Package 'VennDetail'

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Type Package

Title Comprehensive Visualization and Analysis of Multi-Set Intersections

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Description A comprehensive package for visualizing multi-set intersections and extracting detailed subset information. VennDetail generates high-resolution visualizations including traditional Venn diagrams, Venn-pie plots, and UpSet-style plots. It provides functions to extract and combine subset details with user datasets in various formats. The package is particularly useful for bioinformatics applications but can be used for any multi-set analysis.

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LazyData true

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Suggests knitr, rmarkdown, testthat (>= 3.0.0), markdown, RColorBrewer, rstudioapi

VignetteBuilder knitr

URL https://github.com/guokai8/VennDetail

BugReports https://github.com/guokai8/VennDetail/issues

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Contents

`VennDetail-package` *VennDetail: Comprehensive Visualization and Analysis of Multi-Set Intersections*

Description

A comprehensive package for visualizing multi-set intersections and extracting detailed subset information. VennDetail generates high-resolution visualizations including traditional Venn diagrams, Venn-pie plots, and UpSet-style plots. It provides functions to extract and combine subset details with user datasets in various formats.

Details

The VennDetail package offers several powerful visualization and analysis tools:

Visualization methods:

- Traditional Venn diagram (for 2-5 sets)
- VennPie visualization (useful for more than 5 sets)
- UpSet plot (matrix-based visualization)
- Bar plot (simple visualization of subset sizes)

Key features:

- Extraction of elements in any subset combination
- Combining subset information with user-supplied data frames
- Statistical analysis of set intersections
- Enrichment analysis for set members
- Interactive visualizations
- High-resolution figure export
- Shiny app for interactive exploration

Getting Started

To create a Venn object for analysis:

“‘ # Create sample datasets A <- sample(1:100, 40, replace = FALSE) B <- sample(1:100, 60, replace = FALSE) C <- sample(1:100, 40, replace = FALSE)

Create a Venn object res <- venndetail(list(A = A, B = B, C = C)) “‘

Visualization

“‘ # Traditional Venn diagram vennDiagram(res)

VennPie visualization vennpie(res)

UpSet plot upsetPlot(res)

Bar plot dplot(res, order = TRUE)

Generic plot function with type selection plot(res, type = "venn") “‘

Data Extraction

“‘ # Extract elements shared by all sets shared <- getSet(res, "Shared")

Extract elements unique to set A unique_to_A <- getSet(res, "A") “‘

Statistical Analysis

“‘ # Test for significance of overlaps stats <- vennStats(res) “‘

Author(s)

Kai Guo, Brett McGregor

See Also

Useful links:

- https://github.com/guokai8/VennDetail
- Report bugs at https://github.com/guokai8/VennDetail/issues

---

.add_colnames *Give first colname as RowNxyz*

Description

Give first colname as RowNxyz

Usage

```
.add_colnames(x)
```

Arguments

x	data frame

Value

return data frame with the first colnames change to "RowNxyz"

.findOverlap *Find overlap between sets in a list*

Description

Find overlap between sets in a list

Usage

```
.findOverlap(setlist, xlim = c(0, 1), ylim = c(0, 1))
```

Arguments

setlist	list of character vectors.
xlim	vector with 2 numbers, x axis limits for the venn diagram.
ylim	vector with 2 numbers, y axis limits for the venn diagram.

Value

list with 2 items: a data.frame with information about the groups (sizes, coordinates, etc.), and a data.frame containing the x and y coordinates for the venn diagram

---

.make.table *make table for venndetail modified from make.truth.table (VennDiagram)*

Description

make table for venndetail modified from make.truth.table (VennDiagram)

Usage

```
.make.table(x)
```

Arguments

x	A list with input groups

Value

A data frame with logical vector columns and 2 ^ length(x)-1 rows.

Author(s)

Kai Guo

`.vennDiagram` *Create a standalone Venn diagram*

Description

This function creates a standalone Venn diagram for 2-5 sets

Usage

```
.vennDiagram(
  setlist,
  title = NULL,
  colors = NULL,
  alpha = 0.4,
  showNumbers = TRUE,
  numberSize = 4,
  numberColor = "black",
  labelSize = 4,
  labelColor = "black",
  borderCol = FALSE,
  fillCol = TRUE,
  fixedCoords = TRUE,
  xlim = c(0, 1),
  ylim = c(0, 1)
)
```

Arguments

`setlist`	A named list of character vectors, each representing a set
`title`	Optional title for the plot
`colors`	Vector of colors for the sets. If NULL, default colors will be used
`alpha`	Transparency level for the circles (0-1)
`showNumbers`	Logical, whether to show counts and percentages in each region
`numberSize`	Size of the count labels
`numberColor`	Color of the count labels
`labelSize`	Size of the set labels
`labelColor`	Color of the set labels

borderCol	Logical, whether to color the borders of circles
fillCol	Logical, whether to fill circles with colors
fixedCoords	Logical, whether to use fixed coordinates
xlim	Vector with 2 numbers, x axis limits for the venn diagram
ylim	Vector with 2 numbers, y axis limits for the venn diagram

Value

A ggplot object

Author(s)

Kai Guo

`as.data.frame.Venn` *Utility functions for VennDetail package*

Description

Internal utility functions for the VennDetail package

Converts a Venn object to a data frame for easier manipulation

Usage

```
## S3 method for class 'Venn'
as.data.frame(x, ...)
```

Arguments

x	A Venn object
...	Additional arguments (not used)

Value

A data frame with subset information

Author(s)

Kai Guo

Examples

```
# Create a Venn object
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
res <- venndetail(list(A = A, B = B))

# Convert to data frame
df <- as.data.frame(res)
head(df)
```

---

compareVenn *Compare two Venn objects*

Description

Compares two Venn objects and returns a list of differences

Usage

```
compareVenn(x, y, what = c("groups", "subsets", "all"))
```

Arguments

x	First Venn object
y	Second Venn object
what	What to compare: "groups" (default), "subsets", or "all"

Value

A list with differences between the objects

Author(s)

Kai Guo

Examples

```
# Create two Venn objects
A1 <- sample(1:100, 40, replace = FALSE)
B1 <- sample(1:100, 60, replace = FALSE)
res1 <- venndetail(list(A = A1, B = B1))

A2 <- sample(1:100, 45, replace = FALSE)
B2 <- sample(1:100, 55, replace = FALSE)
res2 <- venndetail(list(A = A2, B = B2))

# Compare the objects
compareVenn(res1, res2)
```

`create_interactive_vennpie` *Create an interactive vennpie chart with plotly*

Description

Creates a simple pie chart visualization for interactive exploration of set intersections

Usage

```
create_interactive_vennpie(
  object,
  subset = NULL,
  any = NULL,
  color = NULL,
  revcolor = "lightgrey",
  title = NULL
)
```

Arguments

`object`	A Venn object
`subset`	Character vector of subset names to highlight
`any`	Highlight subsets shared by exactly this many sets
`color`	Optional vector of colors for the subsets
`revcolor`	Color for non-highlighted subsets
`title`	Optional plot title

Value

A plotly object

Author(s)

Kai Guo

`detail` *Get subset details from a Venn object*

Description

Returns a named numeric vector with counts for each subset

The objective of this function is to summarizes the overlaps across groups identified by venndetail without creating diagram.

