Package ‘Glimma’

November 20, 2016

Type    Package
Title   Interactive HTML graphics
Version 1.2.1
Date    2016-02-29
Author  Shian Su, Matt Ritchie, Charity Law
Maintainer Shian Su <su.s@wehi.edu.au>
Description This package generates interactive visualisations for analysis of RNA-sequencing data using output from limma, edgeR or DESeq2 packages in an HTML page. The interactions are built on top of the popular static representations of analysis results in order to provide additional information.

biocViews DifferentialExpression, ReportWriting, RNASeq, Visualization
Depends R (>= 3.3.0)
Imports DESeq2, edgeR, grDevices, methods, stats, utils
Suggests BiocStyle, limma
License GPL-3 | file LICENSE
URL https://github.com/Shians/Glimma
BugReports https://github.com/Shians/Glimma/issues
RoxygenNote 5.0.1
NeedsCompilation no
LazyData true

R topics documented:

as.hexcol .................................................. 2
CharToHexCol ............................................. 3
glAutoinput .............................................. 3
glBar ....................................................... 4
glBar.default ............................................. 4
glimma ...................................................... 5
glink ....................................................... 6
glMDPlot ................................................... 7
glMDPlot.default ....................................... 8
glMDPlot.DESeqDataSet ................................. 10
glMDPlot.DESeqResults ................................. 11
as.hexcol

**Description**

Functions to convert numbers into corresponding hex codes for colours

**Usage**

```r
as.hexcol(x)
```

**Arguments**

- `x` the colour value(s) to be converted to hex values.

**Value**

hex codes for colours

**Examples**

```r
as.hexcol(c(1, 2, 3))
as.hexcol(c("red", "black", "green"))
```
**CharToHexCol**  
*String to hex colour converter*

**Description**
Function to convert colour strings into hex codes

**Usage**
```
CharToHexCol(x)
```

**Arguments**
- `x`  
  the string colour value(s) to be converted to hex values.

**Value**
hex codes for colours

---

**glAutoinput**  
*Glimma Autocomplete Input*

**Description**
Create an autocompleted input field.

**Usage**
```
glAutoinput(target, action, idval = "none", flag = "none")
```

**Arguments**
- `target`  
  the index of the plot which receives the event and performs an action.
- `action`  
  the action to be performed at target plot using input information.
- `idval`  
  the column from which the autocomplete list will be populated.
- `flag`  
  indicates special flags for custom features.

**Value**
a input object containing the input field information.
glBar

Glimma MD Plot

Description
Create an interactive bar plot object.

Usage
glBar(x, ...)

Arguments
- x: the data.frame containing data to plot.
- ...: additional arguments depending on input object type.

Value
A chart object containing the information to create an interactive bar plot.

Author(s)
Shian Su

See Also
- glBar.default

Examples
```r
data(mtcars)
counts <- table(mtcars$gear)
data <- data.frame(nGears=as.numeric(names(counts)), Count=as.numeric(counts))
plot1 <- glBar(data, "Count", "nGears", ylab="Number of Gears")
glimma(plot1, layout=c(1,1), launch=TRUE)
```

---

glBar.default

Glimma MD Plot

Description
Default method for interactive bar plot.

Usage
```r
## Default S3 method:
glBar(x, yval, names.arg = rownames(x), ndigits = NULL, signif = 6, xlab = NULL, ylab = yval, main = NULL, height = 400, width = 500, colval = NULL, annot = yval, flag = NULL, info = NULL, ...)
```
Arguments

x           the data.frame containing data to plot.
yval        the column name for the x-axis values.
names.arg   the column name for the label on each bar.
ndigits     the number of digits after the decimal to round to in the tooltip (overrides signif).
signif       the number of significant figures to display in the tooltip.
xlab        the label on the x-axis.
ylab        the label on the y-axis.
main        the title for the plot.
height      the height of the plot (in pixels).
width       the width of the plot (in pixels).
colval      the colours for each data point.
annot       the columns to display in the tooltip.
flag         the special flag to indicate special plot.
info        additional information for plotting.
...         additional arguments.

Value

A chart object containing the information to create an interactive bar plot.

Author(s)

Shian Su

Examples

data(mtcars)
counts <- table(mtcars$gear)
data <- data.frame(nGears=as.numeric(names(counts)), Count=as.numeric(counts))

plot1 <- glBar(data, "Count", "nGears", ylab="Number of Gears")
glimma(plot1, layout=c(1,1), launch=TRUE)

Description

Core glimma plot manager. Generates environment for glimma plots.

