Package 'hpgltools'

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Type Package

Title A pile of (hopefully) useful R functions

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Author Ashton Trey Belew, Keith Hughitt

Maintainer Ashton Trey Belew <abelew@gmail.com>

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

Imports Biobase, knitr, ggplot2, magrittr, methods

VignetteBuilder knitr

RoxygenNote 5.0.1

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.

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, conditions = NULL, batches = NULL, model_cond = TRUE,
  model_batch = TRUE, model_intercept = TRUE, extra_contrasts = NULL,
  alt_model = NULL, libsize = NULL, annot_df = NULL, ...)
```

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.
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.
...	Picks up extra arguments into arglist, currently only passed to write_limma().

Value

A list of limma, deseq, edger results.

Examples

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

## 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, 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.

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 cbcbSEQ.*

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",
  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.
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

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")
```

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.

Value

Df of orthologs.

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

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.

Examples

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

## End(Not run)
```

check_clusterprofiler *Make sure that clusterProfiler is ready to run.*

Description

Many of our ontology searches are using non-supported organisms. These need to have a geneTable.rda file in place which maps the gene IDs to GO IDs. This function checks for that file and attempts to set it up if it is not found.

Usage

```
check_clusterprofiler(gff = "test.gff", goids_df = NULL)
```

Arguments

gff	Ggff file containing annotation data (gene lengths).
goids_df	Data frame of gene IDs and GO ontologies 1:1, other columns are ignored.

Value

GO2EG data structure created, probably don't save this, it is entirely too big.

Examples

```
## Not run:
 go2eg <- check_clusterprofiler(gff, goids_df)
 rm(go2eg)

## End(Not run)
```

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, force = FALSE, ...)
```

Arguments

input	Expt input.
force	Force non-standard data
...	More options for future expansion

Value

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

`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(conditions, batches, model_batch = TRUE, model_cond = TRUE,
  model_intercept = TRUE, alt_model = NULL, alt_string = NULL,
  intercept = 0, reverse = FALSE)
```

Arguments

`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.

Value

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

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.

Examples

```
object <- choose_orgdb("homo_sapiens")
```

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.

Examples

```
object <- choose_txdb("homo_sapiens")
```

---

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 = "/usr/bin/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 = "reference/go/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_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, csv = NULL,
  excel = NULL,
  excel_title = "Table SXXX: Combined Differential Expression of YYY",
  excel_sheet = "combined_DE", keepers = "all", include_basic = TRUE,
  add_plots = TRUE, plot_dim = 6, compare_plots = TRUE)
```

Arguments

`all_pairwise_result`	Output from all_pairwise().
`extra_annot`	Add some annotation information?
`csv`	On some computers (Edson!) printing to excel runs the machine oom for big data sets.
`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.
`excel_sheet`	Name the excel sheet.
`keepers`	List of reformatted table names to explicitly keep certain contrasts in specific orders and orientations.
`include_basic`	Include my stupid basic logFC tables?
`add_plots`	Add plots to the end of the sheets with expression values?
`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 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')

## 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

`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.

Value

Some plots

---

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)
```

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.

Value

List of the results.

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!

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.

Value

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

See Also

Biobase

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)
```

---

create_combined_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

```
create_combined_table(li, ed, de, ba, table_name, annot_df = NULL,
  inverse = FALSE, include_basic = TRUE, fc_cutoff = 1, p_cutoff = 0.05)
```

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?
include_basic	Include the basic table?
fc_cutoff	Preferred logfoldchange cutoff.
p_cutoff	Preferred pvalue cutoff.

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.

---

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 hpgl_read_files 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).

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

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?
alt_model	Provide an arbitrary model here.
extra_contrasts	Provide extra contrasts here.
model_intercept	Use an intercept model? DESeq seems to not be a fan of them.
model_batch	Is batch in the experimental model?
annot_df	Include some annotation information in the results?
force	Force deseq to accept data which likely violates its assumptions.
...	triple dots! Options are passed to arglist.

