components anova_fstats: the sum of the residuals with the factor vs without (manually calculated) anova_f: The result from performing anova(withfactor, withoutfactor), the F slot anova_p: The p-value calculated from the anova() call anova_sums: The RSS value from the above anova() call cor_heatmap: A heatmap from recordPlot() describing pca_cor.

Warning

This function has gotten too damn big and needs to be split up.

See Also

corpcor stats fast.svd, lm

Examples

```
## Not run:
 pca_info = pca_information(exprs(some_expt$expressionset), some_design, "all")
 pca_info

## End(Not run)
```

`pcRes` *Compute variance of each principal component and how they correlate with batch and cond*

Description

This was copy/pasted from cbcbSEQ https://github.com/kokrah/cbcbSEQ/blob/master/R/explore.R

Usage

```
pcRes(v, d, condition = NULL, batch = NULL)
```

Arguments

`v`	from makeSVD
`d`	from makeSVD
`condition`	factor describing experiment
`batch`	factor describing batch

Value

A dataframe containig variance, cum. variance, cond.R-sqrd, batch.R-sqrd

See Also

`plot_pca`

pct_all_kegg *Extract the percent differentially expressed genes for all KEGG pathways.*

Description

KEGGgraph provides some interesting functionality for mapping KEGGids and examining the pieces. This attempts to use that in order to evaluate how many 'significant' genes are in a given pathway.

Usage

```
pct_all_kegg(all_ids, sig_ids, organism = "dme", pathways = "all",
  pathdir = "kegg_pathways", verbose = FALSE, ...)
```

Arguments

all_ids	Set of all gene IDs in a given analysis.
sig_ids	Set of significant gene IDs.
organism	KEGG organism identifier.
pathways	What pathways to look at?
pathdir	Directory into which to copy downloaded pathway files.
verbose	Talky talky?
...	Options I might pass from other functions are dropped into arglist.

Value

Dataframe including the filenames, percentages, nodes included, and differential nodes.

See Also

KEGGgraph KEGGREST

pct_kegg_diff *Extract the percent differentially expressed genes in a given KEGG pathway.*

Description

KEGGgraph provides some interesting functionality for mapping KEGGids and examining the pieces. This attempts to use that in order to evaluate how many 'significant' genes are in a given pathway.

Usage

```
pct_kegg_diff(all_ids, sig_ids, pathway = "00500", organism = "dme",
  pathdir = "kegg_pathways", ...)
```

Arguments

all_ids	Set of all gene IDs in a given analysis.
sig_ids	Set of significant gene IDs.
pathway	Numeric pathway identifier.
organism	KEGG organism identifier.
pathdir	Directory into which to copy downloaded pathway files.
...	Options I might pass from other functions are dropped into arglist.

Value

Percent genes/pathway deemed significant.

See Also

KEGGgraph KEGGREST

---

pkg_cleaner *Cleans up illegal characters in packages generated by make_organismdbi(), make_orgdb(), and make_txdb(). This attempts to fix some of the common problems therein.*

Description

OrganismDbi instances are pretty neat, they pull together OrgDb and TxDb. With any luck, this function provides the ability to pull together all the data from the TriTrypDb, GO.db, and KEGGREST in order to accomplish these peculiar tasks.

Usage

```
pkg_cleaner(path, removal = "-like", replace = "")
```

Arguments

path	Location for the original Db/Dbi instance.
removal	String to remove from the instance.
replace	What to replace removal with, when necessary.

Value

A new OrgDb/TxDb/OrganismDbi

Examples

```
## Not run:
 crazytown <- make_organismdbi()  ## wait a loong time

## End(Not run)
```

---

plot_batchsv *Make a dotplot of known batches vs. SVs.*

Description

This should make a quick df of the factors and surrogates and plot them. Maybe it should be folded into plot_svfactor? Hmm, I think first I will write this and see if it is better.

Usage

```
plot_batchsv(expt, svs, batch_column = "batch", factor_type = "factor")
```

Arguments

expt	Experiment from which to acquire the design, counts, etc.
svs	Set of surrogate variable estimations from sva/svg or batch estimates.
batch_column	Which experimental design column to use?
factor_type	This may be a factor or range, it is intended to plot a scatterplot if it is a range, a dotplot if a factor.

Value

Plot of batch vs surrogate variables as per Leek's work.

See Also

sva ggplot2

Examples

```
## Not run:
 estimate_vs_snps <- plot_batchsv(start, surrogate_estimate, "snpcategory")

## End(Not run)
```

plot_bcv *Steal edgeR's plotBCV() and make it a ggplot2.*

Description

This was written primarily to understand what that function is doing in edgeR.

Usage

```
plot_bcv(data)
```

Arguments

data	A dataframe/expt/exprs with count data

Value

a plot! of the BCV a la ggplot2.

See Also

edgeR plotBCV

Examples

```
## Not run:
 bcv <- plot_bcv(expt)
 summary(bcv$data)
 bcv$plot

## End(Not run)
```

plot_boxplot *Make a ggplot boxplot of a set of samples.*

Description

Boxplots and density plots provide complementary views of data distributions. The general idea is that if the box for one sample is significantly shifted from the others, then it is likely an outlier in the same way a density plot shifted is an outlier.

Usage

```
plot_boxplot(data, colors = NULL, names = NULL, title = NULL,
  scale = NULL, ...)
```

Arguments

data	Expt or data frame set of samples.
colors	Color scheme, if not provided will make its own.
names	Another version of the sample names for printing.
title	A title!
scale	Whether to log scale the y-axis.
...	More parameters are more fun!

Value

Ggplot2 boxplot of the samples. Each boxplot contains the following information: a centered line describing the median value of counts of all genes in the sample, a box around the line describing the inner-quartiles around the median (quartiles 2 and 3 for those who are counting), a vertical line above/below the box which shows 1.5x the inner quartile range (a common metric of the non-outliers), and single dots for each gene which is outside that range. A single dot is transparent.

See Also

ggplot2 reshape2 geom_boxplot `melt` `scale_x_discrete`

Examples

```
## Not run:
 a_boxplot <- plot_boxplot(expt)
 a_boxplot  ## ooo pretty boxplot look at the lines

## End(Not run)
```

---

plot_corheat *Make a heatmap.3 description of the correlation between samples.*

Description

Given a set of count tables and design, this will calculate the pairwise correlations and plot them as a heatmap. It attempts to standardize the inputs and eventual output.

Usage

```
plot_corheat(expt_data, expt_colors = NULL, expt_design = NULL,
  method = "pearson", expt_names = NULL, batch_row = "batch",
  title = NULL, ...)
```

Arguments

expt_data	Dataframe, expt, or expressionset to work with.
expt_colors	Color scheme for the samples, not needed if this is an expt.
expt_design	Design matrix describing the experiment, not needed if this is an expt.
method	Correlation statistic to use. (pearson, spearman, kendall, robust).
expt_names	Alternate names to use for the samples.
batch_row	Name of the design row used for 'batch' column colors.
title	Title for the plot.
...	More options are wonderful!

Value

Gplots heatmap describing describing how the samples are clustering vis a vis pairwise correlation.

See Also

grDevice hpgl_cor brewer.pal recordPlot

Examples

```
## Not run:
 corheat_plot <- hpgl_corheat(expt=expt, method="robust")

## End(Not run)
```

---

plot_density *Create a density plot, showing the distribution of each column of data.*

Description

Density plots and boxplots are cousins and provide very similar views of data distributions. Some people like one, some the other. I think they are both colorful and fun!

Usage

```
plot_density(data, colors = NULL, sample_names = NULL,
  position = "identity", fill = NULL, title = NULL, scale = NULL,
  colors_by = "condition")
```

Arguments

data	Expt, expressionset, or data frame.
colors	Color scheme to use.
sample_names	Names of the samples.
position	How to place the lines, either let them overlap (identity), or stack them.
fill	Fill the distributions? This might make the plot unreasonably colorful.
title	Title for the plot.
scale	Plot on the log scale?
colors_by	Factor for coloring the lines

Value

Ggplot2 density plot!

See Also

ggplot2 geom_density

Examples

```
## Not run:
 funkytown <- plot_density(data)

## End(Not run)
```

---

plot_disheat *Make a heatmap.3 description of the distances (euclidean by default) between samples.*

Description

Given a set of count tables and design, this will calculate the pairwise distances and plot them as a heatmap. It attempts to standardize the inputs and eventual output.

Usage

```
plot_disheat(expt_data, expt_colors = NULL, expt_design = NULL,
  method = "euclidean", expt_names = NULL, batch_row = "batch",
  title = NULL, ...)
```

Arguments

expt_data	Dataframe, expt, or expressionset to work with.
expt_colors	Color scheme (not needed if an expt is provided).
expt_design	Design matrix (not needed if an expt is provided).
method	Distance metric to use.
expt_names	Alternate names to use for the samples.
batch_row	Name of the design row used for 'batch' column colors.
title	Title for the plot.
...	More parameters!

Value

a recordPlot() heatmap describing the distance between samples.

See Also

RColorBrewer brewer.pal heatmap.2 recordPlot

Examples

```
## Not run:
 disheat_plot = plot_disheat(expt=expt, method="euclidean")

## End(Not run)
```

---

plot_dist_scatter *Make a scatter plot between two sets of numbers with a cheesy distance metric and some statistics of the two sets.*

Description

The distance metric should be codified and made more intelligent. Currently it creates a dataframe of distances which are absolute distances from each axis, multiplied by each other, summed by axis, then normalized against the maximum.

Usage

```
plot_dist_scatter(df, tooltip_data = NULL, gvis_filename = NULL, size = 2)
```

Arguments

df	Dataframe likely containing two columns.
tooltip_data	Df of tooltip information for gvis graphs.
gvis_filename	Filename to write a fancy html graph.
size	Size of the dots.

Value

Ggplot2 scatter plot. This plot provides a "bird's eye" view of two data sets. This plot assumes the two data structures are not correlated, and so it calculates the median/mad of each axis and uses these to calculate a stupid, home-grown distance metric away from both medians. This distance metric is used to color dots which are presumed the therefore be interesting because they are far from 'normal.' This will make a fun clicky googleVis graph if requested.

See Also

ggplot2 plot_gvis_scatter geom_point plot_linear_scatter

Examples

```
## Not run:
 dist_scatter(lotsofnumbers_intwo_columns, tooltip_data=tooltip_dataframe,
                   gvis_filename="html/fun_scatterplot.html")

## End(Not run)
```

---

plot_epitrochoid *Make epitrochoid plots!*

Description

7, 2, 6, 7 should give a pretty result.

Usage

```
plot_epitrochoid(radius_a = 7, radius_b = 2, dist_b = 6,
  revolutions = 7, increments = 6480)
```

Arguments

radius_a	Radius of the major circle
radius_b	And the smaller circle.
dist_b	between b and the drawing point.
revolutions	How many times to revolve through the spirograph.
increments	How many dots to lay down while writing.

plot_essentiality *Plot the essentiality of a library as per DeJesus et al.*

Description

This provides a plot of the essentiality metrics 'zbar' with respect to gene.

