

Package ‘RGraphSpace’

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Type Package

Version 1.0.9

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

Description

Interface to integrate 'igraph' and 'ggplot2' graphics within spatial maps. 'RGraphSpace' implements new geometric objects using 'ggplot2' prototypes, customized for representing large 'igraph' objects in a normalized coordinate system. 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>

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Author Victor Apolonio [ctb],
Vinicius Chagas [ctb],
Mauro Castro [aut, cre] (ORCID:
<https://orcid.org/0000-0003-4942-8131>>)

Maintainer Mauro Castro <mauro.a.castro@gmail.com>

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getGraphSpace, GraphSpace-method
<i>Accessors for fetching slots from a GraphSpace object</i>

Description

getGraphSpace retrieves 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', 'submit_mask', and 'submit_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

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

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	<i>GraphSpace: An S4 class for igraph objects</i>
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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	<i>Toy 'igraph' objects</i>
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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	<i>Plot GraphSpace objects</i>
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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
<i>Plotting igraph objects with RGraphSpace</i>

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 <code>igraph</code> or GraphSpace class object. If <code>gs</code> is an <code>igraph</code> , then it must include <code>x</code> , <code>y</code> , and <code>name</code> vertex attributes (see GraphSpace).
theme	Name of a custom <code>RGraphSpace</code> theme. These themes (from <code>'th1'</code> to <code>'th3'</code>) consist of preconfigured <code>ggplot</code> settings, which the user can subsequently refine using ggplot2 .
xlab	The title for the <code>'x'</code> axis of a 2D-image space.
ylab	The title for the <code>'y'</code> axis of a 2D-image space.
font.size	A single numeric value passed to <code>ggplot</code> 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 <code>'add.labels'</code> .
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 <code>RGraphSpace 1.0.9</code> ; use <code>'node.labels'</code> instead.
mark.size	Deprecated from <code>RGraphSpace 1.0.9</code> ; use <code>'label.size'</code> instead.
mark.color	Deprecated from <code>RGraphSpace 1.0.9</code> ; use <code>'label.color'</code> 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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