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 results estimateSizeFactors estimateDispersions nbinomWaldTest

Examples

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

## End(Not run)
```

---

deseq_coefficient_scatter

Plot out 2 coefficients with respect to one another from deseq2.

Description

It can be nice to see a plot of two coefficients from a deseq2 comparison with respect to one another. This hopefully makes that easy.

Usage

```
deseq_coefficient_scatter(output, toptable = NULL, x = 1, y = 2,
  gvis_filename = NULL, gvis_trendline = TRUE, z = 1.5,
  tooltip_data = NULL, base_url = NULL, color_low = "#DD0000",
  color_high = "#7B9F35", ...)
```

Arguments

output	Set of pairwise comparisons provided by deseq_pairwise().
toptable	The table to use for extracting the logfc values.
x	Name or number of the x-axis coefficient column to extract.
y	Name or number of the y-axis coefficient column to extract.
gvis_filename	Filename for plotting gvis interactive graphs of the data.
gvis_trendline	Add a trendline to the gvis plot?
z	Make pretty colors for genes this number of z-scores from the median.
tooltip_data	Dataframe of gene annotations to be used in the gvis plot.
base_url	When plotting interactive plots, have link-outs to this base url.
color_low	Color to use for low-logfc values.
color_high	Color to use for high-logfc values.
...	A few options may be added outside this scope and are left in the arglist, notably qlimit, fc_column, p_column. I need to make a consistent decision about how to handle these not-always needed parameters, either always define them in the function body, or always put them in arglist(...), doing a little of both is stupid.

Value

Ggplot2 plot showing the relationship between the two coefficients.

See Also

plot_linear_scatter deseq2_pairwise

Examples

```
## Not run:
 pretty = coefficient_scatter(deseq_data, x="wt", y="mut")

## End(Not run)
```

deseq_ma *Make a MA plot of some deseq output with pretty colors and shapes*

Description

Yay pretty colors and shapes!

Usage

```
deseq_ma(output, table = NULL)
```

Arguments

output	The result from all_pairwise(), which should be changed to handle other invocations too.
table	Result from deseq to use, left alone it chooses the first.
p_col	Column to use for p-value data.

Value

a plot!

See Also

plot_ma_de

Examples

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

## 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

`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

`FaFile` `rpkm`

Examples

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

## End(Not run)
```

edger_coefficient_scatter *Plot two coefficients with respect to one another from edgeR.*

Description

It can be nice to see a plot of two coefficients from a edger comparison with respect to one another This hopefully makes that easy.

Usage

```
edger_coefficient_scatter(output, toptable = NULL, x = 1, y = 2,
  gvis_filename = NULL, gvis_trendline = TRUE, z = 1.5,
  tooltip_data = NULL, base_url = NULL, color_low = "#DD0000",
  color_high = "#7B9F35", ...)
```

Arguments

output	Set of pairwise comparisons provided by edger_pairwise().
toptable	The table to use for extracting the logfc values.
x	Name or number of the x-axis coefficient column to extract.
y	Name or number of the y-axis coefficient column to extract.
gvis_filename	Filename for plotting gvis interactive graphs of the data.
gvis_trendline	Add a trendline to the gvis plot?
z	Make pretty colors for genes this number of z-scores from the median.
tooltip_data	Dataframe of gene annotations to be used in the gvis plot.
base_url	Add a linkout to gvis plots to this base url.
color_low	Color to use for low-logfc values.
color_high	Color to use for high-logfc values.
...	A few options may be added outside this scope and are left in the arglist, notably qlimit, fc_column, p_column. I need to make a consistent decision about how to handle these not-always needed parameters, either always define them in the function body, or always put them in arglist(...), doing a little of both is stupid.

Value

Ggplot2 plot showing the relationship between the two coefficients.

See Also

plot_linear_scatter edger_pairwise

Examples

```
## Not run:
 pretty = coefficient_scatter(limma_data, x="wt", y="mut")

## End(Not run)
```

---

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

Description

Yay pretty colors and shapes!

Usage

```
edger_ma(output, table = NULL)
```

Arguments

output	The result from all_pairwise(), which should be changed to handle other invocations too.
table	Result from edger to use, left alone it chooses the first.
p_col	Column to use for p-value data.

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)
```

`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, 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 = "default", ...)
```

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.

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 topTags glmLRT make_pairwise_contrasts DGEList calcNormFactors estimateTagwiseDisp estimateCommonDisp estimateGLMCommonDisp estimateGLMTrendedDisp glmFit

Examples

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

## End(Not run)
```

`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_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.

`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"), possible_ids = c("GENEID", "CDSID",
  "TXID"))
```

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.
possible_ids	Corresponding IDs for the above types.