Usage

```
plot_essentiality(file)
```

Arguments

file	a file created using the perl script 'essentiality_tas.pl'

Value

A couple of plots

See Also

ggplot2

plot_fun_venn *A quick wrapper around venneuler to help label stuff*

Description

venneuler makes pretty venn diagrams, but no labels!

Usage

```
plot_fun_venn(ones = c(), twos = c(), threes = c(), fours = c(),
  fives = c(), factor = 0.9)
```

Arguments

ones	Character list of singletone categories
twos	Character list of doubletone categories
threes	Character list of tripletone categories
fours	Character list of quad categories
fives	Character list of quint categories
factor	Currently unused, but intended to change the radial distance to the label from the center of each circle.

Value

Two element list containing the venneuler data and the plot.

See Also

venneuler

`plot_goseq_pval` *Make a pvalue plot from goseq data.*

Description

With minor changes, it is possible to push the goseq results into a clusterProfiler-ish pvalue plot. This handles those changes and returns the ggplot results.

Usage

```
plot_goseq_pval(goterms, wrapped_width = 30, cutoff = 0.1, n = 30,
  mincat = 5, level = NULL)
```

Arguments

`goterms`	Some data from goseq!
`wrapped_width`	Number of characters before wrapping to help legibility.
`cutoff`	Pvalue cutoff for the plot.
`n`	How many groups to include?
`mincat`	Minimum size of the category for inclusion.
`level`	Levels of the ontology tree to use.

Value

Plots!

See Also

goseq clusterProfiler `goseq` `plot_ontpval`

plot_gostats_pval *Make a pvalue plot similar to that from clusterprofiler from gostats data.*

Description

clusterprofiler provides beautiful plots describing significantly overrepresented categories. This function attempts to expand the repetoire of data available to them to include data from gostats. The pval_plot function upon which this is based now has a bunch of new helpers now that I understand how the ontology trees work better, this should take advantage of that, but currently does not.

Usage

```
plot_gostats_pval(gs_result, wrapped_width = 20, cutoff = 0.1, n = 12,
  group_minsize = 5)
```

Arguments

gs_result	Ontology search results.
wrapped_width	Make the text large enough to read.
cutoff	What is the maximum pvalue allowed?
n	How many groups to include in the plot?
group_minsize	Minimum group size before inclusion.

Value

Plots!

See Also

clusterProfiler plot_ontpval

plot_gprofiler_pval *Make a pvalue plot from gprofiler data.*

Description

The p-value plots from clusterProfiler are pretty, this sets the gprofiler data into a format suitable for plotting in that fashion and returns the resulting plots of significant ontologies.

Usage

```
plot_gprofiler_pval(gp_result, wrapped_width = 30, cutoff = 0.1, n = 30,
  group_minsize = 5, scorer = "recall", ...)
```

Arguments

gp_result	Some data from gProfiler.
wrapped_width	Maximum width of the text names.
cutoff	P-value cutoff for the plots.
n	Maximum number of ontologies to include.
group_minsize	Minimum ontology group size to include.
scorer	Which column to use for scoring the data.
...	Options I might pass from other functions are dropped into arglist.

Value

List of MF/BP/CC pvalue plots.

See Also

topgo clusterProfiler

---

plot_gvis_ma *Make an html version of an MA plot: M(log ratio of conditions) / A(mean average).*

Description

A fun snippet from wikipedia: "In many microarray gene expression experiments, an underlying assumption is that most of the genes would not see any change in their expression therefore the majority of the points on the y-axis (M) would be located at 0, since Log(1) is 0. If this is not the case, then a normalization method such as LOESS should be applied to the data before statistical analysis. If the median line is not straight, the data should be normalized.

Usage

```
plot_gvis_ma(df, tooltip_data = NULL, filename = "html/gvis_ma_plot.html",
  base_url = "", ...)
```

Arguments

df	Data frame of counts which have been normalized counts by sample-type, which is to say the output from voom/voomMod/hpgl_voom().
tooltip_data	Df of tooltip information (gene names, etc).
filename	Filename to write a fancy html graph.
base_url	String with a basename used for generating URLs for clicking dots on the graph.
...	more options are more options!

Value

NULL, but along the way an html file is generated which contains a googleVis MA plot. See plot_de_ma() for details.

See Also

googleVis plot_ma_de

Examples

```
## Not run:
 plot_gvis_ma(df, filename="html/fun_ma_plot.html",
              base_url="http://yeastgenome.org/accession?")

## End(Not run)
```

---

plot_gvis_scatter *Make an html version of a scatter plot.*

Description

Given an arbitrary scatter plot, we can make it pretty and javascript-tacular using this function.

Usage

```
plot_gvis_scatter(df, tooltip_data = NULL,
  filename = "html/gvis_scatter.html", base_url = "", trendline = NULL)
```

Arguments

df	Df of two columns to compare.
tooltip_data	Df of tooltip information for gvis graphs.
filename	Filename to write a fancy html graph.
base_url	Url to send click events which will be suffixed with the gene name.
trendline	Add a trendline?

Value

NULL, but along the way an html file is generated which contains a googleVis scatter plot. See plot_scatter() for details.

See Also

googleVis gvisScatterChart

Examples

```
## Not run:
 gvis_scatter(a_dataframe_twocolumns, filename="html/fun_scatter_plot.html",
              base_url="http://yeastgenome.org/accession?")

## End(Not run)
```

`plot_gvis_volcano` *Make an html version of an volcano plot.*

Description

Volcano plots provide some visual clues regarding the success of a given contrast. For our data, it has the -log10(pvalue) on the y-axis and fold-change on the x. Here is a neat snippet from wikipedia describing them generally: "The concept of volcano plot can be generalized to other applications, where the x-axis is related to a measure of the strength of a statistical signal, and y-axis is related to a measure of the statistical significance of the signal."

Usage

```
plot_gvis_volcano(toptable_data, fc_cutoff = 0.8, p_cutoff = 0.05,
  tooltip_data = NULL, filename = "html/gvis_vol_plot.html",
  base_url = "", ...)
```

Arguments

`toptable_data`	Df of toptable() data.
`fc_cutoff`	Fold change cutoff.
`p_cutoff`	Maximum p value to allow.
`tooltip_data`	Df of tooltip information.
`filename`	Filename to write a fancy html graph.
`base_url`	String with a basename used for generating URLs for clicking dots on the graph.
`...`	more options

Value

NULL, but along the way an html file is generated which contains a googleVis volcano plot.

See Also

googleVis `plot_volcano`

Examples

```
## Not run:
 plot_gvis_volcano(voomed_data, toptable_data, filename="html/fun_ma_plot.html",
                   base_url="http://yeastgenome.org/accession?")

## End(Not run)
```

`plot_heatmap` *Make a heatmap.3 plot, does the work for plot_disheat and plot_corheat.*

Description

This does what is says on the tin. Sets the colors for correlation or distance heatmaps, handles the calculation of the relevant metrics, and plots the heatmap.

Usage

```
plot_heatmap(expt_data, expt_colors = NULL, expt_design = NULL,
  method = "pearson", expt_names = NULL, type = "correlation",
  batch_row = "batch", title = NULL, ...)
```

Arguments

`expt_data`	Dataframe, expt, or expressionset to work with.
`expt_colors`	Color scheme for the samples.
`expt_design`	Design matrix describing the experiment vis a vis conditions and batches.
`method`	Distance or correlation metric to use.
`expt_names`	Alternate names to use for the samples.
`type`	Defines the use of correlation, distance, or sample heatmap.
`batch_row`	Name of the design row used for 'batch' column colors.
`title`	Title for the plot.
`...`	I like elipses!

Value

a recordPlot() heatmap describing the distance between samples.

See Also

RColorBrewer `brewer.pal` `recordPlot`

plot_heatplus *Potential replacement for heatmap.2 based plots.*

Description

Heatplus is an interesting tool, I have a few examples of using it and intend to include them here.

Usage

```
plot_heatplus(fundata)
```

Arguments

fundata	A data frame to plot.

plot_histogram *Make a pretty histogram of something.*

Description

A shortcut to make a ggplot2 histogram which makes an attempt to set reasonable bin widths and set the scale to log if that seems a good idea.

Usage

```
plot_histogram(df, binwidth = NULL, log = FALSE, bins = 500,
  fillcolor = "darkgrey", color = "black")
```

Arguments

df	Dataframe of lots of pretty numbers.
binwidth	Width of the bins for the histogram.
log	Replot on the log scale?
bins	Number of bins for the histogram.
fillcolor	Change the fill colors of the plotted elements?
color	Change the color of the lines of the plotted elements?

Value

Ggplot histogram.

See Also

ggplot2 geom_histogram geom_density

Examples

```
## Not run:
 kittytime = plot_histogram(df)

## End(Not run)
```

`plot_hypotrochoid` *Make hypotrochoid plots!*

Description

3,7,1 should give the classic 7 leaf clover

Usage

```
plot_hypotrochoid(radius_a = 3, radius_b = 7, dist_b = 1,
  revolutions = 7, increments = 6480)
```

Arguments

`radius_a`	Radius of the major circle
`radius_b`	And the smaller circle.
`dist_b`	between b and the drawing point.
`revolutions`	How many times to revolve through the spirograph.
`increments`	How many dots to lay down while writing.

`plot_legend` *Scab the legend from a PCA plot and print it alone*

Description

This way I can have a legend object to move about.

Usage

```
plot_legend(stuff)
```

Arguments

`stuff`	This can take either a ggplot2 pca plot or some data from which to make one.

Value

A legend!

plot_libsize *Make a ggplot graph of library sizes.*

Description

It is often useful to have a quick view of which samples have more/fewer reads. This does that and maintains one's favorite color scheme and tries to make it pretty!

Usage

```
plot_libsize(data, colors = NULL, names = NULL, text = TRUE,
  title = NULL, yscale = NULL, ...)
```

Arguments

data	Expt, dataframe, or expressionset of samples.
colors	Color scheme if the data is not an expt.
names	Alternate names for the x-axis.
text	Add the numeric values inside the top of the bars of the plot?
title	Title for the plot.
yscale	Whether or not to log10 the y-axis.
...	More parameters for your good time!

Value

a ggplot2 bar plot of every sample's size

See Also

ggplot2 geom_bar geom_text prettyNum scale_y_log10

Examples

```
## Not run:
 libsize_plot <- plot_libsize(expt=expt)
 libsize_plot  ## ooo pretty bargraph

## End(Not run)
```

`plot_linear_scatter` *Make a scatter plot between two groups with a linear model superimposed and some supporting statistics.*

Description

Make a scatter plot between two groups with a linear model superimposed and some supporting statistics.

