Package 'trackViewer'

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Type Package

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Description Visualize mapped reads along with annotation as track layers for NGS dataset such as ChIP-seq, RNA-seq, miRNA-seq, DNA-seq, SNPs and methylation data.

License GPL (>= 2)

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trackViewer-package *Minimal designed plotting tool for genomic data*

Description

A package that plot data and annotation information along genomic coordinates in an elegance style. This tool is based on Gviz but want to draw figures in minimal style for publication.

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Examples

```
library(TxDb.Hsapiens.UCSC.hg19.knownGene)
library(org.Hs.eg.db)
trs <- geneModelFromTxdb(TxDb.Hsapiens.UCSC.hg19.knownGene,
                         org.Hs.eg.db,
                         chrom="chr11",
                         start=122929275,
                         end=122930122)
extdata <- system.file("extdata", package="trackViewer",
                       mustWork=TRUE)
repA <- importScore(paste(extdata, "cpsf160.repA_+.wig", sep="/"),
                    paste(extdata, "cpsf160.repA_-.wig", sep="/"),
                    format="WIG")
strand(repA@dat) <- "+"
strand(repA@dat2) <- "-"
fox2 <- importScore(paste(extdata, "fox2.bed", sep="/"), format="BED")
dat <- coverageGR(fox2@dat)
fox2@dat <- dat[strand(dat)=="+"]
fox2@dat2 <- dat[strand(dat)=="-"]
gr <- GRanges("chr11", IRanges(122929275, 122930122), strand="-")
vp <- viewTracks(trackList(repA, fox2, trs), gr=gr, autoOptimizeStyle=TRUE)
addGuideLine(c(122929767, 122929969), vp=vp)
addArrowMark(list(x=unit(.5, "npc"),
                  y=unit(.39, "npc")),
             col="blue")
```

addArrowMark *Add arrow mark to the figure at a given position*

Description

A function to add arrow mark for emphasizing peaks

Usage

```
addArrowMark(
  pos = grid.locator(),
  label = NULL,
  angle = 15,
  length = unit(0.25, "inches"),
  col = "red",
  cex = 1,
  quadrant = 4,
  type = "closed",
  vp = NULL
)
```

Arguments

pos	A unit object representing the location of arrow mark to be placed at current viewport. Default is the value of grid.locator, which will get the location of the mouse click.
label	A character or expression vector.
angle	A parameter passed into grid::arrow function. The angle of arrow head in degrees (smaller numbers produce narrower, pointier arrows). Essentially describes the width of the arrow head.
length	A parameter passed into grid::arrow function. Aunit specifying the length of the arrow head.
col	color of the arrow
cex	Multiplier applied to fontsize
quadrant	the direction of arrow, 1: to bottomleft, 2: to bottomright, 3: to topright, 4: to topleft
type	A parameter passed into grid::arrow function. One of "open" or "closed" indicating whether the arrow head should be a closed triangle.
vp	A Grid viewport object. It must be output of viewTracks

Value

invisible x, y position value.

See Also

See Also as addGuideLine, arrow

Examples

```
grid.newpage()
addArrowMark(list(x=unit(.5, "npc"),
                  y=unit(.5, "npc")),
                  label="label1",
                  col="blue")
##  how to get the position by mouse click
if(interactive()){
pos <- addArrowMark(label="byClick")
addArrowMark(pos, label="samePosAsAbove")
```

```
}
```

---

addGuideLine *Add guide lines to the tracks*

Description

A function to add lines for emphasizing the positions

Usage

```
addGuideLine(guideLine, col = "gray", lty = "dashed", lwd = 1, vp = NULL)
```

Arguments

guideLine	The genomic coordinates to draw the lines
col	A vector for the line color
lty	A vector for the line type
lwd	A vector for the line width
vp	A Grid viewport object. It must be output of viewTracks

See Also

See Also as getCurTrackViewport, addArrowMark, viewTracks

Examples

```
vp <- getCurTrackViewport(trackViewerStyle(), 10000, 10200)
addGuideLine(c(10010, 10025, 10150), vp=vp)
```

---

addInteractionAnnotation
Add annotation markers to the figure at a given position

Description

A function to add annotation markers for emphasizing interactions

Usage

```
addInteractionAnnotation(
  obj,
  idx,
  FUN = grid.polygon,
  panel = c("top", "bottom"),
  ...
)
```

Arguments

obj	A GInteractions object, GRanges object or numeric vector. For numeric vector, the positive value will generate a line with slope 1 and negative value will generate a line at the position with slope -1.
idx	The layer number of track.
FUN	Function for plot. Available functions are grid.polygon, grid.lines, and grid.text for GInteractions object; grid.lines, and grid.text for GRanges object; FUN is not used for numeric vector.
panel	Plot regions. Available values are "top", "bottom".
...	Parameters will be passed to FUN.

Value

invisible viewport for plot region.

See Also

See Also as addGuideLine, addArrowMark

Examples

```
library(trackViewer)
library(InteractionSet)
gi <- readRDS(system.file("extdata", "nij.chr6.51120000.53200000.gi.rds",
 package="trackViewer"))
tads <- GInteractions(
GRanges("chr6",
        IRanges(c(51130001, 51130001, 51450001, 52210001), width = 20000)),
GRanges("chr6",
        IRanges(c(51530001, 52170001, 52210001, 53210001), width = 20000)))
range <- GRanges("chr6", IRanges(51120000, 53200000))
tr <- gi2track(gi)
viewTracks(trackList(tr),
           gr=range, autoOptimizeStyle = TRUE)
addInteractionAnnotation(tads, "tr", grid.lines,
 gp=gpar(col = "#E69F00", lwd=3, lty=3))
```

ARA *Aggregate Region Analysis*

Description

Extract the interaction signal means from given coordinates.

Usage

```
ARA(gr, upstream = 2e+05, downstream = upstream, resolution = 10000, ...)
```

Arguments

gr	A 'GRanges' object. The center of the object will be used for alignment for all the given regions.
upstream, downstream	numeric(1L). Upstream and downstream from the center of given 'gr' input will be used to extract the signals.
resolution	numeric(1L). The resolution will be passed to importGInteractions function.
...	The parameters used by importGInteractions function. Please note that the ranges resolution and out parameter should not be involved.

Value

A GInteractions object with scores which represent the mean values of the interactions.

Examples

```
hic <- system.file("extdata", "test_chr22.hic", package = "trackViewer",
                   mustWork=TRUE)
gr <- GRanges("22", c(seq(20000001, 50000001, by=10000000), width=1))
gi <- ARA(gr, file=hic, format="hic")
rg <- GRanges("22", IRanges(1, 400000))
op <- optimizeStyle(trackList(gi2track(gi)))
heatmap <- op$tracks
sty <- op$style
setTrackViewerStyleParam(sty, "xat", c(1, 200000, 400000))
setTrackViewerStyleParam(sty, "xlabel",c("-20K", "center", "20K"))
viewTracks(heatmap, viewerStyle=sty, gr=rg)
```

---

browseTracks *browse tracks*

Description

browse tracks by a web browser.

Usage

```
browseTracks(
  trackList,
  gr = GRanges(),
  ignore.strand = TRUE,
  width = NULL,
  height = NULL,
  ...
)
```

Arguments

trackList	an object of trackList
gr	an object of GRanges
ignore.strand	ignore the strand or not when do filter. default TRUE
width	width of the figure
height	height of the figure
...	parameters not used

Value

An object of class htmlwidget that will intelligently print itself into HTML in a variety of contexts including the R console, within R Markdown documents, and within Shiny output bindings.

