

# Package ‘VennDetail’

November 21, 2025

**Type** Package

**Title** Comprehensive Visualization and Analysis of Multi-Set Intersections

**Version** 1.26.0

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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.

**License** GPL-2

**Encoding** UTF-8

**LazyData** true

**Depends** R (>= 4.0.0),

**Imports** dplyr, DT, methods, ggplot2, grDevices, magrittr, patchwork, plotly, purrr, rlang, shiny, stats, tibble, tidyr, htmlwidgets, utils

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

**VignetteBuilder** knitr

**URL** <https://github.com/guokai8/VennDetail>

**BugReports** <https://github.com/guokai8/VennDetail/issues>

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|--------------------|----------------------------------------------------------------------------------------|
| VennDetail-package | <i>VennDetail: Comprehensive Visualization and Analysis of Multi-Set Intersections</i> |
|--------------------|----------------------------------------------------------------------------------------|

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"

---

|                           |                                            |
|---------------------------|--------------------------------------------|
| <code>.findOverlap</code> | <i>Find overlap between sets in a list</i> |
|---------------------------|--------------------------------------------|

---

**Description**

Find overlap between sets in a list

**Usage**

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

**Arguments**

|                      |                                                            |
|----------------------|------------------------------------------------------------|
| <code>setlist</code> | list of character vectors.                                 |
| <code>xlim</code>    | vector with 2 numbers, x axis limits for the venn diagram. |
| <code>ylim</code>    | 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

---

|                          |                                                                               |
|--------------------------|-------------------------------------------------------------------------------|
| <code>.make.table</code> | <i>make table for venndetail modified from make.truth.table (VennDiagram)</i> |
|--------------------------|-------------------------------------------------------------------------------|

---

**Description**

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

**Usage**

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

**Arguments**

|                |                          |
|----------------|--------------------------|
| <code>x</code> | A list with input groups |
|----------------|--------------------------|

**Value**

A data frame with logical vector columns and  $2^{\text{length}(x)} - 1$  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

---

|            |                                   |
|------------|-----------------------------------|
| add_prefix | <i>Add prefix to column names</i> |
|------------|-----------------------------------|

---

**Description**

Adds a prefix to column names except for "RowNxyz"

**Usage**

```
add_prefix(x, prefix, sep = "_")
```

**Arguments**

|        |                                                   |
|--------|---------------------------------------------------|
| x      | A data.frame                                      |
| prefix | Prefix to add                                     |
| sep    | Separator between prefix and original column name |

**Value**

A data.frame with prefixed column names

**Author(s)**

Kai Guo

---

|                     |                                  |
|---------------------|----------------------------------|
| add_rownames_column | <i>Add row names as a column</i> |
|---------------------|----------------------------------|

---

**Description**

Adds row names as a column named "RowNxyz"

**Usage**

```
add_rownames_column(x)
```

**Arguments**

|   |              |
|---|--------------|
| x | A data.frame |
|---|--------------|

**Value**

A data.frame with row names as a column

**Author(s)**

Kai Guo

---

|                                 |                                              |
|---------------------------------|----------------------------------------------|
| <code>as.data.frame.Venn</code> | <i>Convert a Venn object to a data frame</i> |
|---------------------------------|----------------------------------------------|

---

### Description

Converts a Venn object to a data frame for easier manipulation

### Usage

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

### Arguments

|                  |                                 |
|------------------|---------------------------------|
| <code>x</code>   | A Venn object                   |
| <code>...</code> | 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)
```

---

|                          |                                 |
|--------------------------|---------------------------------|
| <code>compareVenn</code> | <i>Compare two Venn objects</i> |
|--------------------------|---------------------------------|

---

### 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 | <i>Get subset details from a Venn object</i> |
|--------|----------------------------------------------|

---

**Description**

Returns a named numeric vector with counts for each subset

The objective of this function is to summarize 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)

```

---

|                     |                                              |
|---------------------|----------------------------------------------|
| detail, Venn-method | <i>Get subset details from a Venn object</i> |
|---------------------|----------------------------------------------|