Usage

glimma(..., layout = c(1, 1), path = getwd(), folder = "glimma-plots",
html = "index", overwrite = TRUE, launch = TRUE)
Arguments

... the jschart or jslink objects for processing.
layout the numeric vector representing the number of rows and columns in plot window.
path the path in which the folder will be created.
folder the name of the fold to save html file to.
html the name of the html file to save plots to.
overwrite the option to overwrite existing folder if it already exists.
launch TRUE to launch plot after call.

Value
Generates interactive plots based on filling layout row by row from left to right.

Examples

data(iris)

plot1 <- glScatter(iris, xval="Sepal.Length", yval="Sepal.Width", colval="Species")
glimma(plot1, c(1,1))

gllink

Plot linkages

Description
Helper function for writing the link properties in interactive Glimma plots

Usage
gllink(from, to, src = "none", dest = "none", flag = "none",
both = FALSE, info = "none")

Arguments
from the index of the plot from which the event is dispatched.
to the index of the plot which receives the event and performs an action.
src the action that is performed in the "from" plot.
dest the action that is performed in the "to" plot.
flag indicates special links for particular chart types.
both creates symmetric links whereby the "dest" action in "to" also triggers the "src" action in "from".
info additional info for creating the link.

Value
a link object containing the plot linking information.
Examples

```r
data(iris)
data <- data.frame(Name=paste("Flower", 1:nrow(iris), sep="-"), iris)

plot1 <- g1Scatter(data, xval="Sepal.Length", yval="Sepal.Width", colval="Species")
plot2 <- g1Scatter(data, xval="Species", yval="Petal.Length", colval="Species")
link1 <- g1link(1, 2, src="hover", dest="hover", both=TRUE)
glimma(plot1, plot2, link1, layout=c(1,2))
```

---

g1MDPlot  

Glimma MD Plot

Description

Draw an interactive MD plot

Usage

```r
g1MDPlot(x, ...)```

Arguments

- **x**  
  the DE object to plot.

- **...**  
  additional arguments affecting the plots produced. See specific methods for detailed arguments.

Value

Draws a two-panel interactive MD plot in an html page. The left plot shows the log-fold-change vs average expression. The right plot shows the expression levels of a particular gene of each sample. Hovering over points on left plot will plot expression level for corresponding gene, clicking on points will fix the expression plot to gene. Clicking on rows on the table has the same effect as clicking on the corresponding gene in the plot.

Author(s)

Shian Su

See Also

- `g1MDPlot.default`, `g1MDPlot.DGELRT`, `g1MDPlot.DGEExact`, `g1MDPlot.MArrayLM`, `g1MDPlot.DESeqDataSet`

Examples

```r
library(limma)
library(edgeR)

data(lymphomaRNAseq)
x <- lymphomaRNAseq

sel <- rowSums(cpm(x$counts)>0.5)>=3
```
```r
x <- x[sel,]

genotype <- relevel(x$samples$group, "Smchd1-null")
x <- calcNormFactors(x, method="TMM")
des <- model.matrix(~genotype)

## Apply voom with sample quality weights and fit linear model
v <- voomWithQualityWeights(x, design=des, normalization="none", plot=FALSE)
vfit <- lmFit(v, des)

## Apply treat relative to a fold-change of 1.5
vtfit <- treat(vfit.lfc=log2(1.5))
vfit <- eBayes(vfit)
results <- decideTests(vfit,p.value=0.01)

glMDPlot(vfit, counts=x$counts, anno=x$genes, groups=genotype, samples=1:7, status=results[,2], main="MD plot: Wild-type vs Smchd1", display.columns=c("Symbols", "GeneID", "GeneName"), folder="Smchd1-Lymphoma")
```

---

**glMDPlot.default**  
**Glimma MD Plot**

**Description**

Draw an interactive MD plot from a data.frame

**Usage**

```r
## Default S3 method:
glMDPlot(x, xval, yval, counts = NULL, anno = NULL, 
groups, samples = NULL, status = rep(0, nrow(x)), transform = TRUE, 
side.xlab = "Group", side.ylab = "logCPM", side.log = FALSE, 
side.gridstep = ifelse(!transform || side.log, FALSE, 0.5), xlab = xval, 
ylab = yval, search.by = "Symbols", jitter = 30, id.column = "GeneID", 
display.columns = id.column, cols = c("#0000FF", "#858585", "#B32222"), 
sample.cols = rep("#1f77b4", ncol(counts)), table = TRUE, 
path = getwd(), folder = "glimma-plots", html = "MD-Plot", 
launch = TRUE, ...)
```

**Arguments**

- `x`  
  the data.frame object containing expression and fold change values.
- `xval`  
  the column to plot on x axis of left plot.
- `yval`  
  the column to plot on y axis of left plot.
- `counts`  
  the matrix containing all counts.
- `anno`  
  the data.frame containing gene annotations.
- `groups`  
  the factor containing experimental groups of the samples.
samples
status
transform
side.xlab
side.ylab
side.log
side.gridstep
xlab
ylab
search.by
jitter
id.column
display.columns
cols
sample.cols
table
path
folder
html
launch
... 
Value

Draws a two-panel interactive MD plot in an html page. The left plot shows the log-fold-change vs average expression. The right plot shows the expression levels of a particular gene of each sample. Hovering over points on left plot will plot expression level for corresponding gene, clicking on points will fix the expression plot to gene. Clicking on rows on the table has the same effect as clicking on the corresponding gene in the plot.

Author(s)

Shian Su
Description

Draw an interactive MD plot from a DESeqDataSet object

Usage