Examples

```
extdata <- system.file("extdata", package="trackViewer", mustWork=TRUE)
files <- dir(extdata, "-.wig")
tracks <- lapply(paste(extdata, files, sep="/"),
                 importScore, format="WIG")
tracks <- lapply(tracks, function(.ele) {strand(.ele@dat) <- "-"; .ele})
names(tracks) <- c("trackA", "trackB")
fox2 <- importScore(paste(extdata, "fox2.bed", sep="/"), format="BED")
dat <- coverageGR(fox2@dat)
fox2@dat <- dat[strand(dat)=="+"]
fox2@dat2 <- dat[strand(dat)=="-"]
gr <- GRanges("chr11", IRanges(122929275, 122930122))
browseTracks(trackList(tracks, fox2), gr=gr)
```

---

browseTracks-shiny *Shiny bindings for browseTracks*

Description

Output and render functions for using browseTracks within Shiny applications and interactive Rmd documents.

Usage

```
browseTracksOutput(outputId, width = "100%", height = "600px")

renderbrowseTracks(expr, env = parent.frame(), quoted = FALSE)
```

Arguments

outputId	output variable to read from
width, height	Must be a valid CSS unit (like '100%', '400px', 'auto') or a number, which will be coerced to a string and have 'px' appended.
expr	An expression that generates a browseTracks
env	The environment in which to evaluate expr.
quoted	Is expr a quoted expression (with quote())? This is useful if you want to save an expression in a variable.

coverageGR *calculate coverage*

Description

calculate coverage for GRanges, GAlignments or GAlignmentPairs

Usage

```
coverageGR(gr)
```

Arguments

gr	an object of RGanges, GAlignments or GAlignmentPairs

Value

an object of GRanges

See Also

See Also as coverage, coverage-methods

Examples

```
bed <- system.file("extdata", "fox2.bed", package="trackViewer",
                   mustWork=TRUE)
fox2 <- importScore(bed)
fox2$dat <- coverageGR(fox2$dat)
```

dandelion.plot *dandelion.plots*

Description

Plot variants and somatic mutations

Usage

```
dandelion.plot(
  SNP.gr,
  features = NULL,
  ranges = NULL,
  type = c("fan", "circle", "pie", "pin"),
  newpage = TRUE,
  ylab = TRUE,
  ylab.gp = gpar(col = "black"),
  xaxis = TRUE,
  xaxis.gp = gpar(col = "black"),
```

```
  yaxis = FALSE,
  yaxis.gp = gpar(col = "black"),
  legend = NULL,
  cex = 1,
  maxgaps = 1/50,
  heightMethod = NULL,
  label_on_feature = FALSE,
  ...
)
```

Arguments

SNP.gr	A object of GRanges or GRangesList. All the width of GRanges must be 1.
features	A object of GRanges or GRangesList.
ranges	A object of GRanges or GRangesList.
type	Character. Could be fan, circle, pie or pin.
newpage	plot in the new page or not.
ylab	plot ylab or not. If it is a character vector, the vector will be used as ylab.
ylab.gp, xaxis.gp, yaxis.gp	An object of class gpar for ylab, xaxis or yaxis.
xaxis, yaxis	plot xaxis/yaxis or not. If it is a numeric vector with length greater than 1, the vector will be used as the points at which tick-marks are to be drawn. And the names of the vector will be used to as labels to be placed at the tick points if it has names.
legend	If it is a list with named color vectors, a legend will be added.
cex	cex will control the size of circle.
maxgaps	maxgaps between the stem of dandelions. It is calculated by the width of plot region divided by maxgaps. If a GRanges object is set, the dandelions stem will be clustered in each genomic range.
heightMethod	A function used to determine the height of stem of dandelion. eg. Mean. Default is length.
label_on_feature	Labels of the feature directly on them. Default FALSE.
...	not used.

Details

In SNP.gr and features, metadata of the GRanges object will be used to control the color, fill, border, height, data source of pie if the type is pie.

Examples

```
SNP <- c(10, 100, 105, 108, 400, 410, 420, 600, 700, 805, 840, 1400, 1402)
SNP.gr <- GRanges("chr1", IRanges(SNP, width=1, names=paste0("snp", SNP)),
                  score=sample.int(100, length(SNP))/100)
features <- GRanges("chr1", IRanges(c(1, 501, 1001),
                                    width=c(120, 500, 405),
                                    names=paste0("block", 1:3)),
                    color="black",
                    fill=c("#FF8833", "#51C6E6", "#DFA32D"),
                    height=c(0.1, 0.05, 0.08))
dandelion.plot(SNP.gr, features, type="fan")
```

geneModelFromTxdb *Prepare gene model from an object of TxDb*

Description

Generate an object of track for viewTracks by given parameters.

Usage

```
geneModelFromTxdb(
  txdb,
  orgDb,
  gr,
  chrom,
  start,
  end,
  strand = c("*", "+", "-"),
  txdump = NULL
)
```

Arguments

txdb	An object of TxDb
orgDb	An object of "OrgDb"
gr	An object of GRanges.
chrom	chromosome name, must be a seqname of txdb
start	start position
end	end position
strand	strand
txdump	output of as.list(txdb), a list of data frames that can be used to make the db again with no loss of information.

Value

Generate a list of track from a TxDb object.

See Also

See Also as importScore, importBam, viewTracks

Examples

```
library(TxDb.Hsapiens.UCSC.hg19.knownGene)
library(org.Hs.eg.db)
trs <- geneModelFromTxdb(TxDb.Hsapiens.UCSC.hg19.knownGene,
                         org.Hs.eg.db,
                         chrom="chr20",
                         start=22560000,
                         end=22565000,
                         strand="-")
```

geneTrack *track from TxDb*

Description

Generate a track object from TxDb by given gene ids

Usage

```
geneTrack(ids, txdb, symbols, type = c("gene", "transcript"), asList = TRUE)
```

Arguments

ids	Gene IDs. A vector of character. It should be keys in txdb.
txdb	An object of TxDb.
symbols	symbol of genes.
type	Output type of track, "gene" or "transcript".
asList	Output a list of tracks or not. Default TRUE.

Value

An object of track

Examples

```
library(TxDb.Hsapiens.UCSC.hg19.knownGene)
library(org.Hs.eg.db)
ids <- c("3312", "390259", "341056", "79827")
symbols <- mget(ids, org.Hs.egSYMBOL)
geneTrack(ids, TxDb.Hsapiens.UCSC.hg19.knownGene, symbols)
```

getCurTrackViewport *Get current track viewport*

Description

Get current track viewport for addGuideLine

Usage

```
getCurTrackViewport(curViewerStyle, start, end)
```

Arguments

curViewerStyle	an object of trackViewerStyle
start	start position of current track
end	end position of current track

Value

an object of viewport

See Also

See Also as addGuideLine

Examples

```
vp <- getCurTrackViewport(trackViewerStyle(), 10000, 10200)
addGuideLine(c(10010, 10025, 10150), vp=vp)
```

---

getGeneIDsFromTxDb *get gene ids by genomic location*

Description

retrieve gene ids from txdb object by genomic location.

Usage

```
getGeneIDsFromTxDb(gr, txdb)
```

Arguments

gr	GRanges object.
txdb	An object of TxDb.

Value

A character vector of gene ids

Examples

```
library(TxDb.Hsapiens.UCSC.hg19.knownGene)
gr <- parse2GRanges("chr11:122,830,799-123,116,707")
ids <- getGeneIDsFromTxDb(gr, TxDb.Hsapiens.UCSC.hg19.knownGene)
```

getLocation *get genomic location by gene symbol*

Description

given a gene name, get the genomic coordinates.