Usage

```
plot_linear_scatter(df, tooltip_data = NULL, gvis_filename = NULL,
  cormethod = "pearson", size = 2, loess = FALSE, identity = FALSE,
  gvis_trendline = NULL, first = NULL, second = NULL, base_url = NULL,
  pretty_colors = TRUE, color_high = NULL, color_low = NULL, ...)
```

Arguments

`df`	Dataframe likely containing two columns.
`tooltip_data`	Df of tooltip information for gvis graphs.
`gvis_filename`	Filename to write a fancy html graph.
`cormethod`	What type of correlation to check?
`size`	Size of the dots on the plot.
`loess`	Add a loess estimation?
`identity`	Add the identity line?
`gvis_trendline`	Add a trendline to the gvis plot? There are a couple possible types, I think linear is the most common.
`first`	First column to plot.
`second`	Second column to plot.
`base_url`	Base url to add to the plot.
`pretty_colors`	Colors!
`color_high`	Chosen color for points significantly above the mean.
`color_low`	Chosen color for points significantly below the mean.
`...`	Extra args likely used for choosing significant genes.

Value

List including a ggplot2 scatter plot and some histograms. This plot provides a "bird's eye" view of two data sets. This plot assumes a (potential) linear correlation between the data, so it calculates the correlation between them. It then calculates and plots a robust linear model of the data using an 'SMDM' estimator (which I don't remember how to describe, just that the document I was reading said it is good). The median/mad of each axis is calculated and plotted as well. The distance from the linear model is finally used to color the dots on the plot. Histograms of each axis are plotted separately and then together under a single cdf to allow tests of distribution similarity. This will make a fun clicky googleVis graph if requested.

See Also

robust stats ggplot2 lmRob weights plot_histogram

Examples

```
## Not run:
 plot_linear_scatter(lotsofnumbers_intwo_columns, tooltip_data=tooltip_dataframe,
                     gvis_filename="html/fun_scatterplot.html")

## End(Not run)
```

---

plot_ma_de *Make a pretty MA plot from one of limma, deseq, edger, or basic.*

Description

Because I can never remember, the following from wikipedia: "An MA plot is an application of a Bland-Altman plot for visual representation of two channel DNA microarray gene expression data which has been transformed onto the M (log ratios) and A (mean average) scale."

Usage

```
plot_ma_de(table, expr_col = "logCPM", fc_col = "logFC", p_col = "qvalue",
  pval_cutoff = 0.05, alpha = 0.4, logfc_cutoff = 1,
  label_numbers = TRUE, size = 2, tooltip_data = NULL,
  gvis_filename = NULL, ...)
```

Arguments

table	Df of linear-modelling, normalized counts by sample-type,
expr_col	Column showing the average expression across genes.
fc_col	Column showing the logFC for each gene.
p_col	Column containing the relevant p values.
pval_cutoff	Name of the pvalue column to use for cutoffs.
alpha	How transparent to make the dots.
logfc_cutoff	Fold change cutoff.
label_numbers	Show how many genes were 'significant', 'up', and 'down'?
size	How big are the dots?
tooltip_data	Df of tooltip information for gvis.
gvis_filename	Filename to write a fancy html graph.
...	More options for you

Value

ggplot2 MA scatter plot. This is defined as the rowmeans of the normalized counts by type across all sample types on the x axis, and the log fold change between conditions on the y-axis. Dots are colored depending on if they are 'significant.' This will make a fun clicky googleVis graph if requested.

See Also

limma googleVis DESeq2 edgeR plot_gvis_ma toptable voom hpgl_voom lmFit makeContrasts contrasts.fit

Examples

```
 ## Not run:
  plot_ma(voomed_data, toptable_data, gvis_filename="html/fun_ma_plot.html")
  ## Currently this assumes that a variant of toptable was used which
  ## gives adjusted p-values.  This is not always the case and I should
  ## check for that, but I have not yet.

## End(Not run)
```

---

plot_multihistogram *Make a pretty histogram of multiple datasets.*

Description

If there are multiple data sets, it might be useful to plot them on a histogram together and look at the t.test results between distributions.

Usage

```
plot_multihistogram(data, log = FALSE, binwidth = NULL, bins = NULL)
```

Arguments

data	Dataframe of lots of pretty numbers, this also accepts lists.
log	Plot the data on the log scale?
binwidth	Set a static bin width with an unknown # of bins? If neither of these are provided, then bins is set to 500, if both are provided, then bins wins.
bins	Set a static # of bins of an unknown width?

Value

List of the ggplot histogram and some statistics describing the distributions.

See Also

ggplot2 pairwise.t.test ddply

Examples

```
## Not run:
 kittytime = plot_multihistogram(df)

## End(Not run)
```

`plot_multiplot` *Make a grid of plots.*

Description

Make a grid of plots.

Usage

```
plot_multiplot(plots, file, cols = NULL, layout = NULL)
```

Arguments

`plots`	a list of plots
`file`	a file to write to
`cols`	the number of columns in the grid
`layout`	set the layout specifically

Value

a multiplot!

`plot_nonzero` *Make a ggplot graph of the number of non-zero genes by sample.*

Description

This puts the number of genes with > 0 hits on the y-axis and CPM on the x-axis. Made by Ramzi Temanni <temanni at umd dot edu>.

Usage

```
plot_nonzero(data, design = NULL, colors = NULL, labels = NULL,
  title = NULL, ...)
```

Arguments

data	Expt, expressionset, or dataframe.
design	Eesign matrix.
colors	Color scheme.
labels	How do you want to label the graph? 'fancy' will use directlabels() to try to match the labels with the positions without overlapping anything else will just stick them on a 45' offset next to the graphed point.
title	Add a title?
...	rawr!

Value

a ggplot2 plot of the number of non-zero genes with respect to each library's CPM.

See Also

ggplot2 geom_point geom_dl

Examples

```
## Not run:
 nonzero_plot = plot_nonzero(expt=expt)
 nonzero_plot  ## ooo pretty

## End(Not run)
```

---

plot_num_siggenes *Given a DE table with fold changes and p-values, show how 'significant' changes with changing cutoffs.*

Description

Sometimes one might want to know how many genes are deemed significant while shifting the bars which define significant. This provides that metrics as a set of tables of numbers of significant up/down genes when p-value is held constant, as well as number when fold-change is held constant.

Usage

```
plot_num_siggenes(table, p_column = "limma_adjp", fc_column = "limma_logfc",
  bins = 100, constant_p = 0.05, constant_fc = 0)
```

Arguments

table	DE table to examine.
p_column	Column in the DE table defining the changing p-value cutoff.
fc_column	Column in the DE table defining the changing +/- log fold change.
bins	Number of incremental changes in p-value/FC to examine.
constant_p	When plotting changing FC, where should the p-value be held?
constant_fc	When plotting changing p, where should the FC be held?

Value

Plots and dataframes describing the changing definition of 'significant.'

See Also

ggplot2

Examples

```
## Not run:
 crazy_sigplots <- plot_num_siggenes(pairwise_result)

## End(Not run)
```

---

plot_ontpval *Make a pvalue plot from a df of IDs, scores, and p-values.*

Description

This function seeks to make generating pretty pvalue plots as shown by clusterprofiler easier.

Usage

```
plot_ontpval(df, ontology = "MF", fontsize = 16)
```

Arguments

df	Some data from topgo/goseq/clusterprofiler.
ontology	Ontology to plot (MF,BP,CC).
fontsize	Fiddling with the font size may make some plots more readable.

Value

Ggplot2 plot of pvalues vs. ontology.

See Also

goseq ggplot2 goseq

plot_pairwise_ma *Plot all pairwise MA plots in an experiment.*

Description

Use affy's ma.plot() on every pair of columns in a data set to help diagnose problematic samples.

Usage

```
plot_pairwise_ma(data, log = NULL, ...)
```

Arguments

data	Expt expressionset or data frame.
log	Is the data in log format?
...	Options are good and passed to arglist().

Value

List of affy::maplots

See Also

affy ma.plot

Examples

```
## Not run:
 ma_plots = plot_pairwise_ma(expt=some_expt)

## End(Not run)
```

plot_pca *Make a ggplot PCA plot describing the samples' clustering.*

Description

Make a ggplot PCA plot describing the samples' clustering.

Usage

```
plot_pca(data, design = NULL, plot_colors = NULL, plot_labels = NULL,
  plot_title = NULL, plot_size = 5, size_column = NULL, ...)
```

Arguments

data	an expt set of samples.
design	a design matrix and.
plot_colors	a color scheme.
plot_labels	add labels? Also, what type? FALSE, "default", or "fancy".
plot_title	a title for the plot.
plot_size	size for the glyphs on the plot.
size_column	use an experimental factor to size the glyphs of the plot
...	arglist from elipsis!

Value

a list containing the following:

1. pca = the result of fast.svd()
2. plot = ggplot2 pca_plot describing the principle component analysis of the samples.
3. table = a table of the PCA plot data
4. res = a table of the PCA res data
5. variance = a table of the PCA plot variance

See Also

directlabels geom_dl plot_pcs

Examples

```
## Not run:
 pca_plot <- plot_pca(expt=expt)
 pca_plot

## End(Not run)
```

---

plot_pcfactor *make a dotplot of some categorised factors and a set of principle components.*

Description

This should make a quick df of the factors and PCs and plot them.

Usage

```
plot_pcfactor(pc_df, expt, exp_factor = "condition", component = "PC1")
```

Arguments

pc_df	Df of principle components.
expt	Expt containing counts, metadata, etc.
exp_factor	Experimental factor to compare against.
component	Which principal component to compare against?

Value

Plot of principle component vs factors in the data

See Also

ggplot2

Examples

```
## Not run:
 estimate_vs_pcs <- plot_pcfactor(pcs, times)

## End(Not run)
```

---

plot_pcs *A quick and dirty PCA plotter of arbitrary components against one another.*

Description

A quick and dirty PCA plotter of arbitrary components against one another.

Usage

```
plot_pcs(pca_data, first = "PC1", second = "PC2", variances = NULL,
  design = NULL, plot_title = TRUE, plot_labels = NULL, plot_size = 5,
  size_column = NULL, ...)
```

Arguments

pca_data	a dataframe of principle components PC1 .. PCN with any other arbitrary information.
first	principle component PCx to put on the x axis.
second	principle component PCy to put on the y axis.
variances	a list of the percent variance explained by each component.
design	the experimental design with condition batch factors.
plot_title	a title for the plot.
plot_labels	a parameter for the labels on the plot.

plot_size	The size of the dots on the plot
size_column	an experimental factor to use for sizing the glyphs
...	extra arguments dropped into arglist

Value

a ggplot2 PCA plot

See Also

ggplot2 geom_dl

Examples

```
## Not run:
 pca_plot = plot_pcs(pca_data, first="PC2", second="PC4", design=expt$design)

## End(Not run)
```

---

plot_qq_all *Quantile/quantile comparison of the mean of all samples vs. each sample.*

Description

This allows one to visualize all individual data columns against the mean of all columns of data in order to see if any one is significantly different than the cloud.

Usage

```
plot_qq_all(data, labels = "short")
```

Arguments

data	Expressionset, expt, or dataframe of samples.
labels	What kind of labels to print?

Value

List containing: logs = a recordPlot() of the pairwise log qq plots. ratios = a recordPlot() of the pairwise ratio qq plots. means = a table of the median values of all the summaries of the qq plots.