Usage

```
detail(object)

## S4 method for signature 'Venn'
detail(object)
```

Arguments

`object`	A Venn object

Value

A named numeric vector with counts for each subset

Author(s)

Kai Guo

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
detail(res)
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
detail(res)
```

dim.Venn *Get dimensions of a Venn object*

Description

Returns the dimensions of the result slot in a Venn object.

Usage

```
## S3 method for class 'Venn'
dim(x)
```

Arguments

x	Venn object

Value

Integer vector of length 2 (rows, columns)

dplot *Create a bar plot of subset counts*

Description

Creates a bar plot showing counts for each subset

Usage

```
dplot(
  object,
  order = FALSE,
  textsize = 5,
  color = NULL,
  theme = ggplot2::theme_light(),
  title = NULL,
  xlabel = NULL,
  ylabel = NULL
)

## S4 method for signature 'Venn'
dplot(object, order = FALSE, textsize = 5)
```

Arguments

object	Venn object
order	Boolean indicating whether to sort the bar (default: FALSE).
textsize	Numeric vector giving the text size above the bar.
color	Optional vector of colors for the bars
theme	The ggplot2 theme to use. Default: theme_light
title	Optional plot title
xlabel	Optional x-axis label
ylabel	Optional y-axis label

Value

A ggplot2 object

Author(s)

Kai Guo

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
dplot(res, order = TRUE, textsize = 3)
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
dplot(res, order = TRUE, textsize = 3)
```

---

getFeature *Extract feature data for specific subsets*

Description

Combines subset information with user-supplied data frames

GetFeature allows users to extract subsets from venn object into a table format along with accompanying information from the data frames provided in the rlist argument

Usage

```
getFeature(
  object,
  subset,
  rlist,
  userowname = TRUE,
  gind = NULL,
  sep = "_",
  wide = FALSE
)

## S4 method for signature 'Venn'
getFeature(
  object,
  subset,
  rlist,
  userowname = TRUE,
  gind = NULL,
  sep = "_",
  wide = FALSE
)
```

Arguments

object	Venn object
subset	Character vector giving the names of the user-defined subset to extract
rlist	List of user-supplied data frames to combine with venndetail result
userowname	Boolean indicating whether to use row names to join data frames or not (default: TRUE)
gind	Column name or index of each user-supplied data.frame to use to join data frames(valid only when userowname=FALSE)
sep	Character string used to separate the terms when concatenating group names into new separation character for new column names in the resulting data frame
wide	Boolean indicating whether to use wide format(default:FALSE)

Value

A data.frame combining subset information with user data

data.frame with subsets information and details from the user supplied data frame

Author(s)

Kai Guo

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
dA <- data.frame(A = A, "FC" = rnorm(40))
dB <- data.frame(B = B, "FC" = rnorm(60))
dC <- data.frame(C = C, "FC" = rnorm(40))
res <- venndetail(list(A = A, B = B, C = C))
features <- getFeature(res, subset = "Shared",
                       rlist = list(dA, dB, dC),
                       userowname = FALSE,
                       gind = rep(1, 3))
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
dA <- data.frame(A = A, "FC" = rnorm(40))
dB <- data.frame(B = B, "FC" = rnorm(60))
dC <- data.frame(C = C, "FC" = rnorm(40))
res <- venndetail(list(A = A, B = B, C = C))
rhs <- getFeature(res, subset = "Shared", rlist = list(dA, dB, dC),
   userowname= FALSE, gind = rep(1, 3))
```

---

getSet *Extract specific subsets from a Venn object*

Description

Extracts elements from specified subsets

getSet function provides a way to extract subsets from venndetail object

Usage

```
getSet(object, subset = NULL, min = 0, wide = FALSE)

## S4 method for signature 'Venn'
getSet(object, subset = NULL, min = 0, wide = FALSE)
```

Arguments

object	Venn object
subset	Character vector giving the subset names
min	The minimum number of input groups that a subset must belong to e.g. min = 2 will only report those subsets with elements shared by 2 or more input groups.
wide	Boolean indicating return wide format (default: FALSE).

Value

A data.frame with elements from the specified subsets

Specific subset information

Author(s)

Kai Guo

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
# Get elements unique to set A
unique_to_A <- getSet(res, "A")
# Get elements shared by all sets
shared <- getSet(res, "Shared")
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
getSet(res, "A")
```

---

head.Venn *Return the first or last parts of a Venn object*

Description

Methods to extract the first or last parts of a Venn object's result slot.

Usage

```
## S3 method for class 'Venn'
head(x, n = 6L, ...)

## S3 method for class 'Venn'
tail(x, n = 6L, ...)
```

Arguments

x	Venn object
n	number of rows to display
...	other arguments ignored (for compatibility with generic)

Value

A data.frame with the first n rows

A data.frame with the last n rows

loadVenn *Load a Venn object from a file*

Description

Loads a Venn object from an RDS file

Usage

```
loadVenn(file)
```

Arguments

file	File name to load from

Value

A Venn object

Author(s)

Kai Guo

Examples

```
## Not run:
# Load a saved Venn object
res <- loadVenn("my_venn.rds")

# Plot the loaded object
plot(res)

## End(Not run)
```

make.subset *Get subset from list of input groups*

Description

Get subset from list of input groups

Usage

```
make.subset(x, sep = "_")
```

Arguments

x	A list with input groups
sep	symbol character used when concatenating group names into subset names

Value

A list of subsets. The names on the list are the subset names and the list elements are the subset details.

Author(s)

Kai Guo

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
x <- list(A = A, B = B, C = C)
out <-  make.subset(x)
```

---

makeContent.upset_grob

Draw method for upset_grob objects

Description

Internal method to draw upset_grob using grid viewports

Usage

```
## S3 method for class 'upset_grob'
makeContent(x)
```

Arguments

x	An upset_grob object

Value

Draws the upset plot

make_subset *Create subsets from a list of sets*

Description

Identifies all possible intersections between sets and returns a list of subsets

Usage

```
make_subset(x, sep = "_")
```

Arguments

x	A list of vectors
sep	Character used to separate set names in subset labels

Value

A named list where each element contains the unique items in that subset

Author(s)

Kai Guo

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
x <- list(A = A, B = B, C = C)
subsets <- make_subset(x)
lengths(subsets)  # Number of elements in each subset
```

make_truth_table *Create a truth table for set combinations*

Description

Creates a logical matrix representing all possible combinations of sets

Usage

```
make_truth_table(x)
```

Arguments

x	A list of vectors

Value

A data frame with logical columns for each set and rows for each combination

Author(s)

Kai Guo

`merge.Venn` *Merge two or more venndetail obejcts*

Description

Merge will combine multiple venn diagrams to allow comparison between multiple groups

Usage

```
## S3 method for class 'Venn'
merge(x, y, ignore.case = FALSE, useupper = TRUE, plot = FALSE, ...)
```