---

**Description**

Returns a named numeric vector with counts for each subset

**Usage**

```

## 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)

```

---

`dim.Venn`*Get the dimensions of a Venn object*

---

**Description**

Returns the dimensions of the result data frame

**Usage**

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

**Arguments**

`x`                      A Venn object

**Value**

A numeric vector with the number of rows and columns

**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 dimensions  
dim(res)
```

---

`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)

```

---

|                    |                                           |
|--------------------|-------------------------------------------|
| dplot, Venn-method | <i>Create a bar plot of subset counts</i> |
|--------------------|-------------------------------------------|

---

### Description

Creates a bar plot showing counts for each subset

### Usage

```

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

```

**Arguments**

|          |                                           |
|----------|-------------------------------------------|
| object   | A Venn object                             |
| order    | Logical: should bars be ordered by count? |
| textsize | Numeric: size of text labels above bars   |
| color    | Optional vector of colors for the bars    |
| theme    | The ggplot2 theme to use                  |
| 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))
# Simple bar plot
dplot(res)
# Ordered bars with custom title
dplot(res, order = TRUE, textsize = 3, title = "Set Intersections")
```

---

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,
  userownname = TRUE,
  gind = NULL,
  sep = "_",
  wide = FALSE
)
```

```
## S4 method for signature 'Venn'
getFeature(
  object,
  subset,
  rlist,
  userownname = 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                                                                                       |
| userownname | 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 userownname=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),
  userownname = 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),
  userownname= FALSE, gind = rep(1, 3))
```

---

getFeature, Venn-method

*Extract feature data for specific subsets*


---

## Description

Combines subset information with user-supplied data frames

## Usage

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

## Arguments

|             |                                                                 |
|-------------|-----------------------------------------------------------------|
| object      | A Venn object                                                   |
| subset      | Character vector of subset names to extract                     |
| rlist       | List of user-supplied data frames                               |
| userownname | Logical: use row names for joining?                             |
| gind        | Column names or indices to use for joining if userownname=FALSE |
| sep         | Character used to separate group names in column names          |
| wide        | Logical: return results in wide format?                         |

## Value

A data.frame combining subset information with user data

## 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),
  userownname = 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")
```

---

|                    |                                                    |
|--------------------|----------------------------------------------------|
| getSet,Venn-method | <i>Extract specific subsets from a Venn object</i> |
|--------------------|----------------------------------------------------|

---

### Description

Extracts elements from specified subsets

### Usage

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

### Arguments

|        |                                              |
|--------|----------------------------------------------|
| object | A Venn object                                |
| subset | Character vector of subset names to extract  |
| min    | Minimum number of sets an element must be in |
| wide   | Logical: return results in wide format?      |

### Value

A data.frame with elements from the specified subsets

### 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")
```

---

|           |                                                    |
|-----------|----------------------------------------------------|
| head.Venn | <i>Extract the first few rows of a Venn object</i> |
|-----------|----------------------------------------------------|

---

### Description

Extract the first n rows of the result data frame

### Usage

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

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

**Arguments**

|     |                                     |
|-----|-------------------------------------|
| x   | A Venn object                       |
| n   | Number of rows to extract           |
| ... | Additional arguments passed to head |

**Value**

A data frame with the first n rows

**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 the first few rows
head(res)
```

---

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)
```

---

|             |                                           |
|-------------|-------------------------------------------|
| make_subset | <i>Create subsets from a list of sets</i> |
|-------------|-------------------------------------------|

---

**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 | <i>Create a truth table for set combinations</i> |
|------------------|--------------------------------------------------|

---

**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

*Utility functions for VennDetail package***Description**

Internal utility functions for the VennDetail package

Combines multiple Venn objects into a single Venn object

**Usage**

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

**Arguments**

|             |                                                               |
|-------------|---------------------------------------------------------------|
| x           | First Venn object                                             |
| y           | Second Venn object                                            |
| ignore.case | Logical: ignore case in group names? Default: FALSE           |
| useupper    | Logical: convert all group names to upper case? Default: TRUE |
| plot        | Logical: plot the combined result? Default: FALSE             |
| ...         | Additional arguments passed to venndetail                     |