Value

Dataframe containing 2 columns: ID, length

`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, z = NULL, n = NULL, p_type = "adj",
  excel = "excel/significant_genes.xlsx", csv = NULL)
```

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'.
`z`	Z-score to define 'significant'.
`n`	Take the top/bottom-n genes.
`p_type`	use an adjusted p-value?
`excel`	Write the results to this excel file, or NULL.
`csv`	Write csv instead of xlsx when running OOM.

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

`fast.svd`

`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)
```

---

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_data, ontology = NULL, pval = 0.1,
  include_all = FALSE, ...)
```

Arguments

goseq_data	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

simple_goseq buildGOmap,

Examples

```
## Not run:
 data = simple_goseq(de_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")
```

Arguments

accession	Accession to download and import

Value

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

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.

Value

Granges data

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 which this uses to decide what to keep.

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` which this uses to decide what to keep.

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 which this uses to decide what to keep.

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

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

keggGet

Examples

```
mapping <- generate_kegg_pathway_mapping(c("hsa00040", "hsa00100"))
```

`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_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", 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...
include_lengths	Also perform a search on structural elements in the genome?

Value

Df of some (by default) human annotations.

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")
```

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.

Value

Df of geneIDs and GOIDs.

See Also

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

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 import.gff

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.

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!

---

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.

Value

List of dataframes with the annotation information.

---

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, exact = FALSE)
```

Arguments

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

Value

Dataframe of ids and names.

---

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)
```

Arguments

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

Value

Dataframe of ids and names.

---

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(expt, estimate_type = "sva_supervised", surrogates = "be",
  ...)
```

Arguments

expt	Raw experiment object
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.
...	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.

---

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

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.

Value

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

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 import.gff import.gff2 import.gff3

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 getSeq

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)
```

---

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

---

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(de_genes, godata, goid_map = "reference/go/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.
godata	Data from goseq.
goid_map	File to save go id mapping.
score_limit	Score limit for the coloring.
goids_df	Mapping of IDs to GO in the Ramigo expected format.
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.

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 = "reference/go/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

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: nonzero = a ggplot2 plot of the non-zero genes vs library size libsize = a ggplot2 bar plot of the library sizes boxplot = a ggplot2 boxplot of the raw data corheat = a recordPlot()ed pairwise correlation heatmap of the raw data smc = a recordPlot()ed view of the standard median pairwise correlation of the raw data disheat = a recordPlot()ed pairwise euclidean distance heatmap of the raw data smd = a recordPlot()ed view of the standard median pairwise distance of the raw data pcaplot = a recordPlot()ed PCA plot of the raw samples pcatable = a table describing the relative contribution of condition/batch of the raw data pcares = a table describing the relative contribution of condition/batch of the raw data pcavar = a table describing the variance of the raw data qq = a recordPlotted() view comparing the quantile/quantiles between the mean of all data and every raw sample 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

heamap.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!

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_enrich.internal` *A minor hack in the clusterProfiler function 'enrich.internal'.*

Description

I do not remember any longer why, but enrichGO errors out in ways which do not always make sense, this was written to alleviate that problem. I believe I sent a diff to the clusterProfiler author but did not hear back and so added this function.

Usage

```
hpgl_enrich.internal(gene, organism, pvalueCutoff = 1,
  pAdjustMethod = "fdr", ont, minGSSize = 2, qvalueCutoff = 0.2,
  readable = FALSE, universe = NULL)
```

Arguments

`gene`	Differentially expressed genes.
`organism`	Pull ensembl annotations if this is a supported species.
`pvalueCutoff`	P-value cutoff.
`pAdjustMethod`	P-adjust method.
`ont`	Molecular function, Biological process, or Cellular component?
`minGSSize`	Minimum gs size?
`qvalueCutoff`	Maximum allowed q-value.
`readable`	Set the readable flag for the DOSE object?
`universe`	Universe of genes to score significance against.

Value

Some clusterProfiler data.

See Also

clusterProfiler

`hpgl_enrichGO` *A minor hack in the clusterProfiler function 'enrichGO'.*

Description

I do not remember any longer why, but enrichGO errors out in ways which do not always make sense, this was written to alleviate that problem. I believe I sent a diff to the clusterProfiler author but did not hear back and so added this function.