Arguments

`x`	Venn object
`y`	Venn object
`ignore.case`	Boolean indicating whether to ignore case of group names (default: FALSE)
`useupper`	Boolean indicating whether to use uppercases for group names (default: TRUE)
`plot`	Boolean indicating whether to plot figure or not (default: FALSE)
`...`	arguments for venndetail

Value

venn object

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res1 <- venndetail(list(A = A, B = B))
res2 <- venndetail(list(A = A, C = C))
res <- merge(res1, res2)
```

names.Venn *Extract subset names from a Venn object*

Description

Returns the names of all subsets in a Venn object

Usage

```
## S3 method for class 'Venn'
names(x)
```

Arguments

x	A Venn object

Value

A character vector of subset names

Author(s)

Kai Guo

Examples

```
# Create a Venn object
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
res <- venndetail(list(A = A, B = B))

# Get subset names
names(res)
```

newVenn *Create a new Venn object*

Description

Constructor function for creating Venn objects with validation

Usage

```
newVenn(
  input,
  raw,
  sep = "_",
  GroupNames,
  result,
  detail,
  wide,
  metadata = list()
)
```

Arguments

input	A list of input sets
raw	A named vector with counts
sep	The separator character
GroupNames	Names of the input groups
result	The result data.frame
detail	The detail vector
wide	The wide-format data.frame
metadata	Additional metadata (optional)

Value

A new Venn object

Author(s)

Kai Guo

Examples

```
## Not run:
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
raw <- c(A = 40, B = 60)
groups <- c("A", "B")
# Create a new Venn object manually (normally done by venndetail function)
venn_obj <- newVenn(input = list(A = A, B = B), raw = raw,
                    GroupNames = groups, ...)

## End(Not run)
```

plot.Venn *Plot a Venn object*

Description

Unified plotting function for Venn objects that supports multiple visualization types

Usage

```
## S3 method for class 'Venn'
plot(
  x,
  type = "venn",
  title = NULL,
  interactive = FALSE,
  filename = NULL,
  width = 8,
  height = 6,
  dpi = 300,
  fill = NULL,
  alpha = 0.5,
  labels = TRUE,
  counts = TRUE,
  showNumbers = TRUE,
  numberSize = 4,
  numberColor = "black",
  labelSize = 4,
  labelColor = "black",
  borderCol = FALSE,
  fillCol = TRUE,
  fixedCoords = TRUE,
  xlim = c(0, 1),
  ylim = c(0, 1),
  show_percentages = TRUE,
  show_unique_only = FALSE,
  scaled = FALSE,
  subset = NULL,
  top = 31,
  min = 0,
  color = NULL,
  revcolor = "lightgrey",
  any = NULL,
  show.number = TRUE,
  show.x = TRUE,
  sep = "_",
  log = FALSE,
  base = NULL,
```

```
  percentage = FALSE,
  nintersects = 40,
  min_size = 1,
  sets_bar_color = NULL,
  main_bar_color = "steelblue",
  point_size = 3,
  line_size = 1,
  show_numbers = TRUE,
  sort_intersections_by = "freq",
  sort_sets_by = "size",
  sort_sets_decreasing = TRUE,
  custom_sets_order = NULL,
  sort_intersections_decreasing = TRUE,
  custom_intersections_order = NULL,
  intersection_color = "black",
  highlight_intersections = NULL,
  highlight_color = "darkorange",
  empty_point_size = 1.5,
  bar_width = 0.7,
  text_angle = 0,
  text_size = 10,
  set_label_size = 3,
  intersection_label_size = 3,
  point_outline_color = "black",
  point_stroke = 0.3,
  set_size_show_values = TRUE,
  intersection_size_show_values = TRUE,
  show_empty_intersections = FALSE,
  show_set_labels = TRUE,
  plot_margin = 0.5,
  height_ratio = 0.7,
  width_ratio = 0.3,
  bar_offset = -0.01,
  set_text_size = 10,
  intersection_title = "Intersection Size",
  set_size_title = "Set Size",
  matrix_point_shape = 21,
  number_color_threshold = 0.75,
  number_colors = c(on_bar = "black", off_bar = "black"),
 theme_params = list(background_color = "white", grid_color = "grey92", axis_text_color
    = "black", use_grid = TRUE, border_color = NA),
  return_data = FALSE,
  order = FALSE,
  textsize = 5,
  theme = ggplot2::theme_light(),
  xlabel = NULL,
  ylabel = NULL,
  ...
```

```
)
```

Arguments

x	A Venn object
type	Type of plot: "venn" (traditional Venn diagram), "vennpie" (pie-chart style), "upset" (UpSet plot), or "bar" (bar plot of subset sizes)
title	Optional plot title
interactive	Logical: create an interactive plot? Default: FALSE
filename	Optional file name to save the plot
width	Width of the saved plot (default: 8)
height	Height of the saved plot (default: 6)
dpi	Resolution in dots per inch (default: 300)
fill	Colors for filling the circles (venn)
alpha	Transparency level (0-1), default: 0.5 (venn)
labels	Logical: show set labels? Default: TRUE (venn)
counts	Logical: show counts? Default: TRUE (venn)
showNumbers	Logical: show counts and percentages? Default: TRUE (venn)
numberSize	Size of count labels, default: 4 (venn)
numberColor	Color of count labels, default: "black" (venn)
labelSize	Size of set labels, default: 4 (venn)
labelColor	Color of set labels, default: "black" (venn)
borderCol	Logical: color borders? Default: FALSE (venn)
fillCol	Logical: fill circles? Default: TRUE (venn)
fixedCoords	Logical: fixed coordinates? Default: TRUE (venn)
xlim	X axis limits, default: c(0, 1) (venn)
ylim	Y axis limits, default: c(0, 1) (venn)
show_percentages	Logical: show percentages? Default: TRUE (venn)
show_unique_only	Logical: show unique only? Default: FALSE (venn)
scaled	Logical: scale circles? Default: FALSE (venn)
subset	Character vector of subsets to highlight (vennpie)
top	Maximum subsets to display, default: 31 (vennpie)
min	Minimum set membership, default: 0 (vennpie/getSet)
color	Colors for subsets (vennpie/bar)
revcolor	Color for non-highlighted, default: "lightgrey" (vennpie)
any	Highlight subsets shared by this many sets (vennpie)
show.number	Logical: show counts? Default: TRUE (vennpie)

`show.x` Logical: show labels? Default: TRUE (vennpie)

`sep` Character separator, default: "_" (vennpie)

`log` Logical: use log scale? Default: FALSE (vennpie)

`base` Base for log transformation (vennpie)

`percentage` Logical: show percentages? Default: FALSE (vennpie)

`nintersects` Maximum intersections, default: 40 (upset)

`min_size` Minimum intersection size, default: 1 (upset)

`sets_bar_color` Colors for set size bars (upset)

`main_bar_color` Color for intersection bars, default: "steelblue" (upset)

`point_size` Size of matrix points, default: 3 (upset)

`line_size` Width of matrix lines, default: 1 (upset)

`show_numbers` Logical: show bar counts? Default: TRUE (upset)

`sort_intersections_by`
Sort method: "freq", "degree", or "custom" (upset)

`sort_sets_by` Sort method: "size", "name", or "custom" (upset)

`sort_sets_decreasing`
Logical: decreasing order? Default: TRUE (upset)

`custom_sets_order`
Custom set order (upset)

`sort_intersections_decreasing`
Logical: decreasing? Default: TRUE (upset)

`custom_intersections_order`
Custom intersection order (upset)

`intersection_color`
Color for dots/lines, default: "black" (upset)

`highlight_intersections`
IDs to highlight (upset)

`highlight_color`
Highlight color, default: "darkorange" (upset)

`empty_point_size`
Empty point size, default: 1.5 (upset)

`bar_width` Bar width (0-1), default: 0.7 (upset)

`text_angle` Text angle, default: 0 (upset)

`text_size` Text size, default: 10 (upset)

`set_label_size` Set label size, default: 3 (upset)

`intersection_label_size`
Intersection label size, default: 3 (upset)

`point_outline_color`
Point outline color, default: "black" (upset)

`point_stroke` Point outline width, default: 0.3 (upset)

`set_size_show_values`
: Show set values? Default: TRUE (upset)

`intersection_size_show_values`
: Show intersection values? Default: TRUE (upset)

`show_empty_intersections`
: Show empty? Default: FALSE (upset)

`show_set_labels`
: Show set labels? Default: TRUE (upset)

`plot_margin` Margin in cm, default: 0.5 (upset)

`height_ratio` Matrix height ratio, default: 0.7 (upset)

`width_ratio` Set size width ratio, default: 0.3 (upset)

`bar_offset` Bar offset, default: -0.01 (upset)

`set_text_size` Set label size, default: 10 (upset)

`intersection_title`
: Intersection title (upset)

`set_size_title` Set size title (upset)

`matrix_point_shape`
: Point shape, default: 21 (upset)

`number_color_threshold`
: Color threshold, default: 0.75 (upset)

`number_colors` Label colors vector (upset)

`theme_params` Theme parameters list (upset)

`return_data` Return data? Default: FALSE (upset)

`order` Logical: order bars? Default: FALSE (bar)

`textsize` Text size, default: 5 (bar)

`theme` ggplot2 theme (bar)

`xlabel` X-axis label (bar)

`ylabel` Y-axis label (bar)

`...` Additional arguments passed to the specific plotting function

Value

A ggplot2 or plotly object

Author(s)

Kai Guo

Examples