Usage

```
getLocation(symbol, txdb, org)
```

Arguments

symbol	Gene symbol
txdb	txdb will be used to extract the genes
org	org package name

Examples

```
library(TxDb.Hsapiens.UCSC.hg19.knownGene)
library(org.Hs.eg.db)
getLocation("HSPA8", TxDb.Hsapiens.UCSC.hg19.knownGene, "org.Hs.eg.db")
```

gi2track *convert GInteractions to track object*

Description

Convert GInteractions object to track object

Usage

```
gi2track(gi, gi2)
```

Arguments

gi	an object of GInteractions
gi2	an object of GInteractions

Value

an track object

Examples

```
gi <- readRDS(system.file("extdata", "nij.chr6.51120000.53200000.gi.rds", package="trackViewer"))
gi2track(gi)
```

gieStain *color sheme for the schema for Chromosome Band (Ideogram)*

Description

Describe the colors of giemsa stain results

Usage

```
gieStain()
```

Value

A character vector of colors

Examples

```
gieStain()
```

GIoperator *GInteractions operator*

Description

GInteractions operations (add, aubtract, multiply, divide)

Usage

```
GIoperator(gi_list, col = "score", operator = c("+", "-", "*", "/"))
```

Arguments

gi_list	a list of GInteractions objects
col	colname of metadata to be calculated
operator	operator, "+" means A + B, and so on. User-defined function also could be used.

Value

an object of GInteractions

Examples

```
library(InteractionSet)
gr2 <- GRanges(seqnames=c("chr1", "chr1"),
               ranges=IRanges(c(7,13), width=3))
gr3 <- GRanges(seqnames=c("chr1", "chr1"),
               ranges=IRanges(c(1, 4), c(3, 9)))
gi <- GInteractions(gr2, gr3, score=c(1, 2))
gi2 <- GInteractions(gr2, gr3, score=c(3, 4))
GIoperator(list(gi, gi2), col="score", operator="+")
GIoperator(list(gi, gi2), col="score", operator="-")
```

gridPlot *plot GRanges metadata*

Description

plot GRanges metadata for different types

Usage

```
gridPlot(gr, gp, type, xscale)
```

Arguments

gr	an object of GRanges with metadata. All metadata must be numeric.
gp	an object of gpar
type	type of the figure, could be barplot, line, point and heatmap
xscale	x scale of the viewport

GRoperator *GRanges operator*

Description

GRanges operations (add, aubtract, multiply, divide)

Usage

```
GRoperator(
  A,
  B,
  col = "score",
  operator = c("+", "-", "*", "/", "^", "%%"),
  ignore.strand = TRUE
)
```

Arguments

A	an object of GRanges
B	an object of GRanges
col	colname of A and B to be calculated
operator	operator, "+" means A + B, and so on. User-defined function also could be used.
ignore.strand	When set to TRUE, the strand information is ignored in the overlap calculations.

Value

an object of GRanges

Examples

```
gr2 <- GRanges(seqnames=c("chr1", "chr1"),
ranges=IRanges(c(7,13), width=3),
strand=c("-", "-"), score=3:4)
gr3 <- GRanges(seqnames=c("chr1", "chr1"),
               ranges=IRanges(c(1, 4), c(3, 9)),
               strand=c("-", "-"), score=c(6L, 2L))
GRoperator(gr2, gr3, col="score", operator="+")
GRoperator(gr2, gr3, col="score", operator="-")
GRoperator(gr2, gr3, col="score", operator="*")
GRoperator(gr2, gr3, col="score", operator="/")
GRoperator(gr2, gr3, col="score", operator=mean)
```

`ideogramPlot` *plot ideogram with data*

Description

plot ideogram with data for multiple chromosomes

Usage

```
ideogramPlot(
  ideo,
  dataList,
  layout = NULL,
  horiz = TRUE,
 parameterList = list(vp = plotViewport(margins = c(0.1, 4.1, 0.3, 0.1)), ideoHeight =
  unit(1/(1 + length(dataList)), "npc"), vgap = unit(0.3, "lines"), ylabs = "auto",
  ylabsRot = ifelse(horiz, 0, 90), ylabsPos = unit(2.5, "lines"), xaxis = FALSE, yaxis
  = FALSE, xlab = "", types = "barplot", heights = NULL, dataColumn = "score", gps =
    gpar(col = "black", fill = "gray")),
  colorSheme = gieStain(),
  gp = gpar(fill = NA, lwd = 2),
  ...
)
```

Arguments

`ideo`	output of loadIdeogram.
`dataList`	a GRangesList of data to plot.
`layout`	The layout of chromosomes. Could be a list with chromosome names as its elements.
`horiz`	a logical value. If FALSE, the ideograms are drawn vertically to the left. If TRUE, the ideograms are drawn horizontally at the bottom.
`parameterList`	a list of parameters for each dataset in the dataList. The elements of the parameters could be xlabs, ylabs, etc. type could be barplot, line, point, heatmap.
`colorSheme`	A character vector of giemsa stain colors.
`gp`	parameters used for grid.roundrect.
`...`	parameters not used.

Examples

```
## Not run:
ideo <- loadIdeogram("hg38")
library(rtracklayer)
library(grid)
dataList <- ideo
dataList$score <- as.numeric(dataList$gieStain)
dataList <- dataList[dataList$gieStain!="gneg"]
dataList <- GRangesList(dataList)
grid.newpage()
ideogramPlot(ideo, dataList,
             layout=list("chr1", "chr2", c("chr3", "chr22"),
                         c("chr4", "chr21"), c("chr5", "chr20"),
                         c("chr6", "chr19"), c("chr7", "chr18"),
                         c("chr8", "chr17"), c("chr9", "chr16"),
                         c("chr10", "chr15"), c("chr11", "chr14"),
                         c("chr12", "chr13"), c("chrX", "chrY")),
             parameterList = list(types="heatmap", colorKeyTitle="sample1"))

## End(Not run)
```

---

importBam *Reading data from a BAM file*

Description

Read a track object from a BAM file

Usage

```
importBam(file, file2, ranges = GRanges(), pairs = FALSE)
```

Arguments

file	The path to the BAM file to read.
file2	The path to the second BAM file to read.
ranges	An object of GRanges to indicate the range to be imported
pairs	logical object to indicate the BAM is paired or not. See readGAlignments

Value

a track object

See Also

See Also as importScore, track, viewTracks

Examples

```
bamfile <- system.file("extdata", "ex1.bam", package="Rsamtools",
mustWork=TRUE)
dat <- importBam(file=bamfile, ranges=GRanges("seq1", IRanges(1, 50), strand="+"))
```

importData *Reading data from a BED or WIG file to RleList*

Description

Read a track object from a BED, bedGraph, WIG or BigWig file to RleList

Usage

```
importData(files, format = NA, ranges = GRanges())
```

Arguments

files	The path to the files to read.
format	The format of import file. Could be BAM, BED, bedGraph, WIG or BigWig
ranges	An object of GRanges to indicate the range to be imported

Value

a list of RleList.

Examples

```
#import a BED file
bedfile <- system.file("tests", "test.bed", package="rtracklayer",
                       mustWork=TRUE)
dat <- importData(files=bedfile, format="BED",
                  ranges=GRanges("chr7", IRanges(127471197, 127474697)))

##import a WIG file
wigfile <- system.file("tests", "step.wig", package = "rtracklayer",
                       mustWork=TRUE)
dat <- importData(files=wigfile, format="WIG",
                  ranges=GRanges("chr19",
                                 IRanges(59104701, 59110920)))

##import a BigWig file
if(.Platform$OS.type!="windows"){
  ##this is because we are using rtracklayer::import
  bwfile <- system.file("tests", "test.bw", package = "rtracklayer",
                        mustWork=TRUE)
  dat <- importData(files=bwfile, format="BigWig",
                    ranges=GRanges("chr19", IRanges(1500, 2700)))
}
```

`importGInteractions` *Reading data from a ginteractions, hic, cool, or validPairs file*