Usage

```
hpgl_enrichGO(gene, organism = "human", ont = "MF", pvalueCutoff = 0.05,
  pAdjustMethod = "BH", universe, qvalueCutoff = 0.2, minGSSize = 2,
  readable = FALSE)
```

Arguments

`gene`	Some differentially expressed genes.
`organism`	if used will cause this to pull the ensG annotations.
`ont`	Molecular function, Biological process, or Cellular component?
`pvalueCutoff`	P-value cutoff.
`pAdjustMethod`	P-value adjustment.
`universe`	Gene universe to use.
`qvalueCutoff`	Maximum qvalue before adding.
`minGSSize`	Smallest ontology group size allowed.
`readable`	Set the readable tag on the returned object?

Value

Some clusterProfiler data.

See Also

clusterProfiler

hpgl_Gff2GeneTable *A near copy-paste of clusterProfiler's readGff().*

Description

There is a redundant merge in the original code which caused my invocations to use up all the memory on my machine.

Usage

```
hpgl_Gff2GeneTable(gffFile, compress = TRUE, split = "=")
```

Arguments

gffFile	Gff file of annotations.
compress	Compress the results?
split	Splitter when reading gff files to extract annotation information.

Value

geneTable.rda file of gene attributes.

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!

`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

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.

Examples

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

## End(Not run)
```

`hpgl_read_files` *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

```
hpgl_read_files(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!

Value

Data frame of count tables.

See Also

create_expt

Examples

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

## 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 and 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, 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).
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?

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

voom lmFit

Examples

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

keggGet

Examples

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

## End(Not run)
```

limma_coefficient_scatter *Plot out 2 coefficients with respect to one another from limma.*

Description

It can be nice to see a plot of two coefficients from a limma comparison with respect to one another. This hopefully makes that easy.

Usage

```
limma_coefficient_scatter(output, toptable = NULL, x = 1, y = 2,
  gvis_filename = NULL, gvis_trendline = TRUE, z = 1.5,
  tooltip_data = NULL, base_url = NULL, color_low = "#DD0000",
  color_high = "#7B9F35", ...)
```

Arguments

output	Set of pairwise comparisons provided by limma_pairwise().
toptable	Use this to get up/downs and color them on the scatter plot.
x	Name or number of the x-axis coefficient column to extract.
y	Name or number of the y-axis coefficient column to extract
gvis_filename	Filename for plotting gvis interactive graphs of the data.
gvis_trendline	Add a trendline to the gvis plot?
z	How far from the median to color the plot red and green.
tooltip_data	Dataframe of gene annotations to be used in the gvis plot.
base_url	Basename for gvis plots.
color_low	Color for the ups.
color_high	Color for the downs.
...	More parameters to make you happy!

Value

Ggplot2 plot showing the relationship between the two coefficients.

See Also

plot_linear_scatter limma_pairwise

Examples

```
## Not run:
 pretty = coefficient_scatter(limma_data, x="wt", y="mut")

## End(Not run)
```

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

Description

Yay pretty colors and shapes!

Usage

```
limma_ma(output, table = NULL, p_col = "adj.P.Val")
```

Arguments

output	The result from all_pairwise(), which should be changed to handle other invocations too.
table	Result from limma to use, left alone it chooses the first.
p_col	Column to use for p-value data.

Value

a plot!

See Also

plot_ma_de

Examples

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

## End(Not run)
```

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, conditions = NULL, batches = NULL,
  model_cond = TRUE, model_batch = TRUE, model_intercept = TRUE,
  extra_contrasts = NULL, alt_model = NULL, libsize = NULL,
  annot_df = NULL, ...)
```

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.
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),"
alt_model	Separate model matrix instead of the normal condition/batch.
libsize	I've recently figured out that libsize is far more important than I previously realized. Play with it here.
annot_df	Data frame for annotations.
...	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

write_limma

Examples

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

## 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

plot_linear_scatter topTable

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

`dir`	Directory containing the RData.rda.xz file.

Value

a bigger global environment

See Also

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.
keytype	mmm the key type used?
fields	Columns included in the output.
sum_exons	Perform a sum of the exons in the data set?

Value

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

See Also

select

Examples

```
## Not run:
one_gene <- load_parasite_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

Value

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

See Also

select

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

select

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, keytype = "ENSEMBL")
```

Arguments

orgdb	OrganismDb instance.
gene_ids	Identifiers of the genes to retrieve annotations.
keytype	the keytype, damn I really need to read this code

Value

Df of kegg mappings

See Also

select

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

select

Examples

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

## End(Not run)
```

---

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!

makeSVD *this a function scabbed from Hector and Kwame's cbcbSEQ*

Description

It just does fast.svd of a matrix comprised of the matrix - rowMeans(matrix)

Usage

```
makeSVD(data)
```

Arguments

data	A data frame to decompose

Value

a list containing the s,v,u from fast.svd

See Also

corpcor fast.svd

Examples

```
## Not run:
 svd = makeSVD(data)

## End(Not run)
```

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

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.

