Package 'RGraphSpace'

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Type Package

Version 1.1.0

Title A Lightweight Interface Between 'igraph' and 'ggplot2' Graphics

Description Interface to integrate 'igraph' and 'ggplot2' graphics in a normalized coordinate system. 'RGraphSpace' implements new geometric objects using 'ggplot2' prototypes, customized for side-by-side visualization of multiple graphs. By scaling shapes and graph elements, 'RGraphSpace' can provide a framework for layered visualizations.

Depends R(>= 4.4), methods, ggplot2

Imports grDevices, scales, grid, igraph, lifecycle

Suggests knitr, rmarkdown, testthat

Enhances RedeR

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VignetteBuilder knitr

URL https://github.com/sysbiolab/RGraphSpace

BugReports https://github.com/sysbiolab/RGraphSpace/issues

Collate gspaceChecks.R gspaceValidation.R gspaceSupplements.R gspaceMisc.R gspacePlots.R gspaceClasses.R gspaceGenerics.R gspaceMethods.R

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Accessors for fetching slots from a GraphSpace object

Description

`getGraphSpace` retrives information from individual slots available in a GraphSpace object.

Usage

```
## S4 method for signature 'GraphSpace'
getGraphSpace(gs, what = "graph")
```

Arguments

`gs`	A preprocessed GraphSpace class object
`what`	A single character value specifying which information should be retrieved from the slots. Options: 'graph','gxy','gxyz','pars','misc','status','summits', 'summit_mask', and 'summit_contour'.

Value

Content from slots in the GraphSpace object.

Examples

```
# Load a demo igraph
data('gtoy1', package = 'RGraphSpace')

# Create a new GraphSpace object
gs <- GraphSpace(gtoy1)

# Get the 'summary' slot in gs
getGraphSpace(gs, what = 'graph')
```

GraphSpace *Constructor of GraphSpace-class objects*

Description

GraphSpace is a constructor of GraphSpace-class objects.

Usage

```
GraphSpace(g, mar = 0.1, layout = NULL, image = NULL, verbose = TRUE)
```

Arguments

g	An igraph object. It must include graph coordinates assigned to x and y vertex attributes, and vertex labels assigned to name vertex attribute.
mar	A single numeric value (in [0,1]) indicating the size of the outer margins as a fraction of the graph space. Note: When an image is provided, mar is a fraction of image margins.
layout	An optional numeric matrix with two columns for x and y coordinates.
image	An optional background image. When provided, x and y coordinates must represent pixel positions in the image space.
verbose	A single logical value specifying to display detailed messages (when verbose=TRUE) or not (when verbose=FALSE).

Value

A GraphSpace class object.

Author(s)

Sysbiolab.

See Also

plotGraphSpace

Examples

```
# Load a demo igraph
data('gtoy1', package = 'RGraphSpace')

gs <- GraphSpace(gtoy1)
```

GraphSpace-class *GraphSpace: An S4 class for igraph objects*

Description

GraphSpace: An S4 class for igraph objects

Value

An S4 class object.

Slots

`nodes` A data frame with xy-vertex coordinates.

`edges` A data frame with edges.

`graph` An igraph object.

`image` A raster background image matrix.

`pars` A list with parameters.

`misc` A list with intermediate objects for downstream methods.

Constructor

see `GraphSpace` constructor.

gtoys *Toy 'igraph' objects*

Description

Small 'igraph' objects used for workflow demonstrations. All graphs include 'x', 'y', and 'name' vertex attributes.

Usage

```
data(gtoy1)
```

Format

igraph

Value

A pre-processed igraph object.

Source

This package.

Examples

```
data(gtoy1)
data(gtoy2)
```

`names,GraphSpace-method`

Accessors for applying essential igraph methods to modify attributes of GraphSpace objects.

Description

Access and modify individual slots of a GraphSpace object. Selected 'igraph' methods are applied to the 'graph' slot and propagated to downstream components.

Usage

```
## S4 method for signature 'GraphSpace'
names(x)

## S4 replacement method for signature 'GraphSpace'
names(x) <- value

## S4 method for signature 'GraphSpace'
gs_vcount(x)

## S4 method for signature 'GraphSpace'
gs_ecount(x)

## S4 method for signature 'GraphSpace'
gs_vertex_attr(x, name, ...)

## S4 replacement method for signature 'GraphSpace'
gs_vertex_attr(x, name, ...) <- value

## S4 method for signature 'GraphSpace'
gs_edge_attr(x, name, ...)

## S4 replacement method for signature 'GraphSpace'
gs_edge_attr(x, name, ...) <- value
```

Arguments

x	A GraphSpace class object
value	The new value of the attribute.
name	Name of the attribute.
...	Additional arguments passed to igraph methods.