```
# Create a Venn object
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))

# Traditional Venn diagram
plot(res, type = "venn")

# Venn diagram with custom colors and transparency
plot(res, type = "venn", fill = c("red", "blue", "green"), alpha = 0.3)

# Venn-pie visualization
plot(res, type = "vennpie")

# Venn-pie with highlighted subsets
plot(res, type = "vennpie", any = 2, log = TRUE)

# UpSet plot
plot(res, type = "upset")

# UpSet plot with custom sorting and highlighting
plot(res, type = "upset",
     sort_sets_by = "size",
     highlight_intersections = c(1, 2),
     highlight_color = "red")

# Bar plot of subset sizes
plot(res, type = "bar")

# Ordered bar plot with larger text
plot(res, type = "bar", order = TRUE, textsize = 8)

# Save plot to file (not run during check)
## Not run:
plot(res, type = "venn", filename = "my_venn.png", width = 10, height = 8)

## End(Not run)

# Create interactive plot
if(interactive()) {
  plot(res, type = "venn", interactive = TRUE)
}
```

---

print.upset_grob *Print method for upset_grob objects*

Description

Print method for upset_grob objects

Usage

```
## S3 method for class 'upset_grob'
print(x, ...)
```

Arguments

x	An upset_grob object
...	Additional arguments (ignored)

Value

Invisibly returns the input object

---

result *Extract results from a Venn object*

Description

Retrieves results from a Venn object in long or wide format

Result will return output in a table format including the contents of the subsets included in the venndetail object

Usage

```
result(object, wide = FALSE)

## S4 method for signature 'Venn'
result(object, wide = FALSE)
```

Arguments

object	A Venn object
wide	Logical: should results be returned in wide format? Default: FALSE

Value

A data.frame containing subset information

Author(s)

Kai Guo

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
# Get results in long format
result_long <- result(res)
# Get results in wide format
result_wide <- result(res, wide = TRUE)
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
result <- result(res)
```

`rowjoin` *Join data.frames by row names or specified columns*

Description

Joins two data.frames using various join methods

join two dataframes by rownames

Usage

```
rowjoin(x, y, fun = "full_join", by = NULL)

## S4 method for signature 'data.frame,data.frame'
rowjoin(x, y, fun = "full_join")
```

Arguments

`x`	data.frame x
`y`	data.frame y
`fun`	Different join format: left_join, full_join, right_join (default:full_join)
`by`	Optional vector of column names to join by

Value

A joined data.frame

dataframe with join results

Author(s)

Kai Guo

Examples

```
library(dplyr)
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
dA <- data.frame(A = A, "FC" = rnorm(40))
dB <- data.frame(B = B, "FC" = rnorm(60))
rownames(dA) <- A
rownames(dB) <- B
# Full join by row names
result <- rowjoin(dA, dB)
# Left join by row names
result <- rowjoin(dA, dB, fun = "left_join")
library(dplyr)
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
dA <- data.frame(A = A, "FC" = rnorm(40))
dB <- data.frame(B = B, "FC" = rnorm(60))
rownames(dA) <- A
rownames(dB) <- B
rowjoin(dA, dB)
```

---

saveVenn *Save a Venn object to a file*

Description

Saves a Venn object to an RDS file for later use

Usage

```
saveVenn(object, file)
```

Arguments

object	A Venn object
file	File name to save to

Value

The file name (invisibly)

Author(s)

Kai Guo

Examples

```
## Not run:
# Create a Venn object
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
res <- venndetail(list(A = A, B = B))

# Save to a file
saveVenn(res, "my_venn.rds")

## End(Not run)
```

`setcolor` *return colors with given a vector*

Description

Setcolor will provide a list of color vectors based on the number used as an input.

Usage

```
setcolor(n, palette = "default")
```

Arguments

`n`	Number of colors needed
`palette`	Type of palette: "default", "categorical", "sequential", or "diverging"

Value

color vector

Author(s)

Kai Guo

Examples

```
mycol <- setcolor(10)
mycol
```

show Venn *Show the summary of venn object*

Description

This function provides a summary of the venn object, including a full results and subsets as well as an summary information.