See Also

Biobase

plot_qq_all_pairwise *Perform qq plots of every column against every other column of a dataset.*

Description

This function is stupid, don't use it. It makes more sense to just use plot_qq, however I am not quite read to delete this function yet.

Usage

```
plot_qq_all_pairwise(data)
```

Arguments

data	Dataframe to perform pairwise qqplots with.

Value

List containing the recordPlot() output of the ratios, logs, and means among samples.

See Also

Biobase

plot_qq_plot *Perform a qqplot between two columns of a matrix.*

Description

Given two columns of data, how well do the distributions match one another? The answer to that question may be visualized through a qq plot!

Usage

```
plot_qq_plot(data, x = 1, y = 2, labels = TRUE)
```

Arguments

data	Data frame/expt/expressionset.
x	First column to compare.
y	Second column to compare.
labels	Include the lables?

Value

a list of the logs, ratios, and mean between the plots as ggplots.

See Also

Biobase

`plot_rpm` *Make relatively pretty bar plots of coverage in a genome.*

Description

This was written for ribosome profiling coverage / gene. It should however, work for any data with little or no modification.

Usage

```
plot_rpm(input, workdir = "images", output = "01.svg",
  name = "LmjF.01.0010", start = 1000, end = 2000, strand = 1,
  padding = 100)
```

Arguments

`input`	Coverage / position filename.
`workdir`	Where to put the resulting images.
`output`	Output image filename.
`name`	Gene name to print at the bottom of the plot.
`start`	Relative to 0, where is the gene's start codon.
`end`	Relative to 0, where is the gene's stop codon.
`strand`	Is this on the + or - strand? (+1/-1)
`padding`	How much space to provide on the sides?

Value

coverage plot surrounging the ORF of interest

See Also

ggplot2

`plot_sample_heatmap` *Make a heatmap.3 description of the similarity of the genes among samples.*

Description

Sometimes you just want to see how the genes of an experiment are related to each other. This can handle that. These heatmap functions should probably be replaced with neatmaps or heatplus or whatever it is, as the annotation dataframes in them are pretty awesome.

Usage

```
plot_sample_heatmap(data, colors = NULL, design = NULL, names = NULL,
  title = NULL, Rowv = TRUE, ...)
```

Arguments

`data`	Expt/expressionset/dataframe set of samples.
`colors`	Color scheme of the samples (not needed if input is an expt).
`design`	Design matrix describing the experiment (gotten for free if an expt).
`names`	Alternate samples names.
`title`	Title of the plot!
`Rowv`	Reorder the rows by expression?
`...`	More parameters for a good time!

Value

a recordPlot() heatmap describing the samples.

See Also

RColorBrewer `brewer.pal` `recordPlot`

`plot_scatter` *Make a pretty scatter plot between two sets of numbers.*

Description

This function tries to supplement a normal scatterplot with some information describing the relationship between the columns of data plotted.

Usage

```
plot_scatter(df, tooltip_data = NULL, color = "black",
  gvis_filename = NULL, size = 2)
```

Arguments

df	Dataframe likely containing two columns.
tooltip_data	Df of tooltip information for gvis.
color	Color of the dots on the graph.
gvis_filename	Filename to write a fancy html graph.
size	Size of the dots on the graph.

Value

Ggplot2 scatter plot.

See Also

ggplot2 googleVis plot_gvis_scatter geom_point plot_linear_scatter

Examples

```
## Not run:
 plot_scatter(lotsofnumbers_intwo_columns, tooltip_data=tooltip_dataframe,
              gvis_filename="html/fun_scatterplot.html")

## End(Not run)
```

---

plot_significant_bar *Make a bar plot of the numbers of significant genes by contrast. These plots are quite difficult to describe.*

Description

Make a bar plot of the numbers of significant genes by contrast. These plots are quite difficult to describe.

Usage

```
plot_significant_bar(ups, downs, maximum = NULL, text = TRUE,
  invert = FALSE, color_list = c("lightcyan", "lightskyblue", "dodgerblue",
  "plum1", "orchid", "purple4"), color_names = c("a_up_inner", "b_up_middle",
  "c_up_outer", "a_down_inner", "b_down_middle", "c_down_outer"))
```

Arguments

ups	Set of up-regulated genes.
downs	Set of down-regulated genes.
maximum	Maximum/minimum number of genes to display.
text	Add text at the ends of the bars describing the number of genes >/< 0 fc.
invert	Flip the order of the included material for readability?
color_list	Set of colors to use for the bars.
color_names	Categories associated with aforementioned colors.

Value

weird significance bar plots

See Also

ggplot2 extract_significant_genes

---

plot_sm *Make an R plot of the standard median correlation or distance among samples.*

Description

This was written by a mix of Kwame Okrah <kokrah at gmail dot com>, Laura Dillon <dillonl at umd dot edu>, and Hector Corrada Bravo <hcorrada at umd dot edu> I reimplemented it using ggplot2 and tried to make it a little more flexible. The general idea is to take the pairwise correlations/distances of the samples, then take the medians, and plot them.

Usage

```
plot_sm(data, colors = NULL, method = "pearson", names = NULL,
  title = NULL, ...)
```

Arguments

data	Expt, expressionset, or data frame.
colors	Color scheme if data is not an expt.
method	Correlation or distance method to use.
names	Use pretty names for the samples?
title	Title for the graph.
...	More parameters to make you happy!

Value

ggplot of the standard median something among the samples. This will also write to an open device. The resulting plot measures the median correlation of each sample among its peers. It notes 1.5* the interquartile range among the samples and makes a horizontal line at that correlation coefficient. Any sample which falls below this line is considered for removal because it is much less similar to all of its peers.

See Also

matrixStats grDevices hpgl_cor rowMedians quantile diff recordPlot

Examples

```
## Not run:
 smc_plot = hpgl_smc(expt=expt)

## End(Not run)
```

`plot_spirograph` *Make spirographs!*

Description

Taken (with modifications) from: http://menugget.blogspot.com/2012/12/spirograph-with-r.html#more A positive value for 'B' will result in a epitrochoid, while a negative value will result in a hypotrochoid.

Usage

```
plot_spirograph(radius_a = 1, radius_b = -4, dist_bc = -2,
  revolutions = 158, increments = 3160, center_a = list(x = 0, y = 0))
```

Arguments

`radius_a`	The radius of the primary circle.
`radius_b`	The radius of the circle travelling around a.
`dist_bc`	A point relative to the center of 'b' which rotates with the turning of 'b'.
`revolutions`	How many revolutions to perform in the plot
`increments`	The number of radial increments to be calculated per revolution
`center_a`	The position of the center of 'a'.

Value

something which I don't yet know.

`plot_svfactor` *Make a dotplot of some categorised factors and a set of SVs (for other factors).*

Description

This should make a quick df of the factors and surrogates and plot them.

Usage

```
plot_svfactor(expt, svest, chosen_factor = "snpcategory",
  factor_type = "factor")
```

Arguments

expt	Experiment from which to acquire the design, counts, etc.
svest	Set of surrogate variable estimations from sva/svg or batch estimates.
chosen_factor	Factor to compare against.
factor_type	This may be a factor or range, it is intended to plot a scatterplot if it is a range, a dotplot if a factor.

Value

surrogate variable plot as per Leek's work

See Also

ggplot2

Examples

```
## Not run:
 estimate_vs_snps <- plot_svfactor(start, surrogate_estimate, "snpcategory")

## End(Not run)
```

---

plot_topgo_densities *Plot the density of categories vs. the possibilities of all categories.*

Description

This can make a large number of plots.

Usage

```
plot_topgo_densities(godata, table)
```

Arguments

godata	Result from topgo.
table	Table of genes.

Value

density plot as per topgo

See Also

topGO

plot_topgo_pval *Make a pvalue plot from topgo data.*

Description

The p-value plots from clusterProfiler are pretty, this sets the topgo data into a format suitable for plotting in that fashion and returns the resulting plots of significant ontologies.

Usage

```
plot_topgo_pval(topgo, wrapped_width = 20, cutoff = 0.1, n = 12,
  type = "fisher")
```

Arguments

topgo	Some data from topgo!
wrapped_width	Maximum width of the text names.
cutoff	P-value cutoff for the plots.
n	Maximum number of ontologies to include.
type	Type of score to use.

Value

List of MF/BP/CC pvalue plots.

See Also

topgo clusterProfiler

plot_volcano *Make a pretty Volcano plot!*

Description

Volcano plots and MA plots provide quick an easy methods to view the set of (in)significantly differentially expressed genes. In the case of a volcano plot, it places the -log10 of the p-value estimate on the y-axis and the fold-change between conditions on the x-axis. Here is a neat snippet from wikipedia: "The concept of volcano plot can be generalized to other applications, where the x-axis is related to a measure of the strength of a statistical signal, and y-axis is related to a measure of the statistical significance of the signal."

Usage

```
plot_volcano(toptable_data, tooltip_data = NULL, gvis_filename = NULL,
  fc_cutoff = 0.8, p_cutoff = 0.05, size = 2, alpha = 0.6,
  xaxis_column = "logFC", yaxis_column = "P.Value", ...)
```

Arguments

toptable_data	Dataframe from limma's toptable which includes log(fold change) and an adjusted p-value.
tooltip_data	Df of tooltip information for gvis.
gvis_filename	Filename to write a fancy html graph.
fc_cutoff	Cutoff defining the minimum/maximum fold change for interesting. This is log, so I went with +/- 0.8 mostly arbitrarily as the default.
p_cutoff	Cutoff defining significant from not.
size	How big are the dots?
alpha	How transparent to make the dots.
xaxis_column	Column from the data to use on the x axis (logFC)
yaxis_column	Column from the data to use on the y axis (p-value)
...	I love parameters!

Value

Ggplot2 volcano scatter plot. This is defined as the -log10(p-value) with respect to log(fold change). The cutoff values are delineated with lines and mark the boundaries between 'significant' and not. This will make a fun clicky googleVis graph if requested.

See Also

limma plot_gvis_ma toptable voom hpgl_voom lmFit makeContrasts contrasts.fit

Examples

```
## Not run:
 plot_volcano(toptable_data, gvis_filename="html/fun_ma_plot.html")
 ## Currently this assumes that a variant of toptable was used which
 ## gives adjusted p-values.  This is not always the case and I should
 ## check for that, but I have not yet.

## End(Not run)
```

---

pp *png() shortcut*

Description

I hate remembering my options for png()

Usage

```
pp(file, width = 9, height = 9, res = 180)
```

Arguments

file	a filename to write
width	How wide?
height	How high?
res	The chosen resolution.

Value

a png with height=width=9 inches and a high resolution

---

print_ups_downs *Reprint the output from extract_significant_genes().*

Description

I found myself needing to reprint these excel sheets because I added some new information. This shortcuts that process for me.