Description

Read a `track` object from a ginteractions, hic, mcool, or validPairs file

Usage

```
importGInteractions(
  file,
  format = c("ginteractions", "hic", "cool", "validPairs"),
  ranges = GRanges(),
  ignore.strand = TRUE,
  out = c("track", "GInteractions"),
  resolution = 1e+05,
  unit = c("BP", "FRAG"),
 normalization = c("NONE", "VC", "VC_SQRT", "KR", "SCALE", "GW_KR", "GW_SCALE", "GW_VC",
    "INTER_KR", "INTER_SCALE", "INTER_VC", "balanced"),
  matrixType = c("observed", "oe", "expected"),
  ...
)
```

Arguments

`file`	The path to the file to read.
`format`	The format of import file. Could be ginteractions, hic, cool or validPairs
`ranges`	An object of `GRanges` to indicate the range to be imported. For .hic file, if the length of ranges is 2, the first range will be used as anchor 1 and the second range will be used as anchor 2.
`ignore.strand`	ignore the strand or not when do filter. default TRUE
`out`	output format. Default is track. Possible values: track, GInteractions.
`resolution`	Resolutions for the interaction data.
`unit`	BP (base pair) or FRAG (fragment) (.hic file only).
`normalization`	Type of normalization, NONE, VC, VC_SORT or KR for .hic and NONE, balanced for .cool.
`matrixType`	Type of matrix for .hic file. Available choices are "observed", "oe", and "expected". default is "observed".
`...`	NOT used.

Value

a `track` object

See Also

See Also as `listResolutions`, `listChromosomes`, `readHicNormTypes`

Examples

```
#import a ginteractions file
#gi <- system.file("extdata", "test.ginteractions.tsv", package="trackViewer",
#                       mustWork=TRUE)
#dat <- importGInteractions(file=gi, format="ginteractions",
#                   ranges=GRanges("chr7", IRanges(127471197, 127474697)))

##import a hic file
if(.Platform$OS.type!="windows"){
hic <- system.file("extdata", "test_chr22.hic", package = "trackViewer",
                       mustWork=TRUE)
dat <- importGInteractions(file=hic, format="hic",
                           ranges=GRanges("22", IRanges(1500000, 100000000)))
}

##import a cool file
cool <- system.file("extdata", "test.mcool", package = "trackViewer",
                     mustWork=TRUE)
dat <- importGInteractions(file=cool, format="cool",
                           resolution = 2,
                           ranges=GRanges("chr1", IRanges(10, 28)))

##import a validPairs file
#validPairs <- system.file("extdata", "test.validPairs", package = "trackViewer",
#                       mustWork=TRUE)
#dat <- importGInteractions(file=validPairs, format="validPairs")
```

`importScore` *Reading data from a BED or WIG file*

Description

Read a `track` object from a BED, bedGraph, WIG or BigWig file

Usage

```
importScore(
  file,
  file2,
  format = c("BED", "bedGraph", "WIG", "BigWig"),
  ranges = GRanges(),
  ignore.strand = TRUE
)
```

Arguments

`file`	The path to the file to read.
`file2`	The path to the second file to read.
`format`	The format of import file. Could be BED, bedGraph, WIG or BigWig
`ranges`	An object of `GRanges` to indicate the range to be imported
`ignore.strand`	ignore the strand or not when do filter. default TRUE

Value

a track object

See Also

See Also as importBam, track, viewTracks

Examples

```
#import a BED file
bedfile <- system.file("tests", "test.bed", package="rtracklayer",
                       mustWork=TRUE)
dat <- importScore(file=bedfile, format="BED",
                   ranges=GRanges("chr7", IRanges(127471197, 127474697)))

##import a WIG file
wigfile <- system.file("tests", "step.wig", package = "rtracklayer",
                       mustWork=TRUE)
dat <- importScore(file=wigfile, format="WIG")

##import a BigWig file
if(.Platform$OS.type!="windows"){##this is because we are using rtracklayer::import
  bwfile <- system.file("tests", "test.bw", package = "rtracklayer",
                        mustWork=TRUE)
  dat <- importScore(file=bwfile, format="BigWig")
}

##import 2 file
wigfile1 <- system.file("extdata", "cpsf160.repA_+.wig", package="trackViewer",
                        mustWork=TRUE)
wigfile2 <- system.file("extdata", "cpsf160.repA_-.wig", package="trackViewer",
                        mustWork=TRUE)
dat <- importScore(wigfile1, wigfile2, format="WIG",
                   ranges=GRanges("chr11", IRanges(122817703, 122889073)))
```

---

importScSeqScore *plot tracks for single cell RNAseq*

Description

Plot single cell RNAseq data as heatmap track for Seurat object.

Usage

```
importScSeqScore(
  object,
  files,
  samplenames,
  ...,
  txdb,
  gene,
  id,
  idents,
```

```
  gr,
  color,
  withCoverageTrack = TRUE,
  flag = scanBamFlag(isSecondaryAlignment = FALSE, isUnmappedQuery = FALSE,
    isNotPassingQualityControls = FALSE, isSupplementaryAlignment = FALSE)
)
```

Arguments

object	Seurat object.
files	bam file to be scanned.
samplenames	sample names for files.
...	parameters used by readGAlignmentsList or readGAlignments
txdb	TxDb object for gene model.
gene	Gene name to plot. (row value)
id	The id of gene used in txdb.
idents	indentity class to define the groups to plot. (column value)
gr	GRanges object to define the ploting region.
color	vector of colors used in heatmap.
withCoverageTrack	plot coverage track or not.
flag	An integer(2) vector used to filter reads based on their 'flag' entry.

Examples

```
## Not run:
library(TxDb.Hsapiens.UCSC.hg19.knownGene)
test_file <- "https://github.com/10XGenomics/subset-bam/raw/master/test/test.bam"
trs <- importScSeqScore(files=test_file,
                        txdb=TxDb.Hsapiens.UCSC.hg19.knownGene,
                        id="653635", gene = "WASH7P")

## End(Not run)
```

---

listChromosomes *List the available chromosome*

Description

List the chromosomes available in the file.

Usage

```
listChromosomes(file, format = c("hic", "cool"))
```

Arguments

file	character(1). File name of .hic or .cool/.mcool/.scool
format	character(1). File format, "hic" or "cool".

Examples

```
hicfile <- system.file("extdata", "test_chr22.hic", package="trackViewer")
listChromosomes(hicfile)
coolfile <- system.file("extdata", "test.mcool", package="trackViewer")
listChromosomes(coolfile, format="cool")
```

---

listNormalizations *List the available normalizations*

Description

List the normalizations available in the file.

Usage

```
listNormalizations(file, format = c("hic", "cool"))
```

Arguments

file	character(1). File name of .hic or .cool/.mcool/.scool
format	character(1). File format, "hic" or "cool".

Examples

```
hicfile <- system.file("extdata", "test_chr22.hic", package="trackViewer")
listNormalizations(hicfile)
coolfile <- system.file("extdata", "test.mcool", package="trackViewer")
listNormalizations(coolfile, format="cool")
```

---

listResolutions *List the available resolutions*

Description

List the resolutions available in the file.

Usage

```
listResolutions(file, format = c("hic", "cool"))
```

Arguments

file	character(1). File name of .hic or .cool/.mcool/.scool
format	character(1). File format, "hic" or "cool".

Examples

```
hicfile <- system.file("extdata", "test_chr22.hic", package="trackViewer")
listResolutions(hicfile)
coolfile <- system.file("extdata", "test.mcool", package="trackViewer")
listResolutions(coolfile, format="cool")
```

loadIdeogram *load ideogram from UCSC*

Description

Download ideogram table from UCSC

Usage

```
loadIdeogram(genome, chrom = NULL, ranges = NULL, ...)
```

Arguments

genome	Assembly name assigned by UCSC, such as hg38, mm10.
chrom	A character vector of chromosome names, or NULL.
ranges	A Ranges object with the intervals.
...	Additional arguments to pass to the GRanges constructor.

Value

A GRanges object.