Usage

```
## S4 method for signature 'Venn'
show(object)
```

Arguments

object	venn object

Value

summary information for the venn object

Author(s)

Kai Guo

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
show(res)
```

summary.Venn *Give summary information of Venn object*

Description

print the summary information of Venn object

Usage

```
## S3 method for class 'Venn'
summary(object, ...)
```

Arguments

object	Venn object
...	other arguments ignored (for compatibility with generic)

Value

summary information

Examples

```
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
summary(res)
```

T2DM *T2DM Dataset*

Description

T2DM data are differential expression genes (DEGs) with annotation from the publication by Hinder et al.

T2DM data are differential expression genes (DEGs) with annotation from the publication by Hinder et al. The data contains three DEG sets from three different tissues (Cortex,SCN,Glom). DEGs were determined by using Cuffdiff with a false discovery rate (FDR) < 0.05 between groups with or without pioglitazone treatment.

Usage

```
T2DM

T2DM
```

Format

A list of data frames with five columns each

A list of data frame with five columns individually:

Entrez Entrez gene IDs

Symbol HGNC symbols

Annotation Gene function

log2FC log2 Fold Change

FDR False Discovery Rate

Examples

```
T2DM
```

upsetPlot *Create an UpSet plot*

Description

Creates an UpSet plot to visualize set intersections

Usage

```
upsetPlot(
  object,
  nintersects = 40,
  min_size = 1,
  sets_bar_color = NULL,
  main_bar_color = "steelblue",
  point_size = 3,
  line_size = 1,
  show_numbers = TRUE,
  sort_intersections_by = "freq",
  sort_sets_by = "size",
  sort_sets_decreasing = TRUE,
  custom_sets_order = NULL,
  sort_intersections_decreasing = TRUE,
  custom_intersections_order = NULL,
  intersection_color = "black",
  highlight_intersections = NULL,
  highlight_color = "darkorange",
  empty_point_size = 1.5,
  bar_width = 0.7,
  text_angle = 0,
  text_size = 10,
  set_label_size = 3,
  intersection_label_size = 3,
  point_outline_color = "black",
  point_stroke = 0.3,
  set_size_show_values = TRUE,
  intersection_size_show_values = TRUE,
  show_empty_intersections = FALSE,
  show_set_labels = TRUE,
  plot_margin = 0.5,
  height_ratio = 0.7,
  width_ratio = 0.3,
  bar_offset = -0.01,
  set_text_size = 10,
  intersection_title = "Intersection Size",
  set_size_title = "Set Size",
  matrix_point_shape = 21,
```

```
  number_color_threshold = 0.75,
  number_colors = c(on_bar = "black", off_bar = "black"),
 theme_params = list(background_color = "white", grid_color = "grey92", axis_text_color
   = "black", use_grid = TRUE, border_color = NA),
  title = NULL,
  interactive = FALSE,
  return_data = FALSE,
  ...
)
```

Arguments

object	A Venn object
nintersects	Maximum number of intersections to show
min_size	Minimum intersection size to include (default: 1)
sets_bar_color	Colors for the set size bars
main_bar_color	Color for the intersection size bars
point_size	Size of points in the matrix
line_size	Width of lines in the matrix
show_numbers	Logical: show counts on bars?
sort_intersections_by	How to sort intersections
sort_sets_by	How to sort sets
sort_sets_decreasing	Whether to sort sets in decreasing order
custom_sets_order	Custom order for sets if sort_sets_by="custom"
sort_intersections_decreasing	Whether to sort intersections in decreasing order
custom_intersections_order	Custom order for intersections
intersection_color	Color for intersection dots and lines
highlight_intersections	Vector of intersection IDs to highlight
highlight_color	Color for highlighted intersections
empty_point_size	Size of empty points in the matrix
bar_width	Width of bars
text_angle	Angle for text labels
text_size	Size of text in the plot
set_label_size	Size of set size labels

`intersection_label_size`
: Size of intersection size labels

`point_outline_color`
: Color for the outline of points

`point_stroke`
: Width of point outline

`set_size_show_values`
: Whether to show set size values

`intersection_size_show_values`
: Whether to show intersection size values

`show_empty_intersections`
: Whether to show empty intersections

`show_set_labels`
: Whether to show set labels

`plot_margin`
: Margin around the plots in cm

`height_ratio`
: Ratio of matrix to total height

`width_ratio`
: Ratio of set size to total width

`bar_offset`
: Horizontal offset for top bars

`set_text_size`
: Size of set labels

`intersection_title`
: Title for the intersection size plot

`set_size_title`
: Title for the set size plot

`matrix_point_shape`
: Shape of the dots in the matrix

`number_color_threshold`
: Fraction of max value for label color switch

`number_colors`
: Colors for labels on/off bars

`theme_params`
: Theme parameters for customization

`title`
: Optional plot title

`interactive`
: Create interactive plot?

`return_data`
: Whether to return the data along with the plot

`...`
: Additional arguments passed to internal functions

Value

A ggplot object or a combined grid layout

Author(s)

Kai Guo

Examples

```
# Basic example
sets <- list(
  "Set A" = c(1:100),
  "Set B" = c(30:120),
  "Set C" = c(20:50, 90:110),
  "Set D" = c(10:40, 80:120)
)
ven <- venndetail(sets)
upsetPlot(ven, bar_offset = -0.02)

# With highlighting
upsetPlot(ven,
          highlight_intersections = c(1, 2),
          highlight_color = "darkorange",
          bar_offset = -0.02)
```

---

upsetPlot,Venn-method *Create an UpSet plot for a Venn object*

Description

Creates an UpSet plot to visualize set intersections

Usage

```
## S4 method for signature 'Venn'
upsetPlot(
  object,
  nintersects = 40,
  min_size = 1,
  sets_bar_color = NULL,
  main_bar_color = "steelblue",
  point_size = 3,
  line_size = 1,
  show_numbers = TRUE,
  sort_intersections_by = "freq",
  sort_sets_by = "size",
  sort_sets_decreasing = TRUE,
  custom_sets_order = NULL,
  sort_intersections_decreasing = TRUE,
  custom_intersections_order = NULL,
  intersection_color = "black",
  highlight_intersections = NULL,
  highlight_color = "darkorange",
  empty_point_size = 1.5,
  bar_width = 0.7,
```