Usage

```
print_ups_downs(upsdowns, wb = NULL, excel = "excel/significant_genes.xlsx",
  according = "limma", summary_count = 1, ma = FALSE)
```

Arguments

upsdowns	Output from extract_significant_genes().
wb	Workbook object to use for writing, or start a new one.
excel	Filename for writing the data.
according	Use limma, deseq, or edger for defining 'significant'.
summary_count	For spacing sequential tables one after another.
ma	Include ma plots?

Value

Return from write_xls.

See Also

combine_de_tables

`read_metadata` *Given a table of meta data, read it in for use by create_expt().*

Description

Reads an experimental design in a few different formats in preparation for creating an expt.

Usage

```
read_metadata(file, ...)
```

Arguments

`file`	Csv/xls file to read.
`...`	Arguments for arglist, used by sep, header and similar read.csv/read.table parameters.

Value

Df of metadata.

See Also

tools openxlsx XLConnect

`recolor_points` *Quick point-recolorizer given an existing plot, df, list of rownames to recolor, and a color*

Description

This function should make it easy to color a family of genes in any of the point plots.

Usage

```
recolor_points(plot, df, ids, color = "red", ...)
```

Arguments

`plot`	Geom_point based plot
`df`	Data frame used to create the plot
`ids`	Set of ids which must be in the rownames of df to recolor
`color`	Chosen color for the new points.
`...`	Extra arguments are passed to arglist.

Value

prettier plot.

`replot_varpart_percent` *A shortcut for replotting the percent plots from variancePartition.*

Description

In case I wish to look at different numbers of genes from variancePartition and/or different columns to sort from.

Usage

```
replot_varpart_percent(varpart_output, n = 30, column = NULL,
  decreasing = TRUE)
```

Arguments

`varpart_output`	List returned by varpart()
`n`	How many genes to plot.
`column`	The df column to use for sorting.
`decreasing`	high->low or vice versa?

Value

The percent variance bar plots from variancePartition!

See Also

variancePartition `plotPercentBars`

`require.auto` *Automatic loading and/or installing of packages.*

Description

Load a library, install it first if necessary.

Usage

```
require.auto(lib, update = FALSE)
```

Arguments

lib	String name of a library to check/install.
update	Update packages?

Details

This was taken from: http://sbamin.com/2012/11/05/tips-for-working-in-r-automatically-install-missing-package/

Value

0 or 1, whether a package was installed or not.

See Also

BiocInstaller biocLite install.packages

Examples

```
## Not run:
 require.auto("ggplot2")

## End(Not run)
```

---

rex *Resets the display and xauthority variables to the new computer I am using so that plot() works.*

Description

This function assumes a line in the .profile which writes the DISPLAY variable to $HOME/.displays/$(hostname).last

Usage

```
rex(display = ":0")
```

Arguments

display	DISPLAY variable to use, if NULL it looks in ~/.displays/$(host).last

saveme *Make a backup rdata file for future reference*

Description

I often use R over a sshfs connection, sometimes with significant latency, and I want to be able to save/load my R sessions relatively quickly. Thus this function uses pxz to compress the R session maximally and relatively fast. This assumes you have pxz installed and >= 4 CPUs.

Usage

```
saveme(directory = "savefiles", backups = 4, filename = "Rdata.rda.xz")
```

Arguments

directory	Directory to save the Rdata file.
backups	How many revisions?
filename	Choose a filename.

Value

Command string used to save the global environment.

See Also

save pipe

Examples

```
## Not run:
 saveme()

## End(Not run)
```

---

semantic_copynumber_extract *Extract multicopy genes from up/down gene expression lists.*

Description

The function semantic_copynumber_filter() is the inverse of this.

Usage

```
semantic_copynumber_extract(de_list, min_copies = 2, semantic = c("mucin",
  "sialidase", "RHS", "MASP", "DGF", "GP63"), semantic_column = "1.tooltip")
```

Arguments

de_list	List of sets of genes deemed significantly up/down with a column expressing approximate count numbers.
min_copies	Keep only those genes with >= n putative copies.
semantic	Set of strings with gene names to exclude.
semantic_column	Column in the DE table used to find the semantic strings for removal.

Details

Currently untested, used for Trypanosome analyses primarily, thus the default strings.

Value

Smaller list of up/down genes.

See Also

semantic_copynumber_filter

---

semantic_copynumber_filter

Remove multicopy genes from up/down gene expression lists.

Description

In our parasite data, there are a few gene types which are consistently obnoxious. Multi-gene families primarily where the coding sequences are divergent, but the UTRs nearly identical. For these genes, our sequence based removal methods fail and so this just excludes them by name.

Usage

```
semantic_copynumber_filter(de_list, max_copies = 2, use_files = FALSE,
  semantic = c("mucin", "sialidase", "RHS", "MASP", "DGF", "GP63"),
  semantic_column = "1.tooltip")
```

Arguments

de_list	List of sets of genes deemed significantly up/down with a column expressing approximate count numbers.
max_copies	Keep only those genes with <= n putative copies.
use_files	Use a set of sequence alignments to define the copy numbers?
semantic	Set of strings with gene names to exclude.
semantic_column	Column in the DE table used to find the semantic strings for removal.

Details

Currently untested, used for Trypanosome analyses primarily, thus the default strings.

Value

Smaller list of up/down genes.

See Also

semantic_copynumber_extract

`sequence_attributes` *Gather some simple sequence attributes.*

Description

This extends the logic of the pattern searching in pattern_count_genome() to search on some other attributes.

Usage

```
sequence_attributes(fasta, gff = NULL, type = "gene", key = "locus_tag")
```

Arguments

fasta	Genome encoded as a fasta file.
gff	Optional gff of annotations (if not provided it will just ask the whole genome).
type	Column of the gff file to use.
key	What type of entry of the gff file to key from?

Value

List of data frames containing gc/at/gt/ac contents.

See Also

Biostrings Rsamtools FaFile getSeq

Examples

```
## Not run:
 num_pattern = sequence_attributes('mgas_5005.fasta', 'mgas_5005.gff')

## End(Not run)
```

set_expt_batch *Change the batches of an expt.*

Description

When exploring differential analyses, it might be useful to play with the conditions/batches of the experiment. Use this to make that easier.

Usage

```
set_expt_batch(expt, fact, ids = NULL, ...)
```

Arguments

expt	Expt to modify.
fact	Batches to replace using this factor.
ids	Specific samples to change.
...	Extra options are like spinach.

Value

The original expt with some new metadata.

See Also

create_expt set_expt_condition

Examples

```
## Not run:
 expt = set_expt_batch(big_expt, factor=c(some,stuff,here))

## End(Not run)
```

set_expt_colors *Change the colors of an expt*

Description

When exploring differential analyses, it might be useful to play with the conditions/batches of the experiment. Use this to make that easier.

Usage

```
set_expt_colors(expt, colors = TRUE, chosen_palette = "Dark2",
  change_by = "condition")
```

Arguments

expt	Expt to modify
colors	colors to replace
chosen_palette	I usually use Dark2 as the RColorBrewer palette.
change_by	Assuming a list is passed, cross reference by condition or sample?

Value

expt Send back the expt with some new metadata

See Also

set_expt_condition set_expt_batch

Examples

```
## Not run:
unique(esmer_expt$design$conditions)
chosen_colors <- list(
   "cl14_epi" = "#FF8D59",
   "clbr_epi" = "#962F00",
   "cl14_tryp" = "#D06D7F",
   "clbr_tryp" = "#A4011F",
   "cl14_late" = "#6BD35E",
   "clbr_late" = "#1E7712",
   "cl14_mid" = "#7280FF",
   "clbr_mid" = "#000D7E")
esmer_expt <- set_expt_colors(expt=esmer_expt, colors=chosen_colors)

## End(Not run)
```

---

set_expt_condition *Change the condition of an expt*

Description

When exploring differential analyses, it might be useful to play with the conditions/batches of the experiment. Use this to make that easier.

Usage

```
set_expt_condition(expt, fact = NULL, ids = NULL, ...)
```

Arguments

expt	Expt to modify
fact	Conditions to replace
ids	Specific sample IDs to change.
...	Extra arguments are given to arglist.

Value

expt Send back the expt with some new metadata

See Also

set_expt_batch create_expt

Examples

```
## Not run:
 expt = set_expt_condition(big_expt, factor=c(some,stuff,here))

## End(Not run)
```

`set_expt_factors` *Change the factors (condition and batch) of an expt*

Description

When exploring differential analyses, it might be useful to play with the conditions/batches of the experiment. Use this to make that easier.

Usage

```
set_expt_factors(expt, condition = NULL, batch = NULL, ids = NULL, ...)
```

Arguments

`expt`	Expt to modify
`condition`	New condition factor
`batch`	New batch factor
`ids`	Specific sample IDs to change.
`...`	Arguments passed along (likely colors)

Value

expt Send back the expt with some new metadata

See Also

set_expt_condition set_expt_batch

Examples

```
## Not run:
 expt = set_expt_factors(big_expt, condition="column", batch="another_column")

## End(Not run)
```

set_expt_samplenames *Change the sample names of an expt.*

Description

Sometimes one does not like the hpgl identifiers, so provide a way to change them on-the-fly.

Usage

```
set_expt_samplenames(expt, newnames)
```

Arguments

expt	Expt to modify
newnames	New names, currently only a character vector.

Value

expt Send back the expt with some new metadata

See Also

set_expt_condition set_expt_batch

Examples

```
## Not run:
 expt = set_expt_samplenames(expt, c("a","b","c","d","e","f"))

## End(Not run)
```

significant_barplots *Given the set of significant genes from combine_de_tables(), provide a view of how many are significant up/down.*

Description

These plots are pretty annoying, and I am certain that this function is not well written, but it provides a series of bar plots which show the number of genes/contrast which are up and down given a set of fold changes and p-value.

Usage

```
significant_barplots(combined, fc_cutoffs = c(0, 1, 2),
  fc_column = "limma_logfc", p_type = "adj", invert = FALSE, p = 0.05,
  z = NULL, order = NULL, maximum = NULL, ...)
```

Arguments

combined	Result from combine_de_tables and/or extract_significant_genes().
fc_cutoffs	Choose 3 fold changes to define the queries. 0, 1, 2 mean greater/less than 0 followed by 2 fold and 4 fold cutoffs.
fc_column	The column in the master-table to use for FC cutoffs.
p_type	Adjusted or not?
invert	Reverse the order of contrasts for readability?
p	Chosen p-value cutoff.
z	Choose instead a z-score cutoff.
order	Choose a specific order for the plots.
maximum	Set a specific limit on the number of genes on the x-axis.
...	More arguments are passed to arglist.

Value

list containing the significance bar plots and some information to hopefully help interpret them.

See Also

ggplot2

Examples

```
## Not run:
 ## Damn I wish I were smrt enough to make this elegant and easily comprehendable, but I cannot.
 barplots <- significant_barplots(combined_result)

## End(Not run)
```

---

sillydist *Calculate a simplistic distance function of a point against two axes.*

Description

Sillydist provides a distance of any point vs. the axes of a plot. This just takes the abs(distances) of each point to the axes, normalizes them against the largest point on the axes, multiplies the result, and normalizes against the max of all point.