See Also

See Also as ideogramPlot

Examples

```
## Not run:
head(loadIdeogram("hg38", chrom = "chr1"))

## End(Not run)
```

lolliplot *Lolliplots*

Description

Plot variants and somatic mutations

Usage

```
lolliplot(
  SNP.gr,
  features = NULL,
  ranges = NULL,
  type = "circle",
  newpage = TRUE,
  ylab = TRUE,
  ylab.gp = gpar(col = "black"),
  yaxis = TRUE,
  yaxis.gp = gpar(col = "black"),
  xaxis = TRUE,
  xaxis.gp = gpar(col = "black"),
  legend = NULL,
  legendPosition = "top",
  cex = 1,
  dashline.col = "gray80",
  jitter = c("node", "label"),
  rescale = FALSE,
  label_on_feature = FALSE,
  lollipop_style_switch_limit = 10,
  ...
)
```

Arguments

SNP.gr	A object of GRanges, GRangesList or a list of GRanges. All the width of GRanges must be 1.
features	A object of GRanges, GRangesList or a list of GRanges. The metadata 'featureLayerID' are used for drawing features in different layers. See details in vignette.
ranges	A object of GRanges or GRangesList.
type	character. Could be circle, pie, pin, pie.stack or flag.
newpage	Plot in the new page or not.
ylab	Plot ylab or not. If it is a character vector, the vector will be used as ylab.
ylab.gp, xaxis.gp, yaxis.gp	An object of class gpar for ylab, xaxis or yaxis.
yaxis	Plot yaxis or not.
xaxis	Plot xaxis or not. If it is a numeric vector with length greater than 1, the vector will be used as the points at which tick-marks are to be drawn. And the names of the vector will be used to as labels to be placed at the tick points if it has names.
legend	If it is a list with named color vectors, a legend will be added.
legendPosition	The position of legend. Possible positions are 'top', 'right', and 'left'.
cex	cex will control the size of circle.
dashline.col	color for the dashed line.
jitter	jitter the position of nodes or labels.

`rescale` logical(1), character(1), numeric vector, or a dataframe with rescale from and to. Rescalse the x-axis or not. if dataframe is used, colnames must be from.start, from.end, to.start, to.end. And the from scale must cover the whole plot region. The rescale parameter can be set as "exon" or "intron" to emphasize "exon" or "intron" region. The "exon" or "intron" can be followed with an integer e.g. "exon_80", or "intron_99". The integer indicates the total percentage of "exon" or "intron" region. Here "exon" indicates all regions in features. And "intron" indicates all flank regions of the features.

`label_on_feature` Labels of the feature directly on them. Default FALSE.

`lollipop_style_switch_limit` The cutoff value for lollipop style for the 'circle' type. If the max score is greater than this cutoff value, trackViewer will only plot one shape at the highest score. Otherwise trackViewer will draw the shapes like 'Tanghulu'.

`...` not used.

Details

In SNP.gr and features, metadata of the GRanges object will be used to control the color, fill, border, alpha, shape, height, cex, dashline.col, data source of pie if the type is pie. And also the controls for labels by name the metadata start as label.parameter.<properties>, and for node labels by name the metadata start as node.label.<properties>, such as label.parameter.rot, label.parameter.gp. The parameter is used for grid.text.or plotMotifLogoA. The metadata 'featureLayerID' for features are used for drawing features in different layers. The metadata 'SNPsideID' for SNP.gr are used for determining the side of lollipops. And the 'SNPsideID' could only be 'top' or 'bottom'.

Examples

```
SNP <- c(10, 100, 105, 108, 400, 410, 420, 600, 700, 805, 840, 1400, 1402)
x <- sample.int(100, length(SNP))
SNP.gr <- GRanges("chr1", IRanges(SNP, width=1, names=paste0("snp", SNP)),
                  value1=x, value2=100-x)
SNP.gr$color <- rep(list(c("red", 'blue')), length(SNP))
SNP.gr$border <- sample.int(7, length(SNP), replace=TRUE)
features <- GRanges("chr1", IRanges(c(1, 501, 1001),
                                    width=c(120, 500, 405),
                                    names=paste0("block", 1:3)),
                    color="black",
                    fill=c("#FF8833", "#51C6E6", "#DFA32D"),
                    height=c(0.1, 0.05, 0.08),
                    label.parameter.rot=45)
lolliplot(SNP.gr, features, type="pie")
```

`optimizeStyle` *Optimize the style of plot*

Description

Automatic optimize the stlye of trackViewer

Usage

```
optimizeStyle(trackList, viewerStyle = trackViewerStyle(), theme = NULL)
```

Arguments

trackList	An object of trackList
viewerStyle	An object of trackViewerStyle
theme	A character string. Could be "bw", "col" or "safe".

Value

a list of a trackList and a trackViewerStyle

See Also

See Also as viewTracks

Examples

```
extdata <- system.file("extdata", package="trackViewer",
                       mustWork=TRUE)
files <- dir(extdata, ".wig")
tracks <- lapply(paste(extdata, files, sep="/"),
                 importScore, format="WIG")
re <- optimizeStyle(trackList(tracks))
trackList <- re$tracks
viewerStyle <- re$style
```

---

parse2GRanges *parse text into GRanges*

Description

parse text like "chr13:99,443,451-99,848,821:-" into GRanges

Usage

```
parse2GRanges(text)
```

Arguments

text	character vector like "chr13:99,443,451-99,848,821:-" or "chr13:99,443,451-99,848,821"

Value

an object of GRanges

Examples

```
parse2GRanges("chr13:99,443,451-99,848,821:-")
```

parseWIG *convert WIG format track to BED format track*

Description

convert WIG format track to BED format track for a given range

Usage

```
parseWIG(trackScore, chrom, from, to)
```

Arguments

trackScore	an object of track with WIG format
chrom	sequence name of the chromosome
from	start coordinate
to	end coordinate

Value

an object of track

Examples

```
extdata <- system.file("extdata", package="trackViewer", mustWork=TRUE)
repA <- importScore(file.path(extdata, "cpsf160.repA_-.wig"),
                    file.path(extdata, "cpsf160.repA_+.wig"),
                    format="WIG")
strand(repA$dat) <- "-"
strand(repA$dat2) <- "+"
parseWIG(repA, chrom="chr11", from=122929275, to=122930122)
```

plotGRanges *plot GRanges data*

Description

A function to plot GRanges data for given range

Usage

```
plotGRanges(
  ...,
  range = GRanges(),
  viewerStyle = trackViewerStyle(),
  autoOptimizeStyle = FALSE,
  newpage = TRUE
)
```

Arguments

...	one or more objects of GRanges
range	an object of GRanges
viewerStyle	an object of trackViewerStyle
autoOptimizeStyle	should use optimizeStyle to optimize style
newpage	should be draw on a new page?

Value

An object of viewport for addGuideLine

See Also

See Also as addGuideLine, addArrowMark

Examples

```
gr1 <- GRanges("chr1", IRanges(1:50, 51:100))
gr2 <- GRanges("chr1", IRanges(seq(from=10, to=80, by=5),
                               seq(from=20, to=90, by=5)))
vp <- plotGRanges(gr1, gr2, range=GRanges("chr1", IRanges(1, 100)))
addGuideLine(guideLine=c(5, 10, 50, 90), col=2:5, vp=vp)

gr <- GRanges("chr1", IRanges(c(1, 11, 21, 31), width=9),
              score=c(5, 10, 5, 1))
plotGRanges(gr, range=GRanges("chr1", IRanges(1, 50)))
```

---

plotIdeo *plot ideogram*

Description

plot ideogram for one chromosome

Usage

```
plotIdeo(
  ideo,
  chrom = seqlevels(ideo)[1],
  colorSheme = gieStain(),
  gp = gpar(fill = NA),
  ...
)
```

Arguments

ideo	output of loadIdeogram.
chrom	A length 1 character vector of chromosome name.
colorSheme	A character vector of giemsa stain colors.
gp	parameters used for grid.roundrect.
...	parameters not used.