**Value**

A new Venn object combining the input objects

**Author(s)**

Kai Guo

**Examples**

```
# Create two Venn objects
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))

# Merge the two objects
res <- merge(res1, res2)

# Plot the merged result
plot(res)
```

---

|            |                                             |
|------------|---------------------------------------------|
| merge.Venn | <i>Merge two or more venndetail obejcts</i> |
|------------|---------------------------------------------|

---

**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 | <i>Extract subset names from a Venn object</i> |
|------------|------------------------------------------------|

---

**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 | <i>Create a new Venn object</i> |
|---------|---------------------------------|

---

**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

|                    |                                                                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>x</b>           | A Venn object                                                                                                                           |
| <b>type</b>        | Type of plot: "venn" (traditional Venn diagram), "vennpie" (pie-chart style), "upset" (UpSet plot), or "bar" (bar plot of subset sizes) |
| <b>title</b>       | Optional plot title                                                                                                                     |
| <b>interactive</b> | Logical: create an interactive plot? Default: FALSE                                                                                     |
| <b>filename</b>    | Optional file name to save the plot                                                                                                     |
| <b>width</b>       | Width of the saved plot (default: 8)                                                                                                    |
| <b>height</b>      | Height of the saved plot (default: 6)                                                                                                   |
| <b>dpi</b>         | Resolution in dots per inch (default: 300)                                                                                              |
| <b>...</b>         | Additional arguments passed to the specific plotting function                                                                           |

### Value

A ggplot2 or plotly object

### Parameters for Traditional Venn Diagram (type = "venn")

|                         |                                                                               |
|-------------------------|-------------------------------------------------------------------------------|
| <b>fill</b>             | Colors for filling the circles                                                |
| <b>alpha</b>            | Transparency level for the circles (0-1), default: 0.5                        |
| <b>labels</b>           | Logical: show set labels? Default: TRUE                                       |
| <b>counts</b>           | Logical: show counts? Default: TRUE                                           |
| <b>showNumbers</b>      | Logical: whether to show counts and percentages in each region, default: TRUE |
| <b>numberSize</b>       | Size of the count labels, default: 4                                          |
| <b>numberColor</b>      | Color of the count labels, default: "black"                                   |
| <b>labelSize</b>        | Size of the set labels, default: 4                                            |
| <b>labelColor</b>       | Color of the set labels, default: "black"                                     |
| <b>borderCol</b>        | Logical: whether to color the borders of circles, default: FALSE              |
| <b>fillCol</b>          | Logical: whether to fill circles with colors, default: TRUE                   |
| <b>fixedCoords</b>      | Logical: whether to use fixed coordinates, default: TRUE                      |
| <b>xlim</b>             | Vector with 2 numbers, x axis limits for the venn diagram, default: c(0, 1)   |
| <b>ylim</b>             | Vector with 2 numbers, y axis limits for the venn diagram, default: c(0, 1)   |
| <b>show_percentages</b> | Logical: show percentages alongside counts? Default: TRUE                     |
| <b>show_unique_only</b> | Logical: show counts only for unique elements? Default: FALSE                 |
| <b>scaled</b>           | Logical: scale circles by set size? Default: FALSE                            |

**Parameters for Venn-Pie Plot (type = "vennpie")**

**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, default: "\_"  
**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

**Parameters for UpSet Plot (type = "upset")**

**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  
**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", or "custom"  
**sort\_sets\_by** How to sort sets: "size" (default), "name", or "custom"  
**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  
**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, default: -0.01

**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="black", off\_bar="black")

**theme\_params** List of theme parameters for customization

**return\_data** Whether to return the data along with the plot, default: FALSE

#### Parameters for Bar Plot (type = "bar")

**order** Logical: should bars be ordered by count? Default: FALSE

**textsize** Numeric: size of text labels above bars, default: 5

**color** Optional vector of colors for the bars

**theme** The ggplot2 theme to use, default: theme\_light()

**xlabel** Optional x-axis label

**ylabel** Optional y-axis label

#### 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 <- vennndetail(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
plot(res, type = "venn", filename = "my_venn.png", width = 10, height = 8)