Usage

```
sillydist(firstterm, secondterm, firstaxis = 0, secondaxis = 0)
```

Arguments

firstterm	X-values of the points.
secondterm	Y-values of the points.
firstaxis	X-value of the vertical axis.
secondaxis	Y-value of the second axis.

Value

Dataframe of the distances.

See Also

ggplot2

Examples

```
## Not run:
 mydist <- sillydist(df[,1], df[,2], first_median, second_median)
 first_vs_second <- ggplot2::ggplot(df, ggplot2::aes_string(x="first", y="second"),
                                    environment=hpgl_env) +
   ggplot2::xlab(paste("Expression of", df_x_axis)) +
   ggplot2::ylab(paste("Expression of", df_y_axis)) +
  ggplot2::geom_vline(color="grey", xintercept=(first_median - first_mad), size=line_size) +
  ggplot2::geom_vline(color="grey", xintercept=(first_median + first_mad), size=line_size) +
   ggplot2::geom_vline(color="darkgrey", xintercept=first_median, size=line_size) +
  ggplot2::geom_hline(color="grey", yintercept=(second_median - second_mad), size=line_size) +
  ggplot2::geom_hline(color="grey", yintercept=(second_median + second_mad), size=line_size) +
   ggplot2::geom_hline(color="darkgrey", yintercept=second_median, size=line_size) +
   ggplot2::geom_point(colour=grDevices::hsv(mydist$dist, 1, mydist$dist),
                       alpha=0.6, size=size) +
   ggplot2::theme(legend.position="none")
 first_vs_second  ## dots get colored according to how far they are from the medians
 ## replace first_median, second_median with 0,0 for the axes

## End(Not run)
```

---

simple_clusterprofiler

Perform the array of analyses in the 2016-04 version of clusterProfiler

---

Description

The new version of clusterProfiler has a bunch of new toys. However, it is more stringent in terms of input in that it now explicitly expects to receive annotation data in terms of a orgdb object. This is mostly advantageous, but will probably cause some changes in the other ontology functions in the near future. This function is an initial pass at making something similar to my previous 'simple_clusterprofiler()' but using these new toys.

Usage

```
simple_clusterprofiler(sig_genes, all_genes, orgdb = "org.Dm.eg.db",
  orgdb_from = "FLYBASE", orgdb_to = "ENTREZID", internal = TRUE,
  go_level = 3, pcutoff = 0.05, qcutoff = 0.1, fc_column = "logFC",
  updown = "up", permutations = 100, min_groupsize = 5,
  kegg_prefix = "Dmel_", mings = 5, kegg_organism = "dme",
  categories = 12, parallel = TRUE)
```

Arguments

sig_genes	Dataframe of genes deemed 'significant.'
all_genes	Dataframe of all genes in the analysis, primarily for gse analyses.
orgdb	Name of the orgDb used for gathering annotation data.
orgdb_from	Name of a key in the orgdb used to cross reference to entrez IDs.
orgdb_to	List of keys to grab from the orgdb for cross referencing ontologies.
internal	Used by the 'use_internal_data' flag.
go_level	How deep into the ontology tree should this dive for over expressed categories.
pcutoff	P-value cutoff for 'significant' analyses.
qcutoff	Q-value cutoff for 'significant' analyses.
fc_column	When extracting vectors of all genes, what column should be used?
updown	Include the less than expected ontologies?
permutations	How many permutations for GSEA-ish analyses?
min_groupsize	Minimum size of an ontology before it is included.
kegg_prefix	Many KEGG ids need a prefix before they will cross reference.
mings	What is the minimum ontology group's size?
kegg_organism	Choose the 3 letter KEGG organism name here.
categories	How many categories should be plotted in bar/dot plots?
parallel	Perform slow operations in parallel?

Value

a list

See Also

clusterProfiler

Examples

```
## Not run:
 holyasscrackers <- simple_clusterprofiler(gene_list, all_genes, "org.Dm.eg.db")

## End(Not run)
```

simple_cp_enricher *Generic enrichment using clusterProfiler.*

Description

culsterProfiler::enricher provides a quick and easy enrichment analysis given a set of siginficant' genes and a data frame which connects each gene to a category.

Usage

```
simple_cp_enricher(sig_genes, de_table, goids_df = NULL)
```

Arguments

sig_genes	Set of 'significant' genes as a table.
de_table	All genes from the original analysis.
goids_df	Dataframe of GO->ID matching the gene names of sig_genes to GO categories.

Value

Table of 'enriched' categories.

simple_filter_counts *Filter low-count genes from a data set only using a simple threshold and number of samples.*

Description

This was a function written by Kwame Okrah and perhaps also Laura Dillon to remove low-count genes. It drops genes based on a threshold and number of samples.

Usage

```
simple_filter_counts(count_table, threshold = 2)
```

Arguments

count_table	Data frame of (pseudo)counts by sample.
threshold	Lower threshold of counts for each gene.

Value

Dataframe of counts without the low-count genes.

See Also

edgeR

Examples

```
## Not run:
 filtered_table <- simple_filter_counts(count_table)

## End(Not run)
```

`simple_gadem` *run the rGADEM suite*

Description

This should provide a set of rGADEM results given an input file of sequences and a genome.

Usage

```
simple_gadem(inputfile, genome = "BSgenome.Hsapiens.UCSC.hs19", ...)
```

Arguments

`inputfile`	Fasta or bed file containing sequences to search.
`genome`	BSgenome to read.
`...`	Parameters for plotting the gadem result.

Value

A list containing slots for plots, the stdout output from gadem, the gadem result, set of occurences of motif, and the returned set of motifs.

`simple_goseq` *Perform a simplified goseq analysis.*

Description

goseq can be pretty difficult to get set up for non-supported organisms. This attempts to make that process a bit simpler as well as give some standard outputs which should be similar to those returned by clusterprofiler/topgo/gostats/gprofiler.

Usage

```
simple_goseq(sig_genes, go_db, length_db, doplot = TRUE, adjust = 0.1,
  pvalue = 0.1, qvalue = 0.1, length_keytype = "transcripts",
  go_keytype = "ENTREZID", goseq_method = "Wallenius",
  padjust_method = "BH", bioc_length_db = "ensGene", ...)
```

Arguments

sig_genes	Data frame of differentially expressed genes, containing IDs etc.
go_db	Database of go to gene mappings (OrgDb/OrganismDb)
length_db	Database of gene lengths (gff/TxDb)
doplot	Include pwf plots?
adjust	Minimum adjusted pvalue for 'significant.'
pvalue	Minimum pvalue for 'significant.'
qvalue	Minimum qvalue for 'significant.'
length_keytype	Keytype to provide to extract lengths
go_keytype	Keytype to provide to extract go IDs
goseq_method	Statistical test for goseq to use.
padjust_method	Which method to use to adjust the pvalues.
bioc_length_db	Source of gene lengths?
...	Extra parameters which I do not recall

Value

Big list including: the pwd:pwf function, alldata:the godata dataframe, pvalue_histogram:p-value histograms, godata_interesting:the ontology information of the enhanced groups, term_table:the goterms with some information about them, mf_subset:a plot of the MF enhanced groups, mfp_plot:the pvalues of the MF group, bp_subset:a plot of the BP enhanced groups, bpp_plot, cc_subset, and ccp_plot

See Also

goseq GO.db

Examples

```
## Not run:
 lotsotables <- simple_goseq(gene_list, godb, lengthdb)

## End(Not run)
```

---

simple_gostats *Simplification function for gostats, in the same vein as those written for clusterProfiler, goseq, and topGO.*

Description

GOstats has a couple interesting peculiarities: Chief among them: the gene IDs must be integers. As a result, I am going to have this function take a gff file in order to get the go ids and gene ids on the same page.

Usage

```
simple_gostats(sig_genes, gff, goids_df, universe_merge = "id",
  second_merge_try = "locus_tag", species = "fun", pcutoff = 0.1,
  direction = "over", conditional = FALSE, categorysize = NULL,
  gff_type = "cds", ...)
```

Arguments

sig_genes	Input list of differentially expressed genes.
gff	Annotation information for this genome.
goids_df	Set of GOids, as before in the format ID/GO.
universe_merge	Column from which to create the universe of genes.
second_merge_try	If the first universe merge fails, try this.
species	Genbank organism to use.
pcutoff	Pvalue cutoff for deciding significant.
direction	Under or over represented categories.
conditional	Perform a conditional search?
categorysize	Category size below which to not include groups.
gff_type	Gff column to use for creating the universe.
...	More parameters!

Value

List of returns from GSEABase, Category, etc.

See Also

GSEABase Category

Examples

```
## Not run:
 knickerbockers <- simple_gostats(sig_genes, gff_file, goids)

## End(Not run)
```

simple_gprofiler *Run searches against the web service g:Profiler.*

Description

Thank you Ginger for showing me your thesis, gProfiler is pretty cool!

Usage

```
simple_gprofiler(sig_genes, species = "hsapiens", first_col = "logFC",
  second_col = "limma_logfc", do_go = TRUE, do_kegg = TRUE,
  do_reactome = TRUE, do_mi = TRUE, do_tf = TRUE, do_corum = TRUE,
  do_hp = TRUE, significant = TRUE, pseudo_gsea = TRUE,
  id_col = "row.names")
```

Arguments

sig_genes	Guess! The set of differentially expressed/interesting genes.
species	Organism supported by gprofiler.
first_col	First place used to define the order of 'significant'.
second_col	If that fails, try a second column.
do_go	Perform GO search?
do_kegg	Perform KEGG search?
do_reactome	Perform reactome search?
do_mi	Do miRNA search?
do_tf	Search for transcription factors?
do_corum	Do corum search?
do_hp	Do the hp search?
significant	Only return the statistically significant hits?
pseudo_gsea	Is the data in a ranked order by significance?
id_col	Which column in the table should be used for gene ID crossreferencing? gProfiler uses Ensembl ids. So if you have a table of entrez or whatever, translate it!

Value

a list of results for go, kegg, reactome, and a few more.

See Also

gProfiler

Examples

```
## Not run:
 gprofiler_is_nice_and_easy <- simple_gprofiler(genes, species='mmusculus')

## End(Not run)
```

`simple_topgo` *Perform a simplified topgo analysis.*

Description

This will attempt to make it easier to run topgo on a set of genes.

Usage

```
simple_topgo(sig_genes, goid_map = "id2go.map", goids_df = NULL,
  pvals = NULL, limitby = "fisher", limit = 0.1, signodes = 100,
  sigforall = TRUE, numchar = 300, selector = "topDiffGenes",
  pval_column = "adj.P.Val", overwrite = FALSE, densities = FALSE,
  pval_plots = TRUE, parallel = FALSE, ...)
```

Arguments

`sig_genes`	Data frame of differentially expressed genes, containing IDs any other columns.
`goid_map`	File containing mappings of genes to goids in the format expected by topgo.
`goids_df`	Data frame of the goids which may be used to make the goid_map.
`pvals`	Set of pvalues in the DE data which may be used to improve the topgo results.
`limitby`	Test to index the results by.
`limit`	Ontology pvalue to use as the lower limit.
`signodes`	I don't remember right now.
`sigforall`	Provide the significance for all nodes?
`numchar`	Character limit for the table of results.
`selector`	Function name for choosing genes to include.
`pval_column`	Column from which to acquire scores.
`overwrite`	Yeah I do not remember this one either.
`densities`	Densities, yeah, the densities...
`pval_plots`	Include pvalue plots of the results a la clusterprofiler?
`parallel`	Perform some operations in parallel to speed this up?
`...`	Other options which I do not remember right now!