```
  text_angle = 0,
  text_size = 10,
  set_label_size = 3,
  intersection_label_size = 3,
  point_outline_color = "black",
  point_stroke = 0.3,
  set_size_show_values = TRUE,
  intersection_size_show_values = TRUE,
  show_empty_intersections = FALSE,
  show_set_labels = TRUE,
  plot_margin = 0.5,
  height_ratio = 0.7,
  width_ratio = 0.3,
  bar_offset = -0.01,
  set_text_size = 10,
  intersection_title = "Intersection Size",
  set_size_title = "Set Size",
  matrix_point_shape = 21,
  number_color_threshold = 0.75,
  number_colors = c(on_bar = "black", off_bar = "black"),
 theme_params = list(background_color = "white", grid_color = "grey92", axis_text_color
    = "black", use_grid = TRUE, border_color = NA),
  title = NULL,
  interactive = FALSE,
  return_data = FALSE
)
```

Arguments

`object`	A Venn object
`nintersects`	Maximum number of intersections to show (default: 40)
`min_size`	Minimum intersection size to include (default: 1)
`sets_bar_color`	Colors for the set size bars (default: NULL for auto-generate)
`main_bar_color`	Color for the intersection size bars (default: "steelblue")
`point_size`	Size of points in the matrix (default: 3)
`line_size`	Width of lines in the matrix (default: 1)
`show_numbers`	Logical: show counts on bars? (default: TRUE)
`sort_intersections_by`	How to sort intersections: "freq" (default), "degree"
`sort_sets_by`	How to sort sets: "size" (default), "name"
`sort_sets_decreasing`	Whether to sort sets in decreasing order (default: TRUE)
`custom_sets_order`	Custom order for sets if sort_sets_by="custom"
`sort_intersections_decreasing`	Whether to sort intersections in decreasing order (default: TRUE)

custom_intersections_order
: Custom order for intersections if sort_intersections_by="custom"

intersection_color
: Color for intersection dots and lines (default: "black")

highlight_intersections
: Vector of intersection IDs to highlight (default: NULL)

highlight_color
: Color for highlighted intersections (default: "darkorange")

empty_point_size
: Size of empty points in the matrix (default: 1.5)

bar_width
: Width of bars (0-1 scale) (default: 0.7)

text_angle
: Angle for text labels (default: 0)

text_size
: Size of text in the plot (default: 10)

set_label_size
: Size of set size labels (default: 3)

intersection_label_size
: Size of intersection size labels (default: 3)

point_outline_color
: Color for the outline of points (default: "black")

point_stroke
: Width of point outline (default: 0.3)

set_size_show_values
: Whether to show set size values (default: TRUE)

intersection_size_show_values
: Whether to show intersection size values (default: TRUE)

show_empty_intersections
: Whether to show empty intersections (default: FALSE)

show_set_labels
: Whether to show set labels (default: TRUE)

plot_margin
: Margin around the plots in cm (default: 0.5)

height_ratio
: Ratio of matrix to total height (default: 0.7)

width_ratio
: Ratio of set size to total width (default: 0.3)

bar_offset
: Horizontal offset for top bars to improve alignment (default: 0)

set_text_size
: Size of set labels (default: 10)

intersection_title
: Title for the intersection size plot (default: "Intersection Size")

set_size_title
: Title for the set size plot (default: "Set Size")

matrix_point_shape
: Shape of the dots in the matrix (21=filled circle) (default: 21)

number_color_threshold
: Fraction of max value where number color switches (default: 0.75)

number_colors
: Named vector with colors for labels on/off bars (default: c(on_bar="white", off_bar="black"))

theme_params
: List of theme parameters for customization (default: list of defaults)

title
: Optional plot title

interactive
: Logical: create interactive plot? (default: FALSE)

return_data
: Whether to return the data along with the plot (default: FALSE)

Value

A ggplot object or a combined grid layout

Author(s)

Kai Guo

Examples

```
# Basic example
sets <- list(
  "Set A" = c(1:100),
  "Set B" = c(30:120),
  "Set C" = c(20:50, 90:110),
  "Set D" = c(10:40, 80:120)
)
ven <- venndetail(sets)
upsetPlot(ven, bar_offset = -0.02)

# With highlighting
upsetPlot(ven,
          highlight_intersections = c(1, 2),
          highlight_color = "darkorange",
          bar_offset = -0.02)
```

---

upset_plot *Create an UpSet plot for set intersection visualization*

Description

Creates a custom UpSet plot showing the intersections between sets. It displays the size of each intersection and the sets involved in each intersection.

Usage

```
upset_plot(
  data_list,
  sets = NULL,
  min_intersection_size = 1,
  max_sets_display = NULL,
  sort_sets_by = "size",
  sort_sets_decreasing = TRUE,
  custom_sets_order = NULL,
  sort_intersections_by = "freq",
  sort_intersections_decreasing = TRUE,
  custom_intersections_order = NULL,
  intersection_color = "black",
```

```
  main_bar_color = "steelblue",
  sets_bar_colors = NULL,
  highlight_intersections = NULL,
  highlight_color = "darkorange",
  point_outline_color = "black",
  filled_point_size = 2,
  empty_point_size = 1.5,
  line_size = 0.5,
  bar_width = 0.6,
  point_stroke = 0.3,
  text_angle = 0,
  text_size = 10,
  set_text_size = 10,
  set_label_size = 3,
  intersection_label_size = 3,
  intersection_title = "Intersection Size",
  set_size_title = "Set Size",
  matrix_point_shape = 21,
  set_size_show_values = TRUE,
  intersection_size_show_values = TRUE,
  show_empty_intersections = FALSE,
  show_set_labels = TRUE,
  show_numbers_on_bars = TRUE,
  number_color_threshold = 0.75,
  number_colors = c(on_bar = "black", off_bar = "black"),
  plot_margin = 0.5,
  height_ratio = 0.5,
  width_ratio = 0.3,
  bar_offset = -0.01,
 theme_params = list(background_color = "white", grid_color = "grey92", axis_text_color
    = "black", use_grid = TRUE, border_color = NA),
  return_data = FALSE
)
```

Arguments

data_list	A named list of vectors, each containing elements in a set
sets	Optional vector of set names to include (default: all sets in data_list)
min_intersection_size	Minimum intersection size to include (default: 1)
max_sets_display	Maximum number of sets to display (default: all)
sort_sets_by	How to sort the sets: "size", "name", or "custom" (default: "size")
sort_sets_decreasing	Whether to sort sets in decreasing order (default: TRUE)
custom_sets_order	Custom order for sets if sort_sets_by="custom"

`sort_intersections_by`
: How to sort intersections: "freq", "degree", or "custom" (default: "freq")

`sort_intersections_decreasing`
: Whether to sort intersections in decreasing order (default: TRUE)

`custom_intersections_order`
: Custom order for intersections if sort_intersections_by="custom"

`intersection_color`
: Color for intersection dots and lines (default: "black")

`main_bar_color`
: Color for the intersection size bars (default: "steelblue")

`sets_bar_colors`
: Named vector of colors for each set (default: auto-generated)

`highlight_intersections`
: Vector of intersection IDs to highlight (default: NULL)

`highlight_color`
: Color for highlighted intersections (default: "#FF5500")

`point_outline_color`
: Color for the outline of points (default: "black")

`filled_point_size`
: Size of filled points in the matrix (default: 2)

`empty_point_size`
: Size of empty points in the matrix (default: 1.5)

`line_size`
: Width of connecting lines (default: 0.5)

`bar_width`
: Width of bars (0-1 scale) (default: 0.7)

`point_stroke`
: Width of point outline (default: 0.3)

`text_angle`
: Angle for text labels (default: 0)

`text_size`
: Size of text in the plot (default: 10)

`set_text_size`
: Size of set labels (default: 10)

`set_label_size`
: Size of set size labels (default: 3)

`intersection_label_size`
: Size of intersection size labels (default: 3)

`intersection_title`
: Title for the intersection size plot (default: "Intersection Size")

`set_size_title`
: Title for the set size plot (default: "Set Size")

`matrix_point_shape`
: Shape of the dots in the matrix (21=filled circle) (default: 21)

`set_size_show_values`
: Whether to show set size values (default: TRUE)

`intersection_size_show_values`
: Whether to show intersection size values (default: TRUE)

`show_empty_intersections`
: Whether to show empty intersections (default: FALSE)

`show_set_labels`
: Whether to show set labels (default: TRUE)

show_numbers_on_bars
: Logical, whether to display counts on bars (default: TRUE)

number_color_threshold
: Fraction of max value where number color switches (default: 0.75)

number_colors
: Named vector with colors for labels on/off bars (default: c(on_bar="white", off_bar="black"))

plot_margin
: Margin around the plots in cm (default: 0.5)

height_ratio
: Ratio of matrix to total height (default: 0.7)

width_ratio
: Ratio of set size to total width (default: 0.3)

bar_offset
: Horizontal offset for top bars to improve alignment (default: 0)

theme_params
: List of theme parameters for customization (default: list of defaults)

return_data
: Whether to return the data along with the plot (default: FALSE)

Value

If return_data=FALSE, returns the patchwork plot object. If return_data=TRUE, returns a list containing the plot and component data.

Author(s)

Kai Guo

Examples