```r
## S3 method for class 'DESeqDataSet'
glMDPlot(x, anno, groups, samples, status = rep(0, nrow(x)), transform = TRUE, side.xlab = "Group", side.ylab = "logMean", side.log = FALSE, side.gridstep = ifelse(!transform || side.log, FALSE, 0.5), search.by = "Symbols", jitter = 30, id.column = "GeneID", display.columns = NULL, cols = c("#0000FF", "#858585", "#B32222"), sample.cols = rep("#1f77b4", ncol(x)), table = TRUE, path = getwd(), folder = "glimma-plots", html = "MD-Plot", launch = TRUE, ...)
```

Arguments

- `x` the DESeqDataSet object.
- `anno` the data.frame containing gene annotations.
- `groups` the factor containing experimental groups of the samples.
- `samples` the names of the samples.
- `status` vector giving the control status of data point, of same length as the number of rows of object. If NULL, then all points are plotted in the default colour.
- `transform` TRUE if counts are raw and should be cpm transformed, FALSE if counts are already transformed to expression scale.
- `side.xlab` label for x axis on right side plot.
- `side.ylab` label for y axis on right side plot.
- `side.log` TRUE to plot expression on the side plot on log scale.
- `side.gridstep` intervals along which to place grid lines on y axis. Currently only available for linear scale.
- `search.by` the name of the column which will be used to search for data points. (should contain unique values)
- `jitter` the amount of jitter to apply to the samples in the expressions plot.
- `id.column` the column containing unique identifiers for each gene.
- `display.columns` character vector containing names of columns to display in mouseover tooltips and table.
- `cols` vector of strings denoting colours corresponding to control status -1, 0 and 1. (may be R named colours or Hex values)
- `sample.cols` vector of strings denoting colours for each sample point on the expression plot.
- `table` logical variable for whether a table of the data should appear on the bottom of the HTML page.
- `path` the path in which the folder will be created.
glMDPlot.DESeqResults

folder the name of the fold to save html file to.
html the name of the html file to save plots to.
launch TRUE to launch plot after call.
... additional arguments to be passed onto the MD plot. (main, xlab, ylab can be set for the left plot)

Value

Draws a two-panel interactive MD plot in an html page. The left plot shows the log-fold-change vs average expression. The right plot shows the expression levels of a particular gene of each sample. Hovering over points on left plot will plot expression level for corresponding gene, clicking on points will fix the expression plot to gene. Clicking on rows on the table has the same effect as clicking on the corresponding gene in the plot.

Author(s)

Shian Su

glMDPlot.DESeqResults  Glimma MD Plot

Description

Draw an interactive MD plot from a DESeqResults object

Usage

### S3 method for class 'DESeqResults'
glMDPlot(x, counts, anno, groups, samples,
    status = rep(0, nrow(x)), transform = TRUE, side.xlab = "Group",
    side.ylab = "logCPM", side.log = FALSE,
    side.gridstep = ifelse(!transform || side.log, FALSE, 0.5),
    search.by = "Symbols", jitter = 30, id.column = "GeneID",
    display.columns = NULL, cols = c("#0000FF", "#858585", "#B32222"),
    sample.cols = rep("#1f77b4", ncol(counts)), table = TRUE,
    path = getwd(), folder = "glimma-plots", html = "MD-Plot",
    launch = TRUE, ...)

Arguments

x the DESeqResults object.
counts the matrix containing all counts.
anno the data.frame containing gene annotations.
groups the factor containing experimental groups of the samples.
samples the names of the samples.
status vector giving the control status of data point, of same length as the number of rows of object. If NULL, then all points are plotted in the default colour.
transform TRUE if counts are raw and should be cpm transformed, FALSE if counts are already transformed to expression scale.
glMDPlot.DGEExact

side.xlab label for x axis on right side plot.
side.ylab label for y axis on right side plot.
side.log TRUE to plot expression on the side plot on log scale.
side.gridstep intervals along which to place grid lines on y axis. Currently only available for linear scale.
search.by the name of the column which will be used to search for data points. (should contain unique values)
jitter the amount of jitter to apply to the samples in the expressions plot.
id.column the column containing unique identifiers for each gene.
display.columns character vector containing names of columns to display in mouseover tooltips and table.
cols vector of strings denoting colours corresponding to control status -1, 0 and 1. (may be R named colours or Hex values)
sample.cols vector of strings denoting colours for each sample point on the expression plot.
table logical variable for whether a table of the data should appear on the bottom of the HTML page.
path the path in which the folder will be created.
folder the name of the fold to save html file to.
html the name of the html file to save plots to.
launch TRUE to launch plot after call.
... additional arguments to be passed onto the MD plot. (main, xlab, ylab can be set for the left plot)

Value

Draws a two-panel interactive MD plot in an html page. The left plot shows the log-fold-change vs average expression. The right plot shows the expression levels of a particular gene of each sample. Hovering over points on left plot will plot expression level for corresponding gene, clicking on points will fix the expression plot to gene. Clicking on rows on the table has the same effect as clicking on the corresponding gene in the plot.

Author(s)

Shian Su

---

glMDPlot.DGEExact  Glimma MD Plot

Description

Draw an interactive MD plot from a DGELRT objet
Usage