Examples

```
## Not run:
ideo <- loadIdeogram("hg38")
library(grid)
grid.newpage()
plotIdeo(ideo)

## End(Not run)
```

---

plotOneIdeo *plot ideogram with data for one chromosome*

Description

plot ideogram with data for one chromosome

Usage

```
plotOneIdeo(
  ideo,
  dataList,
 parameterList = list(vp = plotViewport(margins = c(0.1, 4.1, 1.1, 0.1)), ideoHeight =
    unit(1/(1 + length(dataList)), "npc"), vgap = unit(1, "lines"), ylabs =
   seqlevels(ideo)[1], ylabsRot = 90, ylabsPos = unit(2.5, "lines"), xaxis = FALSE,
   yaxis = FALSE, xlab = "", types = "barplot", heights = NULL, dataColumn = "score",
    gps = gpar(col = "black", fill = "gray")),
  chrom = seqlevels(ideo)[1],
  colorSheme = gieStain(),
  gp = gpar(fill = NA, lwd = 2),
  ...
)
```

Arguments

ideo	output of loadIdeogram.
dataList	a GRangesList of data to plot.
parameterList	a list of parameters for each dataset in the dataList. The elements of the parameters could be xlabs, ylabs, etc. type could be barplot, line, point, heatmap.
chrom	A length 1 character vector of chromosome name.
colorSheme	A character vector of giemsa stain colors.
gp	parameters used for grid.roundrect.
...	parameters not used.

Examples

```
## Not run:
ideo <- loadIdeogram("hg38")
library(rtracklayer)
library(grid)
dataList <- ideo[seqnames(ideo) %in% "chr1"]
dataList$score <- as.numeric(dataList$gieStain)
dataList <- dataList[dataList$gieStain!="gneg"]
dataList <- GRangesList(dataList, dataList)
grid.newpage()
plotOneIdeo(ideo, dataList, chrom="chr1")

## End(Not run)
```

---

pos-class *Class "pos"*

Description

An object of class "pos" represents a point location

Slots

x A numeric value, indicates the x position

y A numeric value, indicates the y position

unit "character" apecifying the units for the corresponding numeric values. See unit

---

reduce,GInteractions-method *Reduce method for 'GInteractions'*

Description

Reduce returns an object of the same type as x containing reduced ranges for each distinct (seqname, strand) pairing.

Usage

```
## S4 method for signature 'GInteractions'
reduce(x, min.gapwidth = 1L, ignore.strand = TRUE, ...)
```

Arguments

x	GInteractions object.
min.gapwidth	Ranges separated by a gap of at least min.gapwidth positions are not merged.
ignore.strand	TRUE or FALSE. Whether the strand of the input ranges should be ignored or not.
...	Not used.

Examples

```
## Not run:
library(InteractionSet)
gi <- readRDS(system.file("extdata", "gi.rds", package="trackViewer"))
reduce(head(gi, n=20))

## End(Not run)
```

`trackList-class` *List of tracks*

Description

An extension of List that holds only `track` objects.

Usage

```
## S4 replacement method for signature 'trackList'
seqlevelsStyle(x) <- value

trackList(..., heightDist = NA)
```

Arguments

`x`	trackList object.
`value`	values to be assigned.
`...`	Each tracks in ... becomes an element in the new trackList, in the same order. This is analogous to the list constructor, except every argument in ... must be derived from `track`.
`heightDist`	A vector or NA to define the height of each track.

See Also

`track`.

`trackStyle-class` *Class* `"trackStyle"`

Description

An object of class `"trackStyle"` represents track style.

An object of class `"track"` bundles the genomic data to be plotted together with the style used to draw it. A `track` is the basic unit accepted by `viewTracks`; several of them are collected into a `trackList` for a multi-panel figure.

Usage

```
## S4 method for signature 'track'
seqlevels(x)

## S4 method for signature 'track'
seqlevelsStyle(x)

## S4 replacement method for signature 'track'
seqlevelsStyle(x) <- value

## S4 method for signature 'track'
show(object)

## S4 method for signature 'track'
x$name

## S4 replacement method for signature 'track'
x$name <- value

## S3 method for class 'track'
.DollarNames(x, pattern = "")

## S3 method for class 'trackStyle'
.DollarNames(x, pattern = "")

setTrackStyleParam(ts, attr, value)

## S4 method for signature 'track,character'
setTrackStyleParam(ts, attr, value)

setTrackXscaleParam(ts, attr, value)

## S4 method for signature 'track,character'
setTrackXscaleParam(ts, attr, value)

setTrackYaxisParam(ts, attr, value)

## S4 method for signature 'track,character'
setTrackYaxisParam(ts, attr, value)
```

Arguments

x	an object of trackStyle or track
value	values to be assigned.
object	an object of trackStyle.
name	slot name of trackStyle or track
pattern	A regular expression. Only matching names are returned.
ts	An object of track.
attr	the name of slot of trackStyle object to be changed.

Details

The validity method enforces the type-specific requirements summarised above; the most common errors are a missing `score` or `feature` metadata column, a lollipop range wider than one base, and a `dat2` whose length does not match `dat` for interaction data.

Note that `dat` and `dat2` are plain `GRanges` objects, so the seqlevel style of the track must match that of the other tracks and of the plotting range. `seqlevelsStyle` and its replacement method are defined for `track` and rename both `dat` and `dat2` at once.

`setTrackStyleParam` changes one styling slot of the `trackStyle` object held in `ts@style`. It accepts only the slots that are plain values; the two compound slots have their own setters, `setTrackXscaleParam` for `xscale` and `setTrackYaxisParam` for `yaxis`. Passing any other name, including `"xscale"` or `"yaxis"`, raises an error.

Accepted values of `attr`:

`tracktype` `"character"`. How the data is drawn. For `"data"` tracks use `"peak"` (the default), `"line"`, `"histogram"` or `"annotation"`, the last marking peak regions rather than plotting their scores. For `"interactionData"` tracks use `"heatmap"` or `"link"`.

`color` `"character"` vector of colors. Give two values when the track has both `dat` and `dat2`, the first for the positive side and the second for the negative side of the baseline.

`height` `"numeric"` between 0 and 1, the fraction of the figure given to this track. Note that `trackList` rewrites this slot for every element it is given, so set it after building the list, not before.

`marginTop`, `marginBottom` `"numeric"`, space left above and below the drawing region of the track, as a fraction of its height. Defaults are 0 and 0.05.

`ylim` `"numeric"` of length 2 fixing the y-axis range. Useful for making two tracks directly comparable, since the range is otherwise taken from the data in the current view.

`ylabpos` `"character"`, one of `"left"`, `"right"`, `"topleft"`, `"bottomleft"`, `"topright"`, `"bottomright"`, `"abovebaseline"`, `"underbaseline"` or `"none"`; for gene-type tracks also `"upstream"` or `"downstream"`.

`ylablas` `"numeric"` in {0, 1, 2, 3}, the rotation of the y label. See `par:las`.

`ylabgp` `"list"` of graphical parameters for the y label, converted to `gpar`, e.g. `list(cex=.8, col="gray30")`.

`breaks` `"numeric"` breaks for the color key of interaction data.

`NAcolor` `"character"`, the color used for missing cells of an interaction heatmap. Default `"white"`.

`ysplit` `"numeric"`, where to split the y region for back-to-back interaction plots. Default 0.5 splits it evenly; it has no effect on other layouts.

The value is assigned with `check = TRUE`, so the validity method of `trackStyle` runs on every call and an out-of-range value (an unknown `tracktype`, an `ylablas` outside 0:3, an unrecognized `ylabpos`) fails immediately rather than at plotting time.