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 = "organdb", ...)
```

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

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.

Value

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

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.

---

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	Model describing 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.

Value

List including the following information: all_pairwise_contrasts = the result from makeContrasts(...) identities = the string identifying each condition alone all_pairwise = the string identifying each pairwise comparison alone contrast_string = the string passed to R to call makeContrasts(...) names = the names given to the identities/contrasts

See Also

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 googleVis 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, gff = NULL, output_dir = "organismdbi", ...)
```

Arguments

orgdb_info	List of data frames generated by make_orgdb_info().
cfg	Configuration data frame as per make_orgdb.
gff	File to read

Value

List of the resulting txDb package and whether it installed.

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)
```

Arguments

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

Value

Data frame of the medians.

Examples

```
## Not run:
 compressed = hpgltools:::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.

---

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.

Value

a table of gene information

See Also

select

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

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

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.
`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_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.
verbose	Whether or not to enable verbose output.

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 PDict FaFile

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

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

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

---

`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.
...	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 *Packages generated by make_organismdbi(), make_orgdb(), and make_txdb() are entirely too fragile. 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.

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

hpgl_cor brewer.pal recordPlot

Examples

```
## corheat_plot = hpgl_corheat(expt=expt, method="robust")
## corheat_plot
```

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

brewer.pal heatmap.2 recordPlot

Examples

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

## 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_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

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 = 20, cutoff = 0.1, n = 10,
  mincat = 10, 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** 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 = 20, cutoff = 0.1, n = 12,
  group_minsize = 5, ...)
```

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.
...	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(counts, degenes, tooltip_data = NULL,
  filename = "html/gvis_ma_plot.html", base_url = "", ...)
```

Arguments

counts	Df of counts which have been normalized counts by sample-type, which is to say the output from voom/voomMod/hpgl_voom().
degenes	Df from toptable or its friends containing p-values.
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_ma() for details.

See Also

plot_ma

Examples

```
## Not run:
 plot_gvis_ma(voomed_data, toptable_data, 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

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

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

brewer.pal recordPlot

---

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

geom_histogram geom_density

Examples

```
## Not run:
 kittytime = plot_histogram(df)

## End(Not run)
```

`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

`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

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

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 *Make a pretty MA plot from the output of voom/limma/eBayes/toptable.*

Description

Make a pretty MA plot from the output of voom/limma/eBayes/toptable.

Usage

```
plot_ma(counts, de_genes, pval_cutoff = 0.05, alpha = 0.4,
  logfc_cutoff = 1, pval = "adjpval", size = 2, tooltip_data = NULL,
  gvis_filename = NULL, ...)
```

Arguments

counts	Df of linear-modelling, normalized counts by sample-type, which is to say the output from voom/voomMod/hpgl_voom().
de_genes	Df from toptable or its friends containing p-values.
pval_cutoff	Cutoff defining significant from not.
alpha	How transparent to make the dots.
logfc_cutoff	Fold change cutoff.
pval	Name of the pvalue column to use for cutoffs.
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

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_ma_de` *Make a pretty MA plot from a DE tool (limma/deseq/edger/basic*

Description

Make a pretty MA plot from a DE tool (limma/deseq/edger/basic

Usage

```
plot_ma_de(table, expr_col = "logCPM", fc_col = "logFC", p_col = "qvalue",
  pval_cutoff = 0.05, alpha = 0.4, logfc_cutoff = 1, 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.
`alpha`	How transparent to make the dots.
`logfc_cutoff`	Fold change cutoff.
`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!
`pval`	Name of the pvalue column to use for cutoffs.

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

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

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

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.'