```r
## S3 method for class 'DGEExact'
glMDPlot(x, counts = NULL, anno = NULL, groups = rep(0, ncol(x)), samples = NULL, status = rep(0, nrow(x)), transform = TRUE, side.xlab = "Group", side.ylab = "logCPM", side.log = FALSE, side.gridstep = ifelse(!transform || side.log, FALSE, 0.5), p.adj.method = "BH", search.by = "Symbols", jitter = 30, id.column = "GeneID", display.columns = NULL, cols = c("#0000FF", "#858585", "#B32222"), sample.cols = rep("#1f77b4", ncol(counts)), table = TRUE, path = getwd(), folder = "glimma-plots", html = "MD-Plot", launch = TRUE, ...)
```

Arguments

- `x`: the DGEExact object.
- `counts`: the matrix containing all counts.
- `anno`: the data.frame containing gene annotations.
- `groups`: the factor containing experimental groups of the samples.
- `samples`: the names of the samples.
- `status`: vector giving the control status of data point, of same length as the number of rows of object. If NULL, then all points are plotted in the default colour.
- `transform`: TRUE if counts are raw and should be cpm transformed, FALSE if counts are already transformed to expression scale.
- `side.xlab`: label for x axis on right side plot.
- `side.ylab`: label for y axis on right side plot.
- `side.log`: TRUE to plot expression on the side plot on log scale.
- `side.gridstep`: intervals along which to place grid lines on y axis. Currently only available for linear scale.
- `p.adj.method`: character vector indicating multiple testing correction method. (defaults to "BH")
- `search.by`: the name of the column which will be used to search for data points. (should contain unique values)
- `jitter`: the amount of jitter to apply to the samples in the expressions plot.
- `id.column`: the column containing unique identifiers for each gene.
- `display.columns`: character vector containing names of columns to display in mouseover tooltips and table.
- `cols`: vector of strings denoting colours corresponding to control status -1, 0 and 1. (may be R named colours or Hex values)
- `sample.cols`: vector of strings denoting colours for each sample point on the expression plot.
- `table`: logical variable for whether a table of the data should appear on the bottom of the HTML page.
- `path`: the path in which the folder will be created.
- `folder`: the name of the fold to save html file to.
- `html`: the name of the html file to save plots to.
- `launch`: TRUE to launch plot after call.
- `...`: additional arguments to be passed onto the MD plot. (main, xlab, ylab can be set for the left plot)
glMDPlot.DGELRT

Value

Draws a two-panel interactive MD plot in an html page. The left plot shows the log-fold-change vs average expression. The right plot shows the expression levels of a particular gene of each sample. Hovering over points on left plot will plot expression levels for corresponding gene, clicking on points will fix the expression plot to gene. Clicking on rows on the table has the same effect as clicking on the corresponding gene in the plot.

Author(s)

Shian Su

glMDPlot.DGELRT  Glimma MD Plot

Description

Draw an interactive MD plot from a DGELRT object

Usage