```
# Basic example
sets <- list(
  "Set A" = c(1:100),
  "Set B" = c(30:120),
  "Set C" = c(20:50, 90:110),
  "Set D" = c(10:40, 80:120)
)
upset_plot(sets)

# With highlighting
upset_plot(sets,
          highlight_intersections = c(1, 2),
          highlight_color = "darkorange",
          bar_offset = -0.02)

# Custom colors
set_colors <- c("Set A" = "blue", "Set B" = "green",
               "Set C" = "orange", "Set D" = "purple")
upset_plot(sets, sets_bar_colors = set_colors,
          main_bar_color = "darkblue")
```

Venn-class *Venn Class*

Description

S4 class to store and manage set intersection data and visualizations

Slots

`input` A list containing the original input datasets

`raw` A named vector with counts of elements in each input set

`sep` The character used to separate set names in subset labels

`GroupNames` A character vector of input group names

`result` A data.frame containing subset information (subset name and elements)

`detail` A named vector with counts of elements in each subset

`wide` A data.frame with subset information in wide format for easier analysis

`metadata` A list to store additional metadata about the analysis

Author(s)

Kai Guo

Examples

```
## Not run:
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
venn_obj <- venndetail(list(A = A, B = B, C = C))
# Access the detail slot
venn_obj@detail

## End(Not run)
```

vennApp *Create an interactive Venn diagram app*

Description

Creates a Shiny app for interactive exploration of Venn diagrams

Usage

```
vennApp(object, launch = TRUE, ...)
```

Arguments

object	A Venn object
launch	Launch the app immediately? Default: TRUE
...	Additional arguments passed to shiny::runApp

Value

A Shiny app object (invisibly)

Author(s)

Kai Guo

Examples

```
## Not run:
# Create a Venn object
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))

# Launch interactive app
vennApp(res)

## End(Not run)
```

---

venndetail *Create a Venn object for set analysis*

Description

Extracts shared and unique elements from multiple sets and creates a Venn object for analysis and visualization

Usage

```
venndetail(
  x,
  sep = "_",
  abbr = FALSE,
  minlength = 3,
  abbr.method = "both.sides",
  verbose = FALSE
)
```

Arguments

x	A list of vectors with group names
sep	Symbol character used when concatenating group names into subset names (default: '_')
abbr	Logical: abbreviate subset names? Default: FALSE
minlength	Minimal length for abbreviated subset names. Default: 3
abbr.method	Method for abbreviation: "both.sides", "left.sides", or "right.sides"
verbose	Logical: show progress messages? Default: FALSE

Value

A Venn object

Author(s)

Kai Guo

Examples

```
# Create a Venn object with three sets
A <- sample(1:100, 40, replace = FALSE)
B <- sample(1:100, 60, replace = FALSE)
C <- sample(1:100, 40, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))

# Examine the results
summary(res)

# Plot the results
plot(res, type = "venn")

# With abbreviated set names
sets <- list(
  LongNameGroup1 = sample(1:100, 40),
  LongNameGroup2 = sample(1:100, 50),
  LongNameGroup3 = sample(1:100, 45)
)
res <- venndetail(sets, abbr = TRUE, minlength = 4)
```

---

vennDiagram *Create a Venn diagram*

Description

Creates a traditional Venn diagram for 2-5 sets

Usage

```
vennDiagram(
  object,
  fill = NULL,
  alpha = 0.5,
  labels = TRUE,
  counts = TRUE,
  showNumbers = TRUE,
  numberSize = 4,
  numberColor = "black",
  labelSize = 4,
  labelColor = "black",
  borderCol = FALSE,
  fillCol = TRUE,
  fixedCoords = TRUE,
  xlim = c(0, 1),
  ylim = c(0, 1),
  show_percentages = TRUE,
  show_unique_only = FALSE,
  scaled = FALSE,
  title = NULL,
  interactive = FALSE,
  ...
)
```

Arguments

object	A Venn object
fill	Colors for filling the circles
alpha	Transparency level for the circles (0-1)
labels	Logical: show set labels? (default: TRUE)
counts	Logical: show counts? (default: TRUE)
showNumbers	Logical: whether to show counts and percentages in each region
numberSize	Size of the count labels
numberColor	Color of the count labels
labelSize	Size of the set labels
labelColor	Color of the set labels
borderCol	Logical: whether to color the borders of circles
fillCol	Logical: whether to fill circles with colors
fixedCoords	Logical: whether to use fixed coordinates
xlim	Vector with 2 numbers, x axis limits for the venn diagram
ylim	Vector with 2 numbers, y axis limits for the venn diagram
show_percentages	Logical: show percentages alongside counts? (default: TRUE)

show_unique_only	Logical: show counts only for unique elements? (default: FALSE)
scaled	Logical: scale circles by set size? (default: FALSE)
title	Optional plot title
interactive	Logical: create interactive plot? (default: FALSE)
...	Additional arguments passed to ggplot2 functions

Value

A ggplot2 or plotly object

Author(s)

Kai Guo

---

vennDiagram,Venn-method

Create a traditional Venn diagram

Description

Creates a traditional Venn diagram for 2-5 sets

Usage

```
## S4 method for signature 'Venn'
vennDiagram(
  object,
  fill = NULL,
  alpha = 0.5,
  labels = TRUE,
  counts = TRUE,
  showNumbers = TRUE,
  numberSize = 4,
  numberColor = "black",
  labelSize = 4,
  labelColor = "black",
  borderCol = FALSE,
  fillCol = TRUE,
  fixedCoords = TRUE,
  xlim = c(0, 1),
  ylim = c(0, 1),
  show_percentages = TRUE,
  show_unique_only = FALSE,
  scaled = FALSE,
  title = NULL,
```

```
  interactive = FALSE,
  ...
)
```

Arguments

object	A Venn object
fill	Colors for filling the circles
alpha	Transparency level for the circles (0-1)
labels	Logical: show set labels? (default: TRUE)
counts	Logical: show counts? (default: TRUE)
showNumbers	Logical: whether to show counts and percentages in each region
numberSize	Size of the count labels
numberColor	Color of the count labels
labelSize	Size of the set labels
labelColor	Color of the set labels
borderCol	Logical: whether to color the borders of circles
fillCol	Logical: whether to fill circles with colors
fixedCoords	Logical: whether to use fixed coordinates
xlim	Vector with 2 numbers, x axis limits for the venn diagram
ylim	Vector with 2 numbers, y axis limits for the venn diagram
show_percentages	Logical: show percentages alongside counts? (default: TRUE)
show_unique_only	Logical: show counts only for unique elements? (default: FALSE)
scaled	Logical: scale circles by set size? (default: FALSE)
title	Optional plot title
interactive	Logical: create interactive plot? (default: FALSE)
...	Additional arguments passed to ggplot2 functions

Value

A ggplot2 or plotly object

Author(s)

Kai Guo

vennEnrichment *Perform enrichment analysis on set intersections*

Description

Performs enrichment analysis to identify overrepresented categories in set intersections

Usage