Value

Updated GraphSpace object.

See Also

vertex_attr, edge_attr

Examples

```
# Load a demo igraph
data('gtoy1', package = 'RGraphSpace')

# Create a new GraphSpace object
gs <- GraphSpace(gtoy1)

# Usage of GraphSpace attribute accessors:

# Get vertex names
names(gs)

# Get vertex count
gs_vcount(gs)

# Get edge count
gs_ecount(gs)

# Access all vertex attributes
gs_vertex_attr(gs)

# Access a specific vertex attribute
gs_vertex_attr(gs, "nodeLabel")

# Modify a single value within a vertex attribute
gs_vertex_attr(gs, "nodeSize")["n1"] <- 10

# Replace an entire vertex attribute
gs_vertex_attr(gs, "nodeSize") <- 10

# Alternative syntax using `$` accessor
gs_vertex_attr(gs)$nodeSize <- 10

# Access a specific edge attribute
gs_edge_attr(gs, "edgeLineColor")
```

```
# Replace an entire edge attribute
gs_edge_attr(gs, "edgeLineWidth") <- 1

 # Alternative syntax using `$` for edge attributes
gs_edge_attr(gs)$edgeLineWidth <- 3
```

`plot.GraphSpace` *Plot GraphSpace objects*

Description

Plot GraphSpace objects

Usage

```
## S3 method for class 'GraphSpace'
plot(x, ...)
```

Arguments

`x`	A GraphSpace class object.
`...`	Additional arguments passed to the `plotGraphSpace` function.

See Also

`plotGraphSpace`

`plotGraphSpace,GraphSpace-method`
Plotting igraph objects with RGraphSpace

Description

`plotGraphSpace` is a wrapper function to create dedicated ggplot graphics for igraph- and GraphSpace-class objects.

Usage

```
## S4 method for signature 'GraphSpace'
plotGraphSpace(
  gs,
  theme = c("th0", "th1", "th2", "th3"),
  xlab = "Graph coordinates 1",
  ylab = "Graph coordinates 2",
  font.size = 1,
```

```
  bg.color = "grey95",
  add.labels = FALSE,
  node.labels = NULL,
  label.size = 3,
  label.color = "grey20",
  add.image = FALSE,
  marks = deprecated(),
  mark.size = deprecated(),
  mark.color = deprecated()
)

## S4 method for signature 'igraph'
plotGraphSpace(gs, ..., mar = 0.1)
```

Arguments

gs	Either an igraph or GraphSpace class object. If gs is an igraph, then it must include x, y, and name vertex attributes (see GraphSpace).
theme	Name of a custom RGraphSpace theme. These themes (from 'th1' to 'th3') consist of preconfigured ggplot settings, which the user can subsequently refine using ggplot2.
xlab	The title for the 'x' axis of a 2D-image space.
ylab	The title for the 'y' axis of a 2D-image space.
font.size	A single numeric value passed to ggplot themes.
bg.color	A single color for background.
add.labels	A logical value indicating whether to plot vertex labels.
node.labels	A vector of vertex names to be highlighted in the graph space. This argument overrides 'add.labels'.
label.size	A size argument passed to geom_text.
label.color	A color passed to geom_text.
add.image	A logical value indicating whether to add a background image, when one is available (see GraphSpace).
marks	Deprecated from RGraphSpace 1.0.9; use 'node.labels' instead.
mark.size	Deprecated from RGraphSpace 1.0.9; use 'label.size' instead.
mark.color	Deprecated from RGraphSpace 1.0.9; use 'label.color' instead.
...	Additional arguments passed to the plotGraphSpace function.
mar	A single numeric value (in [0,1]) indicating the size of the outer margins as a fraction of the graph space.

Value

A ggplot-class object.

Author(s)

Sysbiolab.

See Also

GraphSpace

Examples

```
# Load a demo igraph
data('gtoy1', package = 'RGraphSpace')

# Generate a ggplot for igraph
plotGraphSpace(gtoy1)

# Create a GraphSpace object
gs <- GraphSpace(gtoy1)

# Generate a ggplot for gs
plotGraphSpace(gs)
```

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