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")
```

Arguments

df	Some data from topgo/goseq/clusterprofiler.
ontology	Ontology to plot (MF,BP,CC).

Value

Ggplot2 plot of pvalues vs. ontology.

See Also

goseq **ggplot2**

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

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: pca = the result of fast.svd() plot = ggplot2 pca_plot describing the principle component analysis of the samples. table = a table of the PCA plot data res = a table of the PCA res data variance = a table of the PCA plot variance This makes use of cbcbSEQ and prints the table of variance by component.

See Also

makeSVD, 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?

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 = NULL, 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.

---

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.

---

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.

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

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

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_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

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.

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.

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", modify_y = TRUE, ...)
```

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

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)
```

Arguments

file	a filename to write

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",
  csv = NULL, according = "limma", summary_count = 1)
```

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.

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.

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

biocLite install.packages

Examples

```
## Not run:
require.auto("ggplot2")

## End(Not run)
```

---

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?

Value

Command string used to save the global environment.

See Also

save pipe

Examples

```
## Not run:
 ## saveme()

## End(Not run)
```

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, semantic = c("mucin",
  "sialidase", "RHS", "MASP", "DGF"), 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.
semantic	Set of strings with gene names to exclude.
semantic_column	Column in the DE table used to find the semantic strings for removal.

Value

Smaller list of up/down genes.

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 letterFrequency FaFile

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.
`ids`	Specific samples to change.
`...`	Extra options are like spinach.
`factor`	Batches to replace.

Value

The original expt with some new metadata.

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

After fiddling with conditions/batches, one might want to change the colors.

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")

set_expt_colors(expt, colors = TRUE, chosen_palette = "Dark2")
```

Arguments

`expt`	Expt to modify.
`colors`	New color list.
`ids`	Specific ids to change.
`...`	Arguments passed along (likely colors)
`expt`	Expt to modify
`colors`	colors to replace

Value

expt Send back the expt with some new metadata

expt Send back the expt with some new metadata

Examples

```
## Not run:
 expt = set_expt_colors(big_expt)  ## This will call rcolorbrewer again

## End(Not run)
## Not run:
 expt = set_expt_batch(big_expt, factor=c(some,stuff,here))

## 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, ids = NULL, ...)
```

Arguments

expt	Expt to modify
factor	Conditions to replace
colors	Reset the set of colors (Give a factor if you want to choose your own).

Value

expt Send back the expt with some new metadata

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
...	Arguments passed along (likely colors)

Value

expt Send back the expt with some new metadata

Examples

```
## Not run:
 expt = set_expt_factors(big_expt, condition="column", batch="another_column")

## 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 = c("ENSEMBL", "SYMBOL", "ENTREZID"),
  go_level = 3, pcutoff = 0.05, qcutoff = 0.1, fc_column = "logFC",
  permutations = 100, min_groupsize = 5, kegg_prefix = "Dmel_",
  kegg_organism = "dme", kegg_id_column = "FLYBASECG", categories = 12)
```

Arguments

`sig_genes`	Dataframe of genes deemed 'significant.'
`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.
`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?
`permutations`	How many permutations for GSEA-ish analyses?
`min_groupsize`	What is the minimum ontology group's size?
`kegg_prefix`	Many KEGG ids need a prefix before they will cross reference.

kegg_organism	Choose the 3 letter KEGG organism name here.
kegg_id_column	Column in the orgdb to use for cross referencing to KEGG.
categories	How many categories should be plotted in bar/dot plots?
universe	Dataframe of all genes in the analysis, primarily for gse analyses.

`simple_clusterprofiler_old` *Perform a simplified clusterProfiler analysis.*

Description

I like clusterProfiler quite a lot, but making it work for non-standard species is a bit of a chore. This attempts to alleivate some of those headaches and cover some corner cases where it fails.

Usage