```r
## S3 method for class 'DGELRT'
glMDPlot(x, counts = NULL, anno = NULL, groups = rep(0, ncol(x)), samples = NULL, status = rep(0, nrow(x)), transform = TRUE, side.xlab = "Group", side.ylab = "logCPM", side.log = FALSE, side.gridstep = ifelse(!transform || side.log, FALSE, 0.5), p.adj.method = "BH", search.by = "Symbols", jitter = 30, id.column = "GeneID", display.columns = NULL, cols = c("#0000FF", ",#858585","#B32222"), sample.cols = rep("#1f77b4", ncol(counts)), table = TRUE, path = getwd(), folder = "glimma-plots", html = "MD-Plot", launch = TRUE, ...)
```

Arguments

- `x`  the DGELRT object.
- `counts`  the matrix containing all counts.
- `anno`  the data.frame containing gene annotations.
- `groups`  the factor containing experimental groups of the samples.
- `samples`  the names of the samples.
- `status`  vector giving the control status of data point, of same length as the number of rows of object. If NULL, then all points are plotted in the default colour.
- `transform`  TRUE if counts are raw and should be cpm transformed, FALSE if counts are already transformed to expression scale.
- `side.xlab`  label for x axis on right side plot.
- `side.ylab`  label for y axis on right side plot.
- `side.log`  TRUE to plot expression on the side plot on log scale.
- `side.gridstep`  intervals along which to place grid lines on y axis. Currently only available for linear scale.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>p.adj.method</td>
<td>character vector indicating multiple testing correction method. (defaults to &quot;BH&quot;)</td>
</tr>
<tr>
<td>search.by</td>
<td>the name of the column which will be used to search for data points. (should contain unique values)</td>
</tr>
<tr>
<td>jitter</td>
<td>the amount of jitter to apply to the samples in the expressions plot.</td>
</tr>
<tr>
<td>id.column</td>
<td>the column containing unique identifiers for each gene.</td>
</tr>
<tr>
<td>display.columns</td>
<td>character vector containing names of columns to display in mouseover tooltips and table.</td>
</tr>
<tr>
<td>cols</td>
<td>vector of strings denoting colours corresponding to control status -1, 0 and 1. (may be R named colours or Hex values)</td>
</tr>
<tr>
<td>sample.cols</td>
<td>vector of strings denoting colours for each sample point on the expression plot.</td>
</tr>
<tr>
<td>table</td>
<td>logical variable for whether a table of the data should appear on the bottom of the HTML page.</td>
</tr>
<tr>
<td>path</td>
<td>the path in which the folder will be created.</td>
</tr>
<tr>
<td>folder</td>
<td>the name of the fold to save html file to.</td>
</tr>
<tr>
<td>html</td>
<td>the name of the html file to save plots to.</td>
</tr>
<tr>
<td>launch</td>
<td>TRUE to launch plot after call.</td>
</tr>
<tr>
<td>...</td>
<td>additional arguments to be passed onto the MD plot. (main, xlab, ylab can be set for the left plot)</td>
</tr>
</tbody>
</table>

**Value**

Draws a two-panel interactive MD plot in an html page. The left plot shows the log-fold-change vs average expression. The right plot shows the expression levels of a particular gene of each sample. Hovering over points on left plot will plot expression level for corresponding gene, clicking on points will fix the expression plot to gene. Clicking on rows on the table has the same effect as clicking on the corresponding gene in the plot.

**Author(s)**

Shian Su

---

**glMDPlot.MArrayLM**

**Glimma MD Plot**

**Description**

Draw an interactive MD plot from a MArrayLM object

**Usage**

```r
## S3 method for class 'MArrayLM'

glMDPlot(x, counts = NULL, anno = NULL, groups = rep(0, ncol(x)), samples = NULL, status = rep(0, nrow(x)), transform = TRUE, side.xlab = "Group", side.ylab = "logCPM", side.log = FALSE, side.gridstep = ifelse(!transform || side.log, FALSE, 0.5), coef = ncol(x$coefficients), p.adj.method = "BH", search.by = "Symbols", jitter = 30, id.column = "GeneID", display.columns = NULL, cols = c("#0000FF", "#858585", "#B32222"), sample.cols = rep("#1f77b4", ncol(counts)), table = TRUE, path = getwd(), folder = "glimma-plots", html = "MD-Plot", launch = TRUE, ...)
```
Arguments

- **x**: the MArrayLM object.
- **counts**: the matrix containing all counts.
- **anno**: the data.frame containing gene annotations.
- **groups**: the factor containing experimental groups of the samples.
- **samples**: the names of the samples.
- **status**: vector giving the control status of data point, of same length as the number of rows of object. If NULL, then all points are plotted in the default colour.
- **transform**: TRUE if counts are raw and should be cpm transformed, FALSE if counts are already transformed to expression scale.
- **side.xlab**: label for x axis on right side plot.
- **side.ylab**: label for y axis on right side plot.
- **side.log**: TRUE to plot expression on the side plot on log scale.
- **side.gridstep**: intervals along which to place grid lines on y axis. Currently only available for linear scale.
- **coef**: integer or character index vector indicating which column of object to plot.
- **p.adj.method**: character vector indicating multiple testing correction method. (defaults to "BH")
- **search.by**: the name of the column which will be used to search for data points. (should contain unique values)
- **jitter**: the amount of jitter to apply to the samples in the expressions plot.
- **id.column**: the column containing unique identifiers for each gene.
- **display.columns**: character vector containing names of columns to display in mouseover tooltips and table.
- **cols**: vector of strings denoting colours corresponding to control status -1, 0 and 1. (may be R named colours or Hex values)
- **sample.cols**: vector of strings denoting colours for each sample point on the expression plot.
- **table**: logical variable for whether a table of the data should appear on the bottom of the HTML page.
- **path**: the path in which the folder will be created.
- **folder**: the name of the fold to save html file to.
- **html**: the name of the html file to save plots to.
- **launch**: TRUE to launch plot after call.
- **...**: additional arguments to be passed onto the MD plot. (main, xlab, ylab can be set for the left plot)

Value

Draws a two-panel interactive MD plot in an html page. The left plot shows the log-fold-change vs average expression. The right plot shows the expression levels of a particular gene of each sample. Hovering over points on left plot will plot expression level for corresponding gene, clicking on points will fix the expression plot to gene. Clicking on rows on the table has the same effect as clicking on the corresponding gene in the plot.
Author(s)
Shian Su

Examples

