

Package: SpatialData.plot (via r-universe)

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Title SpatialData visualization

Depends R (>= 4.5), spatialdataR

Version 0.99.9

Description Visualization suit for 'spatialdataR'. Current functionality includes handling of multiscale 'images', visualizing 'labels', 'points', and 'shapes'. For the latter, POINT, POLYGON, and MULTIPOLYGON geometries are supported. For all but 'images', there is support to pass information from annotation 'tables' as aesthetics (e.g., 'colData' or 'assay' data).

Imports BiocGenerics, dplyr, farver, ggnewscale, ggplot2 (>= 4.0.0), MatrixGenerics, methods, rlang, sf, S4Vectors

Suggests BiocStyle, DelayedArray, knitr, magick, patchwork, SingleCellExperiment, testthat, vdiffR, ZarrArray

biocViews Spatial, SingleCell, Visualization, Infrastructure, ImmunoOncology, GeneExpression, Transcriptomics

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Encoding UTF-8

VignetteBuilder knitr

URL <https://github.com/HelenaLC/SpatialData.plot>

BugReports <https://github.com/HelenaLC/SpatialData.plot/issues>

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Config/pak/sysreqs

libabsl-dev libblosc-dev cmake libgdal-dev gdal-bin libgeos-dev libicu-dev libpng-dev libxml2-dev libzstd-dev libssl-dev libproj-dev python3 libsqlite3-dev libudunits2-dev xz-utils zlib1g-dev

Repository <https://biocstaging.r-universe.dev>

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RemoteUrl <https://github.com/BiocStaging/SpatialData.plot>

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blobs	<i>‘SpatialData’ .zarr toy datasets</i>
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Description

data were retrieved on Nov. 11th, 2024, from [here](#).

Value

a SpatialData .zarr store of toy example data with all types of elements represented: (multiscale) RGB image, (multiscale) label, point, circle and (multi)polygon shape, table annotation. In addition, all types of coordinate transformations are represented: identity, scale, translation, affine, and sequence.

Examples

```
x <- file.path("extdata", "blobs.zarr")
x <- system.file(x, package="spatialdataR")
(x <- readSpatialData(x))
```

plotImage	<i>Add image layer to SpatialData plot</i>
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Description

Add image layer to SpatialData plot

Usage

```
plotImage(
  i = 1,
  j = NULL,
  k = NULL,
  ch = NULL,
  c = NULL,
  cl = NULL,
  t = NULL,
  z = NULL,
  x = NULL
)
```

Arguments

i	Index or name of image to plot.
j	Index or name of coordinate transformation to use. If NULL, the coordinate transformation will be inherited from plotSpatialData().
k	Index of the scale to render; by default (NULL), will auto-select scale in order to minimize memory-usage and blurring for a target size of 800 x 800px; use Inf to plot the lowest resolution available.
ch	Image channel(s) to be used for plotting (defaults to the first channel(s) available); use channels() to see which channels are available for a given SpatialDataImage
c	Character vector; colors to use for each channel.
cl	List of length-2 numeric vectors (non-negative, increasing); specifies channel-wise contrast limits - defaults to [0, 1] for all (ignored when image(x, i) is an RGB image; for convenience, any NULL = [0, 1], and n = [0, n]).
t, z	Integer scalar to indicate a specific time- or z-slice; if left unspecified (default NULL), will perform a max-projection.
x	SpatialData object. If NULL, the object will be inherited from plotSpatialData().

Value

An object of type `sd_image`, which can be added to an existing `ggplot`.

Examples

```
x <- file.path("extdata", "blobs.zarr")
x <- system.file(x, package="spatialdataR")
x <- readSpatialData(x, tables=FALSE)

ms <- lapply(seq(3), \(.)
  plotSpatialData(x) +
  plotImage(2, k=.)
patchwork::wrap_plots(ms)

# custom colors
```

```

cmy <- c("cyan", "magenta", "yellow")
plotSpatialData(x) + plotImage(c=cmy)

# contrast limits
cl <- rep(list(c(0, 1/3)), 3)
plotSpatialData(x, ct="global") +
  plotImage(k=1, c=cmy, cl=cl) +
  plotShape(i="blobs_circles", fill="pink") +
  plotPoint(i="blobs_points", colour="instance_id")

```

plotLabel

Add label layer to SpatialData plot

Description

Add label layer to SpatialData plot

Usage

```

plotLabel(
  i = 1,
  j = NULL,
  k = NULL,
  c = NULL,
  a = 0.5,
  pal = NULL,
  nan = NA,
  assay = 1,
  t = NULL,
  z = NULL,
  x = NULL
)

```

Arguments

- | | |
|---|--|
| i | Index or name of label to plot. |
| j | Index or name of coordinate transformation to use. If NULL, the coordinate transformation will be inherited from plotSpatialData(). |
| k | Index of the scale to render; by default (NULL), will auto-select scale in order to minimize memory-usage and blurring for a target size of 800 x 800px; use Inf to plot the lowest resolution available. |
| c | determines label colors; the default (NULL), gives a binary image of whether or not a pixel is non-zero; alternatively, a character string specifying a colData column or row name in an annotation table. |
| a | scalar numeric in [0, 1]; alpha value passed to geom_tile. |

pal	character vector; color for discrete/continuous values (interpolated automatically when insufficient values are provided). When left unspecified, color will be sampled at random.
nan	character string; color for missing values (hidden by default).
assay	character string; in case of c denoting a row name, specifies which assay data to use (see getTable).
t, z	Integer scalar to indicate a specific time- or z-slice; if left unspecified (default NULL), will perform a max-projection.
x	SpatialData object. If NULL, the object will be inherited from plotSpatialData().