Value

Big list including the various outputs from topgo

See Also

topGO

`sm` *Silence, m...*

Description

Some libraries/functions just won't shut up. Ergo, silence, peasant! This is a simpler silence peasant.

Usage

```
sm(...)
```

Arguments

`...`	Some code to shut up.

Value

Whatever the code would have returned.

`snp_add_file` *Add a new snp table to a set of comparisons for clustering.*

Description

This is used by expt_snp to read input files and relatively quickly merge them.

Usage

```
snp_add_file(sample, input_dir = "preprocessing/outputs",
  file_suffix = "_parsed_ratio.txt")
```

Arguments

`sample`	A text snp summary for 1 sample.
`input_dir`	Location of the data.
`file_suffix`	Suffix to use when finding the file(s).

`subset_expt` *An alias to expt_subset, because it is stupid to have something start with verbs and others start with nouns.*

Description

This just calls expt_subset.

Usage

```
subset_expt(...)
```

Arguments

`...`	All arguments are passed to expt_subset.

`subset_ontology_search` *Perform ontology searches on up/down subsets of differential expression data.*

Description

In the same way all_pairwise() attempts to simplify using multiple DE tools, this function seeks to make it easier to extract subsets of differentially expressed data and pass them to goseq, clusterProfiler, topGO, GOstats, and gProfiler.

Usage

```
subset_ontology_search(changed_counts, doplot = TRUE, do_goseq = TRUE,
  do_cluster = TRUE, do_topgo = TRUE, do_gostats = TRUE,
  do_gprofiler = TRUE, according_to = "limma", ...)
```

Arguments

`changed_counts`	List of changed counts as ups and downs.
`doplot`	Include plots in the results?
`do_goseq`	Perform goseq search?
`do_cluster`	Perform clusterprofiler search?
`do_topgo`	Perform topgo search?
`do_gostats`	Perform gostats search?
`do_gprofiler`	Do a gprofiler search?
`according_to`	If results from multiple DE tools were passed, which one defines 'significant'?
`...`	Extra arguments!

Value

List of ontology search results, up and down for each contrast.

See Also

goseq clusterProfiler topGO goStats gProfiler

`sum_exons` *Given a data frame of exon counts and annotation information, sum the exons.*

Description

This function will merge a count table to an annotation table by the child column. It will then sum all rows of exons by parent gene and sum the widths of the exons. Finally it will return a list containing a df of gene lengths and summed counts.

Usage

```
sum_exons(data, gff = NULL, annotdf = NULL, parent = "Parent",
  child = "row.names")
```

Arguments

`data`	Count tables of exons.
`gff`	Gff filename.
`annotdf`	Dataframe of annotations (probably from gff2df).
`parent`	Column from the annotations with the gene names.
`child`	Column from the annotations with the exon names.

Value

List of 2 data frames, counts and lengths by summed exons.

See Also

rtracklayer `gff2df`

Examples

```
## Not run:
summed <- sum_exons(counts, gff='reference/xenopus_laevis.gff.xz')

## End(Not run)
```

`tnseq_saturation` *Make a plot and some simple numbers about tnseq saturation*

Description

This function takes as input a tab separated file from essentiality_tas.pl This is a perl script written to read a bam alignment of tnseq reads against a genome and count how many hits were observed on every TA in the given genome. It furthermore has some logic to tell the difference between reads which were observed on the forward vs. reverse strand as well as reads which appear to be on both strands (eg. they start and end with 'TA').

Usage

```
tnseq_saturation(file)
```

Arguments

`file`	a file created using the perl script 'essentiality_tas.pl'

Value

A plot and some numbers

See Also

ggplot2

`topDiffGenes` *A very simple selector of strong scoring genes (by p-value)*

Description

This function was provided in the topGO documentation, but not defined. It was copied/pasted here. I have ideas for including up/down expression but have so far deemed them not needed because I am feeding topGO already explicit lists of genes which are up/down/whatever. But it still is likely to be useful to be able to further subset the data.

Usage

```
topDiffGenes(allScore)
```

Arguments

`allScore`	The scores of the genes

topgo_tables *Make pretty tables out of topGO data*

Description

The topgo function GenTable is neat, but it needs some simplification to not be obnoxious.

Usage

```
topgo_tables(result, limit = 0.1, limitby = "fisher", numchar = 300,
  orderby = "classic", ranksof = "classic")
```

Arguments

result	Topgo result.
limit	Pvalue limit defining 'significant'.
limitby	Type of test to perform.
numchar	How many characters to allow in the description?
orderby	Which of the available columns to order the table by?
ranksof	Which of the available columns are used to rank the data?

Value

prettier tables

See Also

topGO

topgo_trees *Print trees from topGO.*

Description

The tree printing functionality of topGO is pretty cool, but difficult to get set correctly.

Usage

```
topgo_trees(tg, score_limit = 0.01, sigforall = TRUE,
  do_mf_fisher_tree = TRUE, do_bp_fisher_tree = TRUE,
  do_cc_fisher_tree = TRUE, do_mf_ks_tree = FALSE, do_bp_ks_tree = FALSE,
  do_cc_ks_tree = FALSE, do_mf_el_tree = FALSE, do_bp_el_tree = FALSE,
  do_cc_el_tree = FALSE, do_mf_weight_tree = FALSE,
  do_bp_weight_tree = FALSE, do_cc_weight_tree = FALSE, parallel = FALSE)
```

Arguments

tg	Data from simple_topgo().
score_limit	Score limit to decide whether to add to the tree.
sigforall	Add scores to the tree?
do_mf_fisher_tree	Add the fisher score molecular function tree?
do_bp_fisher_tree	Add the fisher biological process tree?
do_cc_fisher_tree	Add the fisher cellular component tree?
do_mf_ks_tree	Add the ks molecular function tree?
do_bp_ks_tree	Add the ks biological process tree?
do_cc_ks_tree	Add the ks cellular component tree?
do_mf_el_tree	Add the el molecular function tree?
do_bp_el_tree	Add the el biological process tree?
do_cc_el_tree	Add the el cellular component tree?
do_mf_weight_tree	Add the weight mf tree?
do_bp_weight_tree	Add the bp weighted tree?
do_cc_weight_tree	Add the guess
parallel	Perform operations in parallel to speed this up?

Value

Big list including the various outputs from topgo.

See Also

topGO

---

transform_counts *Perform a simple transformation of a count table (log2)*

Description

the add argument is only important if the data was previously cpm'd because that does a +1, thus this will avoid a double+1 on the data.

Usage

```
transform_counts(count_table, design = NULL, transform = "raw",
  base = NULL, ...)
```

Arguments

count_table	A matrix of count data
design	Sometimes the experimental design is also required.
transform	A type of transformation to perform: log2/log10/log.
base	Other log scales?
...	Options I might pass from other functions are dropped into arglist.

Value

dataframe of transformed counts.

See Also

limma

Examples

```
## Not run:
 filtered_table = transform_counts(count_table, transform='log2', converted='cpm')

## End(Not run)
```

---

translate_ids_querymany

Use mygene's queryMany to translate gene ID types

Description

Juggling between entrez, ensembl, etc can be quite a hassel. This hopes to make it easier.

Usage

```
translate_ids_querymany(queries, from = "ensembl", fields = c("uniprot",
  "ensembl.gene", "entrezgene", "go"), species = "human")
```

Arguments

queries	Gene IDs to translate.
from	Database to translate IDs from, pass null if you want it to choose.
fields	Set of fields to request, pass null for all.
species	Human readable species for translation (Eg. 'human' instead of 'hsapiens'.)

Details

Tested in test_40ann_biomart.R This function really just sets a couple of hopefully helpful defaults. When I first attempted to use queryMany, it seemed to need much more intervention than it does now. But at the least this function should provide a reminder of this relatively fast and useful ID translation service.

Value

Df of translated IDs/accessions

See Also

mygene queryMany

Examples

```
## Not run:
 data <- translate_ids_querymany(genes)

## End(Not run)
```

`tritryp_downloads` *Download the various data files from http://tritrypdb.org/*

Description

The tritrypdb nicely makes their downloads standardized!

Usage

```
tritryp_downloads(version = "27", species = "lmajor", strain = "friedlin",
  dl_dir = "organdb/tritryp", quiet = TRUE)
```

Arguments

`version`	What version of the tritrypdb to use?
`species`	Human readable species to use.
`strain`	Strain of the given species to download.
`dl_dir`	Directory into which to download the various files.
`quiet`	Print download progress?

Value

List of downloaded files.

Examples

```
## Not run:
 filenames <- tritryp_downloads(species="lmajor", strain="friedlin", version="28")

## End(Not run)
```

`u_plot` *Plot the rank order svd$u elements to get a view of how much the first genes contribute to the total variance by PC.*

Description

Plot the rank order svd$u elements to get a view of how much the first genes contribute to the total variance by PC.

Usage

```
u_plot(plotted_us)
```

Arguments

`plotted_us`	a list of svd$u elements

Value

a recordPlot() plot showing the first 3 PCs by rank-order svd$u.

`varpart` *Use variancePartition to try and understand where the variance lies in a data set.*

Description

variancePartition is the newest toy introduced by Hector.

Usage

```
varpart(expt, predictor = "condition", factors = c("batch"), cpus = 6,
  genes = 40, parallel = TRUE)
```

Arguments

`expt`	Some data
`predictor`	Non-categorical predictor factor with which to begin the model.
`factors`	Character list of columns in the experiment design to query
`cpus`	Number cpus to use
`genes`	Number of genes to count.
`parallel`	use doParallel?

Value

partitions List of plots and variance data frames

See Also

doParallel variancePartition

---

varpart_summaries *Attempt to use variancePartition's fitVarPartModel() function.*

Description

Note the word 'attempt'. This function is so ungodly slow that it probably will never be used.

Usage

```
varpart_summaries(expt, factors = c("condition", "batch"), cpus = 6)
```

Arguments

expt	Input expressionset.
factors	Set of factors to query
cpus	Number of cpus to use in doParallel.

Value

Summaries of the new model, in theory this would be a nicely batch-corrected data set.

See Also

variancePartition

---

what_happened *Print a string describing what happened to this data.*

Description

Sometimes it is nice to have a string like: log2(cpm(data)) describing what happened to the data.

Usage

```
what_happened(expt = NULL, transform = "raw", convert = "raw",
  norm = "raw", filter = "raw", batch = "raw")
```

Arguments

expt	The expressionset.
transform	How was it transformed?
convert	How was it converted?
norm	How was it normalized?
filter	How was it filtered?
batch	How was it batch-corrected?