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

```

---

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

|                     |                                                                    |
|---------------------|--------------------------------------------------------------------|
| <code>object</code> | A Venn object                                                      |
| <code>wide</code>   | 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)

```

result, Venn-method

*Extract results from a Venn object***Description**

Retrieves results from a Venn object in long or wide format

**Usage**

```

## 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)

```

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)
```



---

rowjoin,data.frame,data.frame-method

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


---

**Description**

Joins two data.frames using various join methods

**Usage**

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

**Arguments**

|     |                                                                    |
|-----|--------------------------------------------------------------------|
| x   | First data.frame                                                   |
| y   | Second data.frame                                                  |
| fun | Join function to use: "full_join", "left_join", "right_join", etc. |
| by  | Optional vector of column names to join by                         |

**Value**

A joined data.frame

**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")
```

---

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.

Returns a color palette for Venn diagrams

Returns a color palette for Venn diagrams

**Usage**

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

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

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

**Arguments**

|         |                                                                         |
|---------|-------------------------------------------------------------------------|
| n       | Number of colors needed                                                 |
| palette | Type of palette: "default", "categorical", "sequential", or "diverging" |
| x       | Number of color                                                         |

**Value**

color vector

A vector of colors

A vector of colors

**Author(s)**

Kai Guo

**Examples**

```
mycol <- setcolor(10)
mycol
# Get 5 colors from the default palette
cols <- setcolor(5)

# Get 10 colors from the categorical palette
cols <- setcolor(10, palette = "categorical")
# Get 5 colors from the default palette
cols <- setcolor(5)

# Get 10 colors from the categorical palette
cols <- setcolor(10, palette = "categorical")
```

---

|              |                                    |
|--------------|------------------------------------|
| set_rownames | <i>Set row names from a column</i> |
|--------------|------------------------------------|

---

**Description**

Sets row names from a specified column

**Usage**

```
set_rownames(x, col)
```

**Arguments**

|     |                                           |
|-----|-------------------------------------------|
| x   | A data.frame                              |
| col | Column index or name to use for row names |

**Value**

A data.frame with row names from the specified column

**Author(s)**

Kai Guo

---

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)
```

---

show, Venn-method

*Show method for Venn objects*


---

### Description

Display method for Venn objects

Display method for Venn objects

### Usage

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

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

**Arguments**

object            A Venn object

**Value**

Invisibly returns the Venn object

Invisibly returns the Venn object

**Author(s)**

Kai Guo

---

|              |                                                       |
|--------------|-------------------------------------------------------|
| summary.Venn | <i>Return summary information about a Venn object</i> |
|--------------|-------------------------------------------------------|

---

**Description**

Summary method for Venn objects

Summary method for Venn objects

**Usage**

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

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

**Arguments**

object            A Venn object

...               Additional arguments (not used)

**Value**

Invisibly returns the Venn object

Invisibly returns 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))
summary(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))
summary(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 | <i>T2DM Dataset</i> |
|------|---------------------|

---

### 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

---

|           |                                                   |
|-----------|---------------------------------------------------|
| tail.Venn | <i>Extract the last few rows of a Venn object</i> |
|-----------|---------------------------------------------------|

---

### Description

Extract the last n rows of the result data frame

### Usage

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

### Arguments

|     |                                     |
|-----|-------------------------------------|
| x   | A Venn object                       |
| n   | Number of rows to extract           |
| ... | Additional arguments passed to tail |

**Value**

A data frame with the last n rows

**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 the last few rows
tail(res)
```