Value

An object of type sd_label, which can be added to an existing ggplot.

Examples

```
x <- file.path("extdata", "blobs.zarr")
x <- system.file(x, package="spatialdataR")
x <- readSpatialData(x)

i <- "blobs_labels"
p <- plotSpatialData(x)

# simple binary image
p + plotLabel(i)

# mock up some extra data
t <- getTable(x, i)
t$id <- sample(letters, ncol(t))
table(x) <- t

# coloring by 'colData'
t <- getTable(x, i)
t$id <- sample(letters, ncol(t))
table(x) <- t
plotSpatialData(x) + plotLabel(i=i, c="id")

# coloring by 'assay' data
plotSpatialData(x) + plotLabel(i=i,
  c="channel_1_sum",
  pal=c("lavender", "blue"))
```

plotPoint

Add point layer to SpatialData plot

Description

Add point layer to SpatialData plot

Usage

```
plotPoint(i = 1, j = NULL, x = NULL, ...)
```

Arguments

<code>i</code>	Index or name of point to plot.
<code>j</code>	Index or name of coordinate transformation to use. If NULL, the coordinate transformation will be inherited from <code>plotSpatialData()</code> .
<code>x</code>	SpatialData object. If NULL, the object will be inherited from <code>plotSpatialData()</code> .
<code>...</code>	Optional aesthetic arguments passed to <code>geom_sf</code> .

Value

An object of type `sd_point`, which can be added to an existing `ggplot`.

Examples

```
x <- file.path("extdata", "blobs.zarr")
x <- system.file(x, package="spatialdataR")
x <- readSpatialData(x)

i <- "blobs_points"
p <- plotSpatialData(x)
p + plotPoint(i=i)           # simple
p + plotPoint(i=i, colour="genes") # discrete
p + plotPoint(i, colour="instance_id") # continuous
```

plotShape

Add shape layer to SpatialData plot

Description

Add shape layer to `SpatialData` plot

Usage

```
plotShape(i = 1, j = NULL, assay = 1, x = NULL, ...)
```

Arguments

<code>i</code>	Index or name of shape to plot.
<code>j</code>	Index or name of coordinate transformation to use. If NULL, the coordinate transformation will be inherited from <code>plotSpatialData()</code> .
<code>assay</code>	Character string; in case of <code>c</code> denoting a row name, specifies which assay data to use (see getTable). (ignored when <code>x</code> is a <code>SpatialDataPoint</code>).
<code>x</code>	SpatialData object. If NULL, the object will be inherited from <code>plotSpatialData()</code> .
<code>...</code>	Optional aesthetic arguments passed to <code>geom_sf</code> .

Value

An object of type `sd_shape`, which can be added to an existing `ggplot`.

Examples

```
x <- file.path("extdata", "blobs.zarr")
x <- system.file(x, package="spatialdataR")
x <- readSpatialData(x)

# shapes
p <- plotSpatialData(x)
a <- p + plotShape(i="blobs_polygons")
b <- p + plotShape(i="blobs_multipolygons")
c <- p + plotShape(i="blobs_circles")
patchwork::wrap_plots(a, b, c)

# layered
p +
  plotShape("blobs_circles", fill="pink") +
  plotShape("blobs_polygons", colour="red")
patchwork::wrap_plots(a, b)
```

plotSpatialData	<i>Plot a SpatialData object</i>
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Description

Initialize an empty `ggplot` for a `SpatialData` object. This function is typically combined with one or more calls to add specific plot layers.

Usage

```
plotSpatialData(x = NULL, ct = NULL)
```

Arguments

<code>x</code>	A <code>SpatialData</code> object.
<code>ct</code>	The name of a coordinate transformation to use for the plot.

Value

A `ggplot` object.

Examples

```
x <- file.path("extdata", "blobs.zarr")
x <- system.file(x, package="spatialdataR")
x <- readSpatialData(x, tables=FALSE)
ms <- lapply(seq(3), \(.) plotSpatialData(x) + plotImage(i=2, k=.))
patchwork::wrap_plots(ms)
```

scalebar

Add scalebar to plot

Description

scalebar will get the axis unit and scale information from the closest preceding layer where this information is present. Therefore, the placement of scalebar in the sequence of layers is important.

Usage

```
scalebar(len = NULL, col = "red", lwd = 1, xrel = 0.05, yrel = 0.05)
```

Arguments

len	scalar numeric giving the length of the scalebar in physical coordinate space; the unit will be extracted from the data's Zarr specifications (see <code>axes(x)</code>).
col	string indicating the color to use for the scalebar.
lwd	scalar numeric indicating the linewidth to use for the scalebar.
xrel, yrel	scalar numeric indicating relative position of the scalebar.

Value

length-two list of `ggplot2::annotate()` layers corresponding to scalebar line (`geom="segment"`) and unit label (`geom="text"`)

Examples

```
zs <- file.path("extdata", "blobs.zarr")
zs <- system.file(zs, package="spatialdataR")
sd <- readSpatialData(zs, tables=FALSE)

# mock unit (data misses specification!)
md <- meta(image(sd, 2))
md$multiscales[[1]]$axes[[3]]$unit <- "micron"
sd$images[[2]]@meta <- md

plotSpatialData(sd) +
  plotImage(i=2) +
  scalebar(len=10)
```

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