`setTrackXscaleParam` changes the x-scale bar of a track, stored as an `xscale` object at `ts@style@xscale`. The x-scale bar is a short horizontal ruler drawn inside the track's own panel, independent of the shared genomic x-axis of the whole figure, typically used to show a distance such as "1K" next to a zoomed-in feature.

`attr` can be any slot of `xscale`, or the convenience name `"position"`:

`from`, `to` Objects of class `pos`, the two endpoints of the scale bar. Because these are `pos` objects rather than bare numbers, setting them directly means constructing the object yourself, e.g. `new("pos", x=12345678, y=0.5, unit="native")` for a point given in native (genomic) coordinates, or a fraction with `unit="npc"` for a position relative to the panel. Most callers will

find `attr="position"` (below) more convenient than setting `from` and `to` separately, since it keeps them centered and in sync with the label.

`label` `"character"`, the text drawn on the scale bar, e.g. `"500 bp"`. Set directly this is used verbatim.

`gp` `"list"` of graphical parameters for the scale bar and its label, converted to gpar, e.g. `list(cex=.5, col="black", lwd=2)`.

`draw` `"logical"`, whether the scale bar is drawn at all. Default `FALSE`; set to `TRUE` even `from`/`to` (or `position`) have been set, the scale bar will show.

`position` A shortcut that sets `from`, `to` and `label` together from a single scale length, instead of requiring two `pos` objects. `value` must be a `"list"` with named elements `x`, `y` and `label`:

- `x`, `y` — the native-coordinate of the bar (genomic position and track-relative y, respectively). The bar is drawn symmetrically about this point.
- `label` — the width the bar should represent.

A `label` that cannot be coerced to numeric (`NA` after `as.numeric`) is rejected before any slot is touched.

As with the other slots of xscale, updated values are assigned with `check = TRUE`, so the pos validity method (checking the `unit` string) still applies when `from`/`to` are set through `"position"`.

`setTrackYaxisParam` changes the y-axis of a track, stored as a yaxisStyle object at `ts@style@yaxis`. This is the axis drawn alongside the track's own data panel (score, coverage, etc.), separate from the shared genomic x-axis of the whole figure.

Accepted values of `attr`, all slots of yaxisStyle:

`at` `"numeric"` vector of y-values at which tick marks are drawn, e.g. `c(0, 25, 50)`. If left at its default (`numeric(0)`), tick positions are chosen automatically from the plotted range.

`label` `"logical"`, whether the numeric value of each tick in `at` is printed next to it. Default `FALSE`, i.e. ticks are drawn without their values; set to `TRUE` to show them.

`gp` `"list"` of graphical parameters for the axis line, ticks and labels, converted to gpar, e.g. `list(cex=.6, col="blue", lwd=1.5)`.

`draw` `"logical"`, whether the y-axis is drawn at all. Default `TRUE`.

`main` `"logical"`, which side of the panel the axis is drawn on: `TRUE` (the default) draws it on the left of the track, `FALSE` on the right. Useful for telling apart the axes of two adjacent or back-to-back tracks at a glance.

Any other value of `attr`, including `"xscale"` or a slot name belonging to trackStyle itself (like `"color"` or `"height"`), is rejected, use setTrackStyleParam for the plain style slots and setTrackXscaleParam for the x-scale bar. Values are assigned with `check = TRUE`, so an ill-typed value (for example a non-logical passed to `"draw"`) fails immediately rather than at plotting time.

Value

An object of class track with the modified style, returned invisibly. The variable supplied as `ts` is updated as a side effect.

An object of class track with the modified `xscale`, returned invisibly. The variable supplied as `ts` is updated as a side effect.

An object of class track with the modified `yaxis`, returned invisibly. The variable supplied as `ts` is updated as a side effect.

Slots

`tracktype` `"character"` track type, could be peak, line, histogram, or annotation. Default is "peak". "annotation" is used to mark the peak regions. For interaction data, it could be "heatmap" or "link".

`color` `"character"` track color. If the track has dat and dat2 slot, it should have two values.

`NAcolor` `"character"` NA color for interactionData.

`breaks` `"numeric"` breaks for color keys of interactionData.

`height` `"numeric"` track height. It should be a value between 0 and 1

`marginTop` `"numeric"` track top margin

`marginBottom` `"numeric"` track bottom margin

`xscale` object of `xscale`, describe the details of x-scale

`yaxis` object of `yaxisStyle`, describe the details of y-axis

`ylim` `"numeric"` y-axis range

`ylabpos` `"character"`, ylable postion, ylabpos should be 'left', 'right', 'topleft', 'bottomleft', 'topright', 'bottomright', 'abovebaseline', 'underbaseline', or 'none'. For gene type track, it also could be 'upstream' or 'downstream'

`ylablas` `"numeric"` y lable direction. It should be a integer 0-3. See `par:las`

`ylabgp` A `"list"` object, It will convert to an object of class `gpar`. This is basically a list of graphical parameter settings of y-label.

`ysplit` A `"numeric"` to split y plot region for interaction data. Default is 0.5, which will split the region half to half. It will only work for back to back plot.

`dat` Object of class `GRanges`, the primary data of the track. The metadata columns it must carry depend on `type` (see 'Details'): coverage-like tracks (`"data"`, `"scSeq"`), `"lollipopData"` and `"interactionData"` require a `score` column, whereas `"gene"` and `"transcript"` tracks require a `feature` column.

`dat2` Object of class `GRanges`, the optional second data set of the track; leave it as a zero-length `GRanges` when unused. Its meaning depends on `type`:

- for `"data"`, `"scSeq"` and `"lollipopData"` tracks it is drawn back-to-back with `dat`: `dat` above the baseline and `dat2` below it as `-1 * score`, which is the usual way to compare two samples or the two strands of one sample in a single panel;
- for `"interactionData"` it holds the second anchor of each interaction, so it must either be the same length as `dat` (anchors matched element-wise) or carry a `target` metadata column.

When supplied it must contain a `score` column, and for lollipop data every range must have width 1, exactly as for `dat`.

`type` The type of track, one of:

`"data"` continuous or interval scores — coverage, signal, peaks. Drawn as a peak, line or histogram depending on `style@tracktype`.

`"gene"` gene models. `dat` must have a `feature` column describing each range (for example `"exon"`, `"CDS"`, `"utr5"`, `"utr3"`).

`"transcript"` transcript models; same `feature` requirement as `"gene"`, but isoforms are drawn on separate rows.

`"scSeq"` single-cell signal. Validated like `"data"`, i.e. a `format` and a numeric `score` are required.

`"lollipopData"` point features such as variants or modification sites. Every range in `dat` (and `dat2`) must have width 1; ranges wider than one base are rejected.

"interactionData" chromatin interactions, for example from Hi-C or 4C. Drawn as a heatmap or as arcs according to style@tracktype.

format The format the data was imported from: "BED", "bedGraph", "WIG", "BigWig" or "BAM". It is required, and must be a single string, for "data" and "scSeq" tracks; other types ignore it. For every format except "WIG" the score column must be numeric or integer. "WIG" is the exception: because a WIG file has no fixed step boundaries until it is plotted, score is stored as a CompressedCharacterList and is converted on the fly — see importScore.

style Object of class trackStyle controlling color, height, margins, y-axis, x-scale and the drawing mode. Do not assign to its slots directly; use setTrackStyleParam, setTrackXscaleParam and setTrackYaxisParam, which validate the value and update the object in the calling frame.

name unused yet

Assignment in the calling frame

Unlike most R functions, setTrackStyleParam modifies its first argument in place: it assigns the updated track back to the variable that was passed in, so setTrackStyleParam(fox2, "color", "red") is enough and fox2 <- setTrackStyleParam(...) is not needed. This works only when ts is given as a name or a subsettable expression that can be assigned to; calling it on a temporary value, for example setTrackStyleParam(importScore(f), "color", "red"), updates nothing the caller can see. Inside lapply and friends the assignment targets the loop variable, which is discarded, so use the returned object there instead — it is returned invisibly and carries the same change.