```r
library(limma)
library(edgeR)
data(lymphomaRNAseq)
x <- lymphomaRNAseq
sel <- rowSums(cpm(x$counts)>0.5)>=3
x <- x[sel,]
genotype <- relevel(x$samples$group, "Smchd1-null")
x <- calcNormFactors(x, method="TMM")
des <- model.matrix(~genotype)
## Apply voom with sample quality weights and fit linear model
v <- voomWithQualityWeights(x, design=des, normalization="none", plot=FALSE)
vfit <- lmFit(v,des)
## Apply treat relative to a fold-change of 1.5
vtfit <- treat(vfit,lfc=log2(1.5))
vfit <- eBayes(vfit)
results <- decideTests(vfit,p.value=0.01)
glMDPlot(vfit, counts=x$counts, anno=x$genes, groups=genotype, samples=1:7,
          status=results[,2], main="MD plot: Wild-type vs Smchd1",
          display.columns=c("Symbols", "GeneID", "GeneName"),
          folder="Smchd1-Lymphoma")
```

glMDPlot

**Glimma MDS Plot**

Description

Draw an interactive MDS plot gene expression matrix with distances calculated from most variable
genes.

Usage

```r
glMDPlot(x, ...)
```

Arguments

- `x`  
  the data.frame containing data to plot.
- `...`  
  additional arguments affecting the plots produced. See specific methods for detailed arguments.
**glMDSPlot.default**

**Value**

Draws a two-panel interactive MDS plot in an html page. The left panel contains the plot between two MDS dimensions, with annotations displayed on hover. The right panel contains a bar plot of the eigenvalues of each dimension, clicking on any of the bars will plot the corresponding dimension against the next dimension.

**Author(s)**

Shian Su, Gordon Smyth

**See Also**

glMDSPlot.default, glMDSPlot.DGEList

**Examples**

```r
data(lymphomaRNAseq)
genotype <- relevel(lymphomaRNAseq$samples$group, "Smchd1-null")

glMDSPlot(lymphomaRNAseq, labels=1:7, groups=genotype)
```

---

**glMDSPlot.default**  
*Glimma MDS Plot*

**Description**

Draw an interactive MDS plot from a gene expression matrix with distances calculated from most variable genes.

**Usage**

```r
## Default S3 method:
glMDSPlot(x, top = 500, labels = 1:ncol(x),
groups = rep(1, ncol(x)), gene.selection = "pairwise",
main = "MDS Plot", path = getwd(), folder = "glimma-plots",
html = "MDS-Plot", launch = TRUE, ...)
```

**Arguments**

- `x`  
  the matrix containing the gene expressions.

- `top`  
  the number of top most variable genes to use.

- `labels`  
  the labels for each sample.

- `groups`  
  the experimental group to which samples belong.

- `gene.selection`  
  "pairwise" if most variable genes are to be chosen for each pair of samples or "common" to select the same genes for all comparisons.

- `main`  
  the title of the plot.

- `path`  
  the path in which the folder will be created.

- `folder`  
  the name of the fold to save html file to.
html
19
html
the name of the html file to save plots to.
l
launch
TRUE to launch plot after call.

... additional arguments.

Value

Draws a two-panel interactive MDS plot in an html page. The left panel contains the plot between two MDS dimensions, with annotations displayed on hover. The right panel contains a bar plot of the eigenvalues of each dimension, clicking on any of the bars will plot the corresponding dimension against the next dimension.

Author(s)

Shian Su, Gordon Smyth

description

Draw an interactive MD plot from a DGEList object with distances calculated from most variable genes.

Usage

## S3 method for class 'DGEList'

glMDSPlot(x, top = 500, labels = 1:ncol(x),
groups = rep(1, ncol(x)), gene.selection = "pairwise",
main = "MDS Plot", path = getwd(), folder = "glimma-plots",
html = "MDS-Plot", launch = TRUE, ...)

Arguments

x
the DGEList containing the gene expressions.

top
the number of top most variable genes to use.

labels
the labels for each sample.

groups
the experimental group to which samples belong.

gene.selection
"pairwise" if most variable genes are to be chosen for each pair of samples or "common" to select the same genes for all comparisons.

main
the title of the plot.

path
the path in which the folder will be created.

folder
the name of the fold to save html file to.

html
the name of the html file to save plots to.

launch
TRUE to launch plot after call.

...
additional arguments.
Value

Draws a two-panel interactive MDS plot in an html page. The left panel contains the plot between two MDS dimensions, with annotations displayed on hover. The right panel contains a bar plot of the eigenvalues of each dimension, clicking on any of the bars will plot the corresponding dimension against the next dimension.

Author(s)

Shian Su, Gordon Smyth

---

**Description**

Create an interactive scatter plot object

**Usage**