```
simple_clusterprofiler_old(de_genes, goids_df = NULL, golevel = 4,
  pcutoff = 0.1, fold_changes = NULL, include_cnetplots = FALSE,
  showcategory = 12, universe = NULL, species = "undef", gff = NULL,
  wrapped_width = 20, method = "Wallenius", padjust = "BH", ...)
```

Arguments

de_genes	Data frame of differentially expressed genes, it must contain an ID column.
goids_df	df containing mappings of genes to goids in the format expected by buildGOmap().
golevel	Relative level in the tree for printing p-value plots, higher is more specific.
pcutoff	(Adj)p-value cutoff to define 'significant'.
fold_changes	Df of fold changes for the DE genes.
include_cnetplots	Cnetplots often have too many glyphs to read, so by default they are not included, however on occasion they are fairly interesting to look at.
showcategory	How many categories to show in p-value plots? Too many and they become illegible.
universe	Gene universe to use.
species	Name of the species to use if supported, jibberish otherwise.
gff	Gff file to generate the universe of genes.
wrapped_width	Width of ontology names in the pvalue plots, too long and the bars disappear, too short and the words run into the lines above.
method	Method for calculating p-values.
padjust	Method for adjusting the p-values.
...	More options, passed to arglist.

Value

List including the following: mf_interesting: A table of the interesting molecular function groups bp_interesting: A table of the interesting biological process groups cc_interesting: A table of the interesting cellular component groups mf_pvals: A histogram of the molecular function p-values bp_pvals: Ditto, biological process cc_pvals: And cellular component... mf_enriched: A table of the enriched molecular function groups by adjusted p-value. bp_enriched: yep, you guessed it cc_enriched: cellular component, too mf_all/bp_all/cc_all: A table of all go categories observed (mf/bp/cc respectively) mfp_plot/bpp_plot/ccp_plot: ggplot2 p-value bar plots describing the over represented groups mf_cnetplot/bp_cnetplot/cc_cnetplot: clusterProfiler cnetplots mf_group_barplot/bp_group_barplot/cc_g The group barplots from clusterProfiler

Examples

```
## Not run:
 up_cluster = simple_clusterprofiler(mga2_ll_thy_top, goids=goids, gff="reference/genome/gas.gff")
## > Some chattery while it runs
## tail(head(up_cluster$bp_interesting, n=10), n=1)
## > ID ont GeneRatio BgRatio     pvalue   p.adjust    qvalue
## > 10 GO:0009311  BP     5/195 10/1262 0.01089364 0.01089364 0.1272835
## >   geneID Count
## >   10 M5005_Spy1632/M5005_Spy1637/M5005_Spy1635/M5005_Spy1636/M5005_Spy1638     5
## >   Description
## >   10 oligosaccharide metabolic process

## End(Not run)
```

`simple_comparison` *Perform a simple experimental/control comparison.*

Description

This is a function written primarily to provide examples for how to use limma. It does the following: 1. Makes a model matrix using condition/batch 2. Optionally uses sva's combat (from cbcbSEQ) 3. Runs voom/lmfit 4. Sets the first element of the design to "changed" and the second to "control". 5. Performs a makeContrasts() of changed - control. 6. Fits them 7. Makes histograms of the two elements of the contrast, cor.tests() them, makes a histogram of the p-values, ma-plot, volcano-plot, writes out the results in an excel sheet, pulls the up/down significant and p-value significant (maybe this should be replaced with write_limma()? 8. And returns a list containining these data and plots. 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.

Usage

```
simple_comparison(subset, workbook = "simple_comparison.xls",
  sheet = "simple_comparison", basename = NA, batch = TRUE,
  combat = FALSE, combat_noscale = TRUE, pvalue_cutoff = 0.05,
  logfc_cutoff = 0.6, tooltip_data = NULL, ...)
```

Arguments

subset	Experimental subset with two conditions to compare.
workbook	Excel workbook to which to write.
sheet	Excel worksheet to which to write.
basename	Url to which to send click evens in clicky volcano/ma plots.
batch	Whether or not to include batch in limma's model.
combat	Whether or not to use combatMod().
combat_noscale	Whether or not to include combat_noscale (makes combat a little less heavy-handed).
pvalue_cutoff	P-value definition of 'significant.'
logfc_cutoff	Fold-change cutoff of significance. 0.6 on the low end and therefore 1.6 on the high.
tooltip_data	Text descriptions of genes if one wants google graphs.
...	More parameters!

Value

A list containing the following pieces: amean_histogram = a histogram of the mean values between the two conditions coef_amean_cor = a correlation test between the mean values and coefficients (this should be a p-value of 1) coefficient_scatter = a scatter plot of condition 2 on the y axis and condition 1 on x coefficient_x = a histogram of the x axis coefficient_y = a histogram of the y axis coefficient_both = a histogram of both coefficient_lm = a description of the line described by y=slope(y/x)+b where coefficient_lmsummary = the r-squared and such information for the linear model coefficient_weights = the weights against the linear model, higher weights mean closer to the line comparisons = the result from eBayes() contrasts = the result from contrasts.fit() contrast_histogram = a histogram of the coefficients downsignificant = a subset from toptable() of the 'down-regulated' genes (< 1 Z from the mean) fit = the result from lmFit(voom_result) ma_plot = an ma plot using the voom$E data and p-values psignificant = a subset from toptable() of all genes with p-values <= pvalue_cutoff pvalue_histogram = a histogram of all the p-values table = everything from toptable() upsignificant = a subset from toptable() of 'up-regulated' genes (> 1 Z from the mean) volcano_plot = a volcano plot of x/y voom_data = the result from calling voom() voom_plot = a plot from voom(), redunant with voom_data

See Also

plot_gvis_ma toptable voom hpgl_voom lmFit makeContrasts contrasts.fit

Examples