Value

An expression describing what has been done to this data.

See Also

create_expt

---

write_basic *Writes out the results of a basic search using write_de_table()*

Description

Looking to provide a single interface for writing tables from basic and friends.

Usage

```
write_basic(data, ...)
```

Arguments

data	Output from basic_pairwise()
...	Options for writing the xlsx file.

Details

Tested in test_26basic.R

See Also

write_de_table

Examples

```
## Not run:
 finished_comparison <- basic_pairwise(expressionset)
 data_list <- write_basic(finished_comparison)

## End(Not run)
```

`write_deseq` *Writes out the results of a deseq search using write_de_table()*

Description

Looking to provide a single interface for writing tables from deseq and friends.

Usage

```
write_deseq(data, ...)
```

Arguments

`data`	Output from deseq_pairwise()
`...`	Options for writing the xlsx file.

Details

Tested in test_24deseq.R

See Also

DESeq2 write_xls

Examples

```
## Not run:
 finished_comparison = deseq_pairwise(expressionset)
 data_list = write_deseq(finished_comparison)

## End(Not run)
```

`write_de_table` *Writes out the results of a single pairwise comparison.*

Description

However, this will do a couple of things to make one's life easier: 1. Make a list of the output, one element for each comparison of the contrast matrix. 2. Write out the results() output for them in separate sheets in excel. 3. Since I have been using qvalues a lot for other stuff, add a column for them.

Usage

```
write_de_table(data, type = "limma", ...)
```

Arguments

data	Output from results().
type	Which DE tool to write.
...	Parameters passed downstream, dumped into arglist and passed, notably the number of genes (n), the coefficient column (coef)

Details

Tested in test_24deseq.R Rewritten in 2016-12 looking to simplify combine_de_tables(). That function is far too big, This should become a template for that.

Value

List of data frames comprising the toptable output for each coefficient, I also added a qvalue entry to these toptable() outputs.

See Also

write_xls

Examples

```
## Not run:
 finished_comparison = eBayes(deseq_output)
 data_list = write_deseq(finished_comparison, workbook="excel/deseq_output.xls")

## End(Not run)
```

---

write_edger *Writes out the results of a edger search using write_de_table()*

Description

Looking to provide a single interface for writing tables from edger and friends.

Usage

```
write_edger(data, ...)
```

Arguments

data	Output from deseq_pairwise()
...	Options for writing the xlsx file.

Details

Tested in test_26edger.R

See Also

limma toptable write_xls

Examples

```
## Not run:
 finished_comparison <- edger_pairwise(expressionset)
 data_list <- write_edger(finished_comparison)

## End(Not run)
```

---

write_expt *Make pretty xlsx files of count data.*

Description

Some folks love excel for looking at this data. ok.

Usage

```
write_expt(expt, excel = "excel/pretty_counts.xlsx", norm = "quant",
  violin = FALSE, convert = "cpm", transform = "log2", batch = "sva",
  filter = "cbcb")
```

Arguments

expt	An expressionset to print.
excel	Filename to write.
norm	Normalization to perform.
violin	Include violin plots?
convert	Conversion to perform.
transform	Transformation used.
batch	Batch correction applied.
filter	Filtering method used.

Details

Tested in test_03graph_metrics.R This performs the following: Writes the raw data, graphs the raw data, normalizes the data, writes it, graphs it, and does a median-by-condition and prints that. I replaced the openxlsx function which writes images into xlsx files with one which does not require an opening of a pre-existing plotter. Instead it (optionally)opens a pdf device, prints the plot to it, opens a png device, prints to that, and inserts the resulting png file. Thus it sacrifices some flexibility for a hopefully more consistent behaivor. In addition, one may use the pdfs as a set of images importable into illustrator or whatever.

Value

A big honking excel file and a list including the dataframes and images created.

See Also

openxlsx Biobase normalize_expt graph_metrics

Examples

```
## Not run:
 excel_sucks <- write_expt(expt)

## End(Not run)
```

`write_goseq_data` *Make a pretty table of goseq data in excel.*

Description

It is my intention to make a function like this for each ontology tool in my repetoire

Usage

```
write_goseq_data(goseq, excel = "excel/goseq.xlsx", wb = NULL,
  add_trees = TRUE, pval = 0.1, add_plots = TRUE, height = 15,
  width = 10, ...)
```

Arguments

goseq	A set of results from simple_goseq().
excel	An excel file to which to write some pretty results.
wb	Workbook object to write to.
add_trees	Include topgoish ontology trees?
pval	Choose a cutoff for reporting by p-value.
add_plots	Include some pvalue plots in the excel output?
height	Height of included plots.
width	and their width.
...	Extra arguments are passed to arglist.

Value

The result from openxlsx in a prettyified xlsx file.

See Also

openxlsx goseq

`write_go_xls` *Write gene ontology tables for excel*

Description

Combine the results from goseq, cluster profiler, topgo, and gostats and drop them into excel Hopefully with a relatively consistent look.

Usage

```
write_go_xls(goseq, cluster, topgo, gostats, gprofiler,
  file = "excel/merged_go", dated = TRUE, n = 30, overwritefile = TRUE)
```

Arguments

`goseq`	The goseq result from simple_goseq()
`cluster`	The result from simple_clusterprofiler()
`topgo`	Guess
`gostats`	Yep, ditto
`gprofiler`	woo hoo!
`file`	the file to save the results.
`dated`	date the excel file
`n`	the number of ontology categories to include in each table.
`overwritefile`	overwrite an existing excel file

Value

the list of ontology information

See Also

openxlsx goseq clusterProfiler goStats topGO gProfiler

`write_gprofiler_data` *Write some excel results from a gprofiler search.*

Description

Gprofiler is pretty awesome. This function will attempt to write its results to an excel file.

Usage

```
write_gprofiler_data(gprofiler_result, wb = NULL,
  excel = "excel/gprofiler_result.xlsx", add_plots = TRUE, height = 15,
  width = 10, ...)
```

Arguments

`gprofiler_result`	The result from simple_gprofiler().
`wb`	Optional workbook object, if you wish to append to an existing workbook.
`excel`	Excel file to which to write.
`add_plots`	Add some pvalue plots?
`height`	Height of included plots?
`width`	And their width.
`...`	More options, not currently used I think.

Value

A prettyified table in an xlsx document.

See Also

openxlsx gProfiler

`write_limma` *Writes out the results of a limma search using write_de_table()*

Description

Looking to provide a single interface for writing tables from limma and friends.

Usage

```
write_limma(data, ...)
```

Arguments

data	Output from limma_pairwise()
...	Options for writing the xlsx file.

Details

Tested in test_21limma.R

See Also

write_de_table

Examples

```
## Not run:
 finished_comparison = limma_pairwise(expressionset)
 data_list = write_limma(finished_comparison)

## End(Not run)
```

---

write_subset_ontologies

Write gene ontology tables for data subsets

Description

Given a set of ontology results, this attempts to write them to an excel workbook in a consistent and relatively easy-to-read fashion.

Usage

```
write_subset_ontologies(kept_ontology, outfile = "excel/subset_go",
  dated = TRUE, n = NULL, overwritefile = TRUE, add_plots = TRUE,
  table_style = "TableStyleMedium9", ...)
```

Arguments

kept_ontology	A result from subset_ontology_search()
outfile	Workbook to which to write.
dated	Append the year-month-day-hour to the workbook.
n	How many ontology categories to write for each search
overwritefile	Overwrite an existing workbook?
add_plots	Add the various p-value plots to the end of each sheet?
table_style	The chosen table style for excel
...	some extra parameters

Value

a set of excel sheet/coordinates

See Also

openxlsx

Examples

```
## Not run:
 all_contrasts <- all_pairwise(expt, model_batch=TRUE)
 keepers <- list(bob = ('numerator','denominator'))
 kept <- combine_de_tables(all_contrasts, keepers=keepers)
 changed <- extract_significant_genes(kept)
 kept_ontologies <- subset_ontology_search(changed, lengths=gene_lengths,
                                           goids=goids, gff=gff, gff_type='gene')
 go_writer <- write_subset_ontologies(kept_ontologies)

## End(Not run)
```

`write_xls` *Write a dataframe to an excel spreadsheet sheet.*

Description

I like to give folks data in any format they prefer, even though I sort of hate excel. Most people I work with use it, so therefore I do too. This function has been through many iterations, first using XLConnect, then xlsx, and now openxlsx. Hopefully this will not change again.

Usage

```
write_xls(data = "undef", wb = NULL, sheet = "first", rownames = TRUE,
  start_row = 1, start_col = 1, ...)
```

Arguments

`data`	Data frame to print.
`wb`	Workbook to which to write.
`sheet`	Name of the sheet to write.
`rownames`	Include row names in the output?
`start_row`	First row of the sheet to write. Useful if writing multiple tables.
`start_col`	First column to write.
`...`	Set of extra arguments given to openxlsx.

Value

List containing the sheet and workbook written as well as the bottom-right coordinates of the last row/column written to the worksheet.

See Also

openxlsx

Examples

```
 ## Not run:
  xls_coords <- write_xls(dataframe, sheet="hpgl_data")
  xls_coords <- write_xls(another_df, sheet="hpgl_data", start_row=xls_coords$end_col)

## End(Not run)
```

---

xlsx_plot_png *An attempt to improve the behaivor of openxlsx's plot inserter.*

Description

The functions provided by openxlsx for adding plots to xlsx files are quite nice, but they can be a little annoying. This attempt to catch some corner cases and potentially save an extra svg-version of each plot inserted.

Usage

```
xlsx_plot_png(a_plot, wb = NULL, sheet = 1, width = 6, height = 6,
  res = 90, plotname = "plot", savedir = "saved_plots",
  fancy_type = "pdf", start_row = 1, start_col = 1, file_type = "png",
  units = "in", ...)
```

Arguments

a_plot	The plot provided
wb	Workbook to which to write.
sheet	Name or number of the sheet to which to add the plot.
width	Plot width in the sheet.
height	Plot height in the sheet.
res	Resolution of the png image inserted into the sheet.
plotname	Prefix of the pdf file created.
savedir	Directory to which to save pdf copies of the plots.
fancy_type	Plot publication quality images in this format.
start_row	Row on which to place the plot in the sheet.

start_col	Column on which to place the plot in the sheet.
file_type	Currently this only does pngs, but perhaps I will parameterize this.
units	Units for the png plotter.
...	Extra arguments are passed to arglist (Primarily for vennerable plots which are odd)

Value

A list containing the result of the tryCatch used to invoke the plot prints.

See Also

openxlsx

Examples

```
## Not run:
 fun_plot <- plot_pca(stuff)$plot
 try_results <- xlsx_plot_png(fun_plot)

## End(Not run)
```

---

ymxb_print *Print a model as y = mx + b just like in grade school!*

Description

Because, why not!?

Usage

```
ymxb_print(model)
```

Arguments

model	Model to print from glm/lm/robustbase.

Value

a string representation of that model.

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