```r
glScatter(x, ...)
```

**Arguments**

- `x` the data.frame containing data to plot.
- `...` additional arguments depending on input object type.

**Value**

A chart object containing the information to create an interactive scatter plot.

**Examples**

```r
data(iris)
plot1 <- glScatter(iris, xval="Sepal.Length", yval="Sepal.Width", colval="Species")
glimma(plot1, c(1,1))
```
### Description

Default method for creating an interactive scatter plot

### Usage

```r
## Default S3 method: 
glScatter(x, xval = "x", yval = "y", idval = NULL, 
point.size = 2, x.jitter = 0, y.jitter = 0, ndigits = NULL, 
signif = 6, log = "", xgrid = FALSE, ygrid = FALSE, xstep = FALSE, 
ystep = FALSE, xlab = xval, ylab = yval, main = NULL, height = 400, 
width = 500, colval = NULL, annot = c(xval, yval), annot.lab = NULL, 
flag = NULL, info = NULL, hide = FALSE, disable = NULL, ...) 
```

### Arguments

- `x`: the data.frame containing data to plot.
- `xval`: the column name for the x-axis values.
- `yval`: the column name for the y-axis values.
- `idval`: the column name for unique identifiers.
- `point.size`: the size of the data points.
- `x.jitter`: the amount of jittering to add to values along the x axis.
- `y.jitter`: the amount of jittering to add to values along the y axis.
- `ndigits`: the number of digits after the decimal to round to in the tooltip (overrides signif).
- `signif`: the number of significant figures to display in the tooltip.
- `log`: a character string which contains "x" if the x axis is to be logarithmic, "y" if the y axis is to be logarithmic and "xy" or "yx" if both axes are to be logarithmic.
- `xgrid`: TRUE if grid lines should be placed along x axis.
- `ygrid`: TRUE if grid lines should be placed y axis.
- `xstep`: the interval at which to set grid lines along the x axis.
- `ystep`: the interval at which to set grid lines along the y axis.
- `xlab`: the label on the x-axis.
- `ylab`: the label on the y-axis.
- `main`: the title for the plot.
- `height`: the height of the plot (in pixels).
- `width`: the width of the plot (in pixels).
- `colval`: the colours for each data point.
- `annot`: the columns to display in the tooltip.
- `annot.lab`: alternative labels for the values displayed in the tooltip.
- `flag`: the special flag to indicate special plot.
- `info`: additional information for plotting.
- `hide`: TRUE to hide the plot when page starts.
- `disable`: the events to disable, options are "click", "hover", "zoom".
- `...`: additional arguments.
Value
A chart object containing the information to create an interactive scatter plot.

Author(s)
Shian Su

Examples
```r
data(iris)
plot1 <- glScatter(iris, xval="Sepal.Length", yval="Sepal.Width", colval="Species")
glimma(plot1, c(1,1))
```

---

**glTable**  
*Glimma Table*

**Description**
Create a table using the data from a chart.

**Usage**
```r
glTable(target, columns)
```

**Arguments**
- `target` the index of the plot from which data is drawn.
- `columns` the columns of data to plot.

**Value**
a input object containing the input field information.

---

**gltablink**  
*Plot linkages*

**Description**
Helper function for writing the link properties in interactive Glimma plots

**Usage**
```r
gltablink(from, to, action = "none", info = "none")
```
**Arguments**

- `from` the index of the source table.
- `to` the index of the plot which receives the event and performs an action.
- `action` the action that is performed in the plot.
- `info` additional info for creating the link.

**Value**

da link object containing the plot linking information.

---

**glXYPlot**  
*Glimma XY Plot*

**Description**

Draw an interactive XY plot with multiple panels

**Usage**