```
vennEnrichment(
  object,
  annotation,
  id_col,
  category_col,
  subsets = NULL,
  min_overlap = 3,
  adjust.method = "BH",
  sig_threshold = 0.05
)
```

Arguments

object	A Venn object
annotation	A data frame with annotation data (e.g., Gene Ontology terms)
id_col	Column in the annotation data frame containing identifiers matching elements in the Venn object
category_col	Column in the annotation data frame containing category information
subsets	Character vector of subset names to analyze (default: NULL, all subsets)
min_overlap	Minimum number of elements a category must share with a subset (default: 3)
adjust.method	Method for multiple testing correction (default: "BH")
sig_threshold	Significance threshold for p-values (default: 0.05)

Value

A data.frame with enrichment analysis results

Author(s)

Kai Guo

Examples

```
# Create a Venn object with gene sets
A <- sample(1:1000, 100, replace = FALSE)
B <- sample(1:1000, 150, replace = FALSE)
C <- sample(1:1000, 120, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))

# Create simulated annotation data
gene_ids <- 1:1000
categories <- sample(c("Category1", "Category2", "Category3", "Category4"),
                     1000, replace = TRUE)
anno <- data.frame(GeneID = gene_ids, Category = categories)

# Perform enrichment analysis
enrichment <- vennEnrichment(res, anno, "GeneID", "Category")
```

---

vennpie *Create a Venn-pie visualization*

Description

Creates a pie-chart-like visualization of set intersections

Usage

```
vennpie(
  object,
  subset = NULL,
  top = 31,
  min = 0,
  color = NULL,
  revcolor = "lightgrey",
  any = NULL,
  show.number = TRUE,
  show.x = TRUE,
  sep = "_",
  log = FALSE,
  base = NULL,
  percentage = FALSE,
  title = NULL,
  interactive = FALSE,
  ...
)
```

Arguments

object	A Venn object
subset	Character vector of subset names to highlight

top	Maximum number of subsets to display
min	Minimum number of sets an element must be in
color	Optional vector of colors for the subsets
revcolor	Color for non-highlighted subsets
any	Highlight subsets shared by exactly this many sets
show.number	Logical: show counts in labels?
show.x	Logical: show subset labels?
sep	Character separator for subset names
log	Logical: use log scale for counts?
base	Base for log transformation if log=TRUE
percentage	Logical: show percentages instead of counts?
title	Optional plot title
interactive	Logical: create interactive plot?
...	Additional arguments

Value

A ggplot2 or plotly object

Author(s)

Kai Guo

`vennpie,Venn-method` *Create a Venn-pie visualization*

Description

Creates a pie-chart-like visualization of set intersections, which is particularly useful for visualizing more than 5 sets

Usage

```
## S4 method for signature 'Venn'
vennpie(
  object,
  subset = NULL,
  top = 31,
  min = 0,
  color = NULL,
  revcolor = "lightgrey",
  any = NULL,
  show.number = TRUE,
```

```
  show.x = TRUE,
  sep = "_",
  log = FALSE,
  base = NULL,
  percentage = FALSE,
  title = NULL,
  interactive = FALSE,
  ...
)
```

Arguments

object	A Venn object
subset	Character vector of subset names to highlight
top	Maximum number of subsets to display. Default: 31
min	Minimum number of sets an element must be in. Default: 0
color	Optional vector of colors for the subsets
revcolor	Color for non-highlighted subsets. Default: "lightgrey"
any	Highlight subsets shared by exactly this many sets
show.number	Logical: show counts in labels? Default: TRUE
show.x	Logical: show subset labels? Default: TRUE
sep	Character separator for subset names
log	Logical: use log scale for counts? Default: FALSE
base	Base for log transformation if log=TRUE
percentage	Logical: show percentages instead of counts? Default: FALSE
title	Optional plot title
interactive	Logical: create interactive plot? Default: FALSE
...	Additional arguments

Value

A ggplot2 or plotly object

Author(s)

Kai Guo

vennStats *Perform statistical tests on set intersections*

Description

Performs statistical tests to evaluate the significance of set intersections

Usage

```
vennStats(
  object,
  universe = NULL,
  method = c("hypergeometric", "permutation"),
  nperm = 1000,
  adjust.method = "BH",
  include_singles = FALSE
)
```

Arguments

object	A Venn object
universe	Size of the universe for hypergeometric test. Default: NULL (will use the union of all sets)
method	Statistical method to use: "hypergeometric" or "permutation". Default: "hypergeometric"
nperm	Number of permutations if method="permutation". Default: 1000
adjust.method	Method for multiple testing correction. Default: "BH"
include_singles	Logical: include tests for single sets? Default: FALSE

Value

A data.frame with statistical test results

Author(s)

Kai Guo

Examples

```
A <- sample(1:1000, 100, replace = FALSE)
B <- sample(1:1000, 150, replace = FALSE)
C <- sample(1:1000, 120, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
stats <- vennStats(res)
```

vennStats,Venn-method *Perform statistical tests on set intersections*

Description

Performs statistical tests to evaluate the significance of set intersections

Usage

```
## S4 method for signature 'Venn'
vennStats(
  object,
  universe = NULL,
  method = c("hypergeometric", "permutation"),
  nperm = 1000,
  adjust.method = "BH",
  include_singles = FALSE
)
```

Arguments

object	A Venn object
universe	Size of the universe for hypergeometric test (default: NULL, will use the union of all sets)
method	Statistical method to use: "hypergeometric" or "permutation" (default: "hypergeometric")
nperm	Number of permutations if method="permutation" (default: 1000)
adjust.method	Method for multiple testing correction (default: "BH")
include_singles	Logical: include tests for single sets? (default: FALSE)

Value

A data.frame with statistical test results

Author(s)

Kai Guo

Examples

```
# Create a Venn object
A <- sample(1:1000, 100, replace = FALSE)
B <- sample(1:1000, 150, replace = FALSE)
C <- sample(1:1000, 120, replace = FALSE)
res <- venndetail(list(A = A, B = B, C = C))
```

```
# Perform statistical tests
stats <- vennStats(res)

# With custom universe size
stats <- vennStats(res, universe = 2000)

# Using permutation test
stats <- vennStats(res, method = "permutation", nperm = 500)
```

[.Venn *Subset a Venn object*

Description

Extract elements from the result slot of a Venn object using bracket notation.

Usage

```
## S3 method for class 'Venn'
x[i, j]
```

Arguments

x	Venn object
i	Row indices
j	Column indices

Value

Subset of the result data.frame

$.Venn *Extract column from a Venn object*

Description

Extract a column from the result slot of a Venn object using $ notation.

Usage

```
## S3 method for class 'Venn'
x$name
```

Arguments

x	Venn object
name	Column name to extract

Value

Vector containing the specified column

Index