---

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

|                                            |                                                             |
|--------------------------------------------|-------------------------------------------------------------|
| <code>object</code>                        | A Venn object                                               |
| <code>nintersects</code>                   | Maximum number of intersections to show                     |
| <code>min_size</code>                      | Minimum intersection size to include (default: 1)           |
| <code>sets_bar_color</code>                | Colors for the set size bars                                |
| <code>main_bar_color</code>                | Color for the intersection size bars                        |
| <code>point_size</code>                    | Size of points in the matrix                                |
| <code>line_size</code>                     | Width of lines in the matrix                                |
| <code>show_numbers</code>                  | Logical: show counts on bars?                               |
| <code>sort_intersections_by</code>         | How to sort intersections                                   |
| <code>sort_sets_by</code>                  | How to sort sets                                            |
| <code>sort_sets_decreasing</code>          | Whether to sort sets in decreasing order                    |
| <code>custom_sets_order</code>             | Custom order for sets if <code>sort_sets_by="custom"</code> |
| <code>sort_intersections_decreasing</code> | Whether to sort intersections in decreasing order           |
| <code>custom_intersections_order</code>    | Custom order for intersections                              |
| <code>intersection_color</code>            | Color for intersection dots and lines                       |
| <code>highlight_intersections</code>       | 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

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

|                                            |                                                                                        |
|--------------------------------------------|----------------------------------------------------------------------------------------|
| <code>data_list</code>                     | A named list of vectors, each containing elements in a set                             |
| <code>sets</code>                          | Optional vector of set names to include (default: all sets in <code>data_list</code> ) |
| <code>min_intersection_size</code>         | Minimum intersection size to include (default: 1)                                      |
| <code>max_sets_display</code>              | Maximum number of sets to display (default: all)                                       |
| <code>sort_sets_by</code>                  | How to sort the sets: "size", "name", or "custom" (default: "size")                    |
| <code>sort_sets_decreasing</code>          | Whether to sort sets in decreasing order (default: TRUE)                               |
| <code>custom_sets_order</code>             | Custom order for sets if <code>sort_sets_by</code> ="custom"                           |
| <code>sort_intersections_by</code>         | How to sort intersections: "freq", "degree", or "custom" (default: "freq")             |
| <code>sort_intersections_decreasing</code> | Whether to sort intersections in decreasing order (default: TRUE)                      |
| <code>custom_intersections_order</code>    | Custom order for intersections if <code>sort_intersections_by</code> ="custom"         |
| <code>intersection_color</code>            | Color for intersection dots and lines (default: "black")                               |
| <code>main_bar_color</code>                | Color for the intersection size bars (default: "steelblue")                            |
| <code>sets_bar_colors</code>               | Named vector of colors for each set (default: auto-generated)                          |
| <code>highlight_intersections</code>       | Vector of intersection IDs to highlight (default: NULL)                                |
| <code>highlight_color</code>               | Color for highlighted intersections (default: "#FF5500")                               |

|                                            |                                                                                                             |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <code>point_outline_color</code>           | Color for the outline of points (default: "black")                                                          |
| <code>filled_point_size</code>             | Size of filled points in the matrix (default: 2)                                                            |
| <code>empty_point_size</code>              | Size of empty points in the matrix (default: 1.5)                                                           |
| <code>line_size</code>                     | Width of connecting lines (default: 0.5)                                                                    |
| <code>bar_width</code>                     | Width of bars (0-1 scale) (default: 0.7)                                                                    |
| <code>point_stroke</code>                  | Width of point outline (default: 0.3)                                                                       |
| <code>text_angle</code>                    | Angle for text labels (default: 0)                                                                          |
| <code>text_size</code>                     | Size of text in the plot (default: 10)                                                                      |
| <code>set_text_size</code>                 | Size of set labels (default: 10)                                                                            |
| <code>set_label_size</code>                | Size of set size labels (default: 3)                                                                        |
| <code>intersection_label_size</code>       | Size of intersection size labels (default: 3)                                                               |
| <code>intersection_title</code>            | Title for the intersection size plot (default: "Intersection Size")                                         |
| <code>set_size_title</code>                | Title for the set size plot (default: "Set Size")                                                           |
| <code>matrix_point_shape</code>            | Shape of the dots in the matrix (21=filled circle) (default: 21)                                            |
| <code>set_size_show_values</code>          | Whether to show set size values (default: TRUE)                                                             |
| <code>intersection_size_show_values</code> | Whether to show intersection size values (default: TRUE)                                                    |
| <code>show_empty_intersections</code>      | Whether to show empty intersections (default: FALSE)                                                        |
| <code>show_set_labels</code>               | Whether to show set labels (default: TRUE)                                                                  |
| <code>show_numbers_on_bars</code>          | Logical, whether to display counts on bars (default: TRUE)                                                  |
| <code>number_color_threshold</code>        | Fraction of max value where number color switches (default: 0.75)                                           |
| <code>number_colors</code>                 | Named vector with colors for labels on/off bars (default: <code>c(on_bar="white", off_bar="black")</code> ) |
| <code>plot_margin</code>                   | Margin around the plots in cm (default: 0.5)                                                                |
| <code>height_ratio</code>                  | Ratio of matrix to total height (default: 0.7)                                                              |
| <code>width_ratio</code>                   | Ratio of set size to total width (default: 0.3)                                                             |
| <code>bar_offset</code>                    | Horizontal offset for top bars to improve alignment (default: 0)                                            |
| <code>theme_params</code>                  | List of theme parameters for customization (default: list of defaults)                                      |
| <code>return_data</code>                   | 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, bar_offset = -0.02)