```r
glXYPlot(x, y, counts = NULL, groups = NULL, samples = NULL,  
status = rep(0, nrow(data)), anno = NULL, display.columns = NULL,  
id.column = "GeneID", xlab = "x", ylab = "y", side.xlab = "Group",  
side.ylab = "logCPM", sample.cols = rep("#1f77b4", length(groups)),  
cols = c("#0000FF", "#858585", "#B32222"), jitter = 30, path = getwd(),  
folder = "glimma-plots", html = "XY-Plot", launch = TRUE, ...)
```

**Arguments**

- `x` a numeric vector of values to plot on the x-axis of the summary plot.
- `y` a numeric vector of values to plot on the y-axis of the summary plot.
- `counts` the matrix containing all counts.
- `groups` the factor containing experimental groups of the samples.
- `samples` the names of the samples.
- `status` vector giving the control status of data point, of same length as the number of rows of object. If NULL, then all points are plotted in the default colou
- `anno` the data.frame containing gene annotations.
- `display.columns` character vector containing names of columns to display in mouseover tooltips and table.
- `id.column` the column containing unique identifiers for each gene.
- `xlab` the label on the x axis for the left plot.
- `ylab` the label on the y axis for the left plot.
- `side.xlab` the label on the x axis for the right plot.
- `side.ylab` the label on the y axis for the right plot.
- `sample.cols` vector of strings denoting colours for each sample point on the expression plot.
hasColumns

cols  vector of strings denoting colours corresponding to control status -1, 0 and 1. (may be R named colours or Hex values)
jitter the amount of jitter to apply to the samples in the expressions plot.
path  the path in which the folder will be created.
folder the name of the fold to save html file to.
html  the name of the html file to save plots to.
launch TRUE to launch plot after call.
...  additional arguments to be passed onto the MD plot. (main, etc. can be set for the left plot)

Value

Draws a two-panel interactive XY scatter plot in an html page. The left plot shows the x and y values specified. The right plot shows the expression levels of a particular gene in each sample. Hovering over points on left plot will plot expression level for the corresponding gene, clicking on points will fix the expression plot to that gene. Clicking on rows on the table has the same effect as clicking on the corresponding gene in the plot. This function generates a display that is similar in style to glMDPlot, except that it provides more flexibility in what the user can provide.

Author(s)

Charity Law and Shian Su

Examples

data(iris)


---

hasColumns  \textit{Column checker}

Description

Check if data.frame controls all the listed columns

Usage

hasColumns(df, columns)

Arguments

df  the data frame to check.
columns  the columns that should exist in the data frame.

Value

stops program with an error if column cannot be found in df
**Description**

Mouse based RNAseq data for study of smchd1 gene.

**Author(s)**

Ruijie Liu, Kelan Chen, Natasha Jansz, Marnie E. Blewitt, Matthew E. Ritchie

**References**


---

**makeJson.chart**

*JSON converter for chart objects*

**Description**

Function to make json object from a chart, ignoring the json property

**Usage**

```r
## S3 method for class 'chart'
makeJson(chart)
```

**Arguments**

- `chart` - the chart object to be converted into JSON

**Value**

a stringified JSON object containing the chart data.
makeJson.data.frame  JSON converter for data frames

Description

Function to create a JSON from a data.frame

Usage

## S3 method for class 'data.frame'
makeJson(df, convert.logical = TRUE)

Arguments

df          the data.frame to be converted into JSON
convert.logical          whether to convert logicals into strings "TRUE" and "FALSE"

Value

a stringified JSON, the data.frame is encoded as a vector of objects, with each column being one object with keys corresponding to column names.

NumToHexCol  Numeric to hex colour converter

Description

Functions to convert numbers into corresponding hex codes for colours

Usage

NumToHexCol(x)

Arguments

x          the colour value(s) to be converted to hex values.

Value

hex codes for colours
Index

+Topic **RNAseq**
  - *lymphomaRNAseq*, 25

as.hexcol, 2
CharToHexCol, 3
glAutoinput, 3
glBar, 4
glBar.default, 4, 4
glimma, 5
gllink, 6
glMDPlot, 7
glMDPlot.default, 7, 8
glMDPlot.DESeqDataSet, 7, 10
glMDPlot.DESeqResults, 11
glMDPlot.DGEEexact, 7, 12
glMDPlot.DGELRT, 7, 14
glMDPlot.MArrayLM, 7, 15
glMDSPlot, 17
glMDSPlot.default, 18, 18
glMDSPlot.DGELList, 18, 19
glScatter, 20
glScatter.default, 21
glTable, 22
gltablink, 22
glXYPlot, 23

hasColumns, 24
lymphomaRNAseq, 25
makeJson.chart, 25
makeJson.data.frame, 26
NumToHexCol, 26