```
## Not run:
 model = model.matrix(~ 0 + subset$conditions)
 simple_comparison(subset, model)

## 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, 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.

Examples

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

## End(Not run)
```

`simple_gadem` *run the rGADEM suite*

Description

This is another function I started but never had cause to finish for the test sequences it works though

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.

`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(de_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

de_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 goseq nullp

---

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(de_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

de_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

---

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(de_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)
```

Arguments

de_genes	guess!
species	an organism supported by gprofiler
first_col	where to search for the order of 'significant' first
second_col	if that fails, try some where else.
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?

Value

a list of results for go, kegg, reactome, and a few more.

---

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(de_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, ...)
```

Arguments

de_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?
...	Other options which I do not remember right now!

Value

Big list including the various outputs from 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.

---

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.

---

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

Examples

```
## Not run:
summed <- sum_exons(counts, gff='reference/xenopus_laevis.gff.xz')

## End(Not run)
```

---

s_p *Silence, peasant!*

Description

Some libraries/functions just won't shut up. Ergo, silence, peasant! This function uses 2 invocations of capture.output and a try(silent=TRUE) to capture the strings of the outputs from the given expression in 'output', and the messages in 'message'. The result of the expression goes into 'result.' If there is an error in the expression, it is returned as a try-error object which may therefore be inspected as needed.

Usage

```
s_p(code)
```

Arguments

code	Some code to shut up.

Value

List of the output log, message log, and result of the expression.

`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

`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?

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)
```

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

Value

Big list including the various outputs from 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, transform = "raw", base = NULL, ...)
```

Arguments

count_table	A matrix of count data
transform	A type of transformation to perform: log2/log10/log
base	for other log scales
...	Options I might pass from other functions are dropped into arglist.

Value

dataframe of logx(counts)

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", to = "entrez",
  species = "human")
```

Arguments

`queries`	Gene IDs to translate.
`from`	Database to translate IDs from.
`to`	Database to translate IDs into.
`species`	Human readable species for translation (Eg. 'human' instead of 'hsapiens'.)

Value

Df of translated IDs/accessions

See Also

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?

tryCatch.W.E *tryCatch both warnings and errors*

Description

We want to catch *and* save both errors and warnings, and in the case of a warning, also keep the computed result.

Usage

```
tryCatch.W.E(expr)
```

Arguments

expr	an expression to try

Details

This was taken from:http://r.789695.n4.nabble.com/How-to-catch-both-warnings-and-errors-td3073597.html and http://tolstoy.newcastle.edu.au/R/help/04/06/0217.html

Value

a list with 'value' and 'warning', where 'value' may be an error caught.

Author(s)

Martin Maechler

`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 gather some plots about a troubling dataset*

Description

variancePartition is the newest toy introduced by Hector

Usage

```
varpart(expt, factors = c("condition", "batch"), cpus = 6, genes = 20)
```

Arguments

`expt`	Some data
`factors`	Character list of columns in the experiment design to query
`cpus`	Number cpus to use
`genes`	Number of genes to count

Value

partitions List of plots and variance data frames

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, file = "excel/goseq.xlsx", pval = 0.1,
  add_plots = TRUE)
```

Arguments

goseq	A set of results from simple_goseq().
file	An excel file to which to write some pretty results.
pval	Choose a cutoff for reporting by p-value.
add_plots	Include some pvalue plots in the excel output?

Value

The result from openxlsx

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
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

`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, ...)
```

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?

`write_limma` *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

```
write_limma(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

toptable write_xls

Examples

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

## 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

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, 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.
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 writeDataTable

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)
```

---

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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