# 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

*Class 'Venn' This class includes all information from venndetail***Description**

S4 class to store and manage set intersection data and visualizations

**Slots**

input original input datasets  
 raw summary of the input datasets  
 sep separation character  
 GroupNames input group names  
 result shared or unique sets  
 detail shared of unique number belongs to each sets  
 wide result in wide format  
 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 <- vennndetail(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 <- vennndetail(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

Vennpie uses the venn object and to creates a figure in the form of a venn pie diagram rather than a traditional venn diagram. Users can highlight a specific sections of the venn pie.

## 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,
  ...
)

## 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
  )
```

### Arguments

|             |                                                                                                                                                             |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| object      | Venn object                                                                                                                                                 |
| subset      | Character vector giving the subset users want to highlight.                                                                                                 |
| top         | number of subsets with largest to display (default: 31)                                                                                                     |
| 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. |
| color       | Character vector giving the colors of the subsets.                                                                                                          |
| revcolor    | Character giving the color for the non-selected subsets.                                                                                                    |
| any         | Number to indicate selected subsets, such as 1 means any unique subsets, 2 means any subsets shared by two groups.                                          |
| show.number | Boolean indicating whether to display the element numbers of the subsets or not (default: TRUE).                                                            |
| show.x      | Boolean indicating whether to show subset labels outside the circle (default: TRUE).                                                                        |
| sep         | Character string used to separate the terms when concatenating group names into new column names (colnames).                                                |
| log         | Boolean indicating whether to transform the data in log scale .                                                                                             |
| base        | Base value for log transformation.                                                                                                                          |
| percentage  | Boolean indicating whether to display subset percentages (default: FALSE).                                                                                  |
| title       | Optional plot title                                                                                                                                         |
| interactive | Logical: create interactive plot?                                                                                                                           |
| ...         | Additional arguments                                                                                                                                        |

### Value

A ggplot2 or plotly object  
vennpie figure

### 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 <- vennndetail(list(A = A, B = B, C = C))
vennpie(res)
```

---

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
)
```

## 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 rows and/or columns from the result data frame

## Usage

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

## Arguments

|   |                         |
|---|-------------------------|
| x | A Venn object           |
| i | Row indices             |
| j | Column indices or names |

## Value

A subset of the result data frame

## 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))

# Extract the first 5 rows
res[1:5, ]

# Extract a specific column
res[, "Subset"]
```

---

|         |                                            |
|---------|--------------------------------------------|
| \$.Venn | <i>Extract a column from a Venn object</i> |
|---------|--------------------------------------------|

---

**Description**

Extract a column from the result data frame

**Usage**

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

**Arguments**

|      |               |
|------|---------------|
| x    | A Venn object |
| name | Column name   |

**Value**

A vector with the column values

**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))  
  
# Extract the Subset column  
res$Subset
```

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