Like setTrackStyleParam, this method assigns the updated track back to the variable passed as ts in the caller's environment, so setTrackXscaleParam(fox2, "draw", TRUE) is sufficient and the result need not be re-assigned. It is also returned invisibly for use in contexts (such as lapply) where the calling-frame assignment has no visible target.

Like setTrackStyleParam and setTrackXscaleParam, this method assigns the updated track back to the variable passed as ts in the caller's environment, so setTrackYaxisParam(fox2, "draw", FALSE) is sufficient on its own. It is also returned invisibly for use in contexts, such as lapply, where that calling-frame assignment has no visible target.

See Also

Please try to use importScore and importBam to generate the object.

setTrackXscaleParam, setTrackYaxisParam, trackStyle

xscale, pos, setTrackStyleParam, setTrackYaxisParam

yaxisStyle, setTrackStyleParam, setTrackXscaleParam

Examples

```
extdata <- system.file("extdata", package="trackViewer",
mustWork=TRUE)
fox2 <- importScore(file.path(extdata, "fox2.bed"), format="BED")
setTrackStyleParam(fox2, "color", c("red","green"))
setTrackXscaleParam(fox2, "gp", list(cex=.5))
setTrackYaxisParam(fox2, "gp", list(col="blue"))
fox2$dat <- GRanges(score=numeric(0))

## inspect and change the style
fox2$type
fox2$style$tracktype
setTrackStyleParam(fox2, "tracktype", "histogram")
```

```
setTrackStyleParam(fox2, "height", .2)

extdata <- system.file("extdata", package="trackViewer", mustWork=TRUE)
fox2 <- importScore(file.path(extdata, "fox2.bed"), format="BED")

## the track is updated in place; no re-assignment needed
setTrackStyleParam(fox2, "tracktype", "histogram")
setTrackStyleParam(fox2, "color", c("#E69F00", "#56B4E9"))
setTrackStyleParam(fox2, "ylim", c(0, 50))
setTrackStyleParam(fox2, "ylabpos", "topleft")
setTrackStyleParam(fox2, "ylabgp", list(cex=.8, col="gray30"))
fox2$style$tracktype

## inside lapply, use the returned value
trs <- lapply(list(a=fox2, b=fox2), function(.ele){
    setTrackStyleParam(.ele, "height", .25)
})

## invalid values are rejected straight away
## Not run:
setTrackStyleParam(fox2, "ylablas", 5)      # must be 0:3
setTrackStyleParam(fox2, "xscale", list())  # use setTrackXscaleParam

## End(Not run)
extdata <- system.file("extdata", package="trackViewer", mustWork=TRUE)
fox2 <- importScore(file.path(extdata, "fox2.bed"), format="BED")

## simplest way: give a centre point and a width in bases
setTrackXscaleParam(fox2, "position",
                    list(x=122929675, y=4, label=500))
setTrackXscaleParam(fox2, "draw", TRUE)

## style the bar itself
setTrackXscaleParam(fox2, "gp", list(cex=.5, col="gray30"))

## equivalent, done by hand with explicit pos objects
setTrackXscaleParam(fox2, "from",
                    new("pos", x=122929675-500, y=4, unit="native"))
setTrackXscaleParam(fox2, "to",
                    new("pos", x=122929675+500, y=4, unit="native"))
setTrackXscaleParam(fox2, "label", "1K")

## Not run:
## rejected: label can't be parsed as a number
setTrackXscaleParam(fox2, "position",
                    list(x=122929675, y=4, label="five hundred"))

## End(Not run)
extdata <- system.file("extdata", package="trackViewer", mustWork=TRUE)
fox2 <- importScore(file.path(extdata, "fox2.bed"), format="BED")

## show tick values at chosen positions
setTrackYaxisParam(fox2, "at", c(0, 25, 50))
setTrackYaxisParam(fox2, "label", TRUE)

## style the axis and move it to the right-hand side
setTrackYaxisParam(fox2, "gp", list(cex=.6, col="blue"))
```

```
setTrackYaxisParam(fox2, "main", FALSE)

## hide the axis entirely
setTrackYaxisParam(fox2, "draw", FALSE)

## Not run:
## rejected: "color" belongs to trackStyle, not yaxisStyle
setTrackYaxisParam(fox2, "color", "red")

## End(Not run)
```

`trackViewerStyle-class` *Class* `"trackViewerStyle"`

Description

An object of class `"trackViewerStyle"` represents track viewer style.

Usage

```
trackViewerStyle(...)

setTrackViewerStyleParam(tvs, attr, value)

## S4 method for signature 'trackViewerStyle,character'
setTrackViewerStyleParam(tvs, attr, value)
```

Arguments

`...`	Each argument in ... becomes an slot in the new trackViewerStyle.
`tvs`	An object of `trackViewerStyle`.
`attr`	the name of slot to be changed.
`value`	values to be assigned.

Details

`setTrackViewerStyleParam` changes one slot of a `trackViewerStyle` object. Unlike `setTrackStyleParam` and its siblings, this style is not attached to a single track: it controls the figure-wide x-axis shared by every track in a plot (drawn once, beneath the bottom-most track), so this function is typically called on the `trackViewerStyle` object passed to `viewTracks`, not on a track itself.

Accepted values of `attr`, all slots of `trackViewerStyle`:

`margin` `"numeric"` of length 4, the bottom, left, top and right margins of the whole plot, as fractions of the device (each value must be between 0 and 0.8). Default `c(.01, .05, 0, 0)`.

`xlas` `"numeric"` in {0, 1, 2, 3}, the rotation of the x-axis tick labels. See `par:las`. Ignored when `autolas` is `TRUE`.

`xgp` `"list"` of graphical parameters for the x-axis, converted to `gpar`, e.g. `list(cex=.8, col="black")`. For the equivalent y-axis settings, see `yaxisStyle` and `setTrackYaxisParam`, which are per-track rather than figure-wide.

xaxis "logical", whether the shared x-axis is drawn at all. Default FALSE.

xat "numeric" vector of genomic positions at which x-axis tick marks are drawn, passed to grid.xaxis as at. If left at its default (numeric(0)), positions are chosen automatically from the plotted range.

xlabel "character" vector of labels for the ticks in xat, passed to grid.xaxis as label. Should be the same length as xat when both are set explicitly; left at its default, labels are generated automatically from the tick positions.

autolas "logical", whether the y-axis label direction is chosen automatically rather than following xlas. Default FALSE.

flip "logical", whether the x-axis (and the whole plot) is flipped, e.g. to display a feature on the minus strand 5' to 3' left to right. Default FALSE.

Any other value of attr is rejected. Values are assigned with check = TRUE, so the validity method of trackViewerStyle runs on every call — an xlas outside 0:3 or a margin outside [0, 0.8] fails immediately with a descriptive message rather than surfacing later as a plotting error.

Value

An object of class trackViewerStyle with the modified slot, returned invisibly. The variable supplied as tvs is updated as a side effect.

Slots

margin "numeric", specify the bottom, left, top and right margin.

xlas "numeric", label direction of x-axis mark. It should be a integer 0-3. See par:las

xgp A "list", object, It will convert to an object of class gpar. This is basically a list of graphical parameter settings of x-axis. For y-axis, see yaxisStyle

xaxis "logical", draw x-axis or not

xat "numeric", the values will be passed to grid.xaxis as 'at' parameter.

xlabel "character", the values will be passed to grid.xaxis as 'label' parameter.

autolas "logical" automatic determine y label direction

flip "logical" flip the x-axis or not, default FALSE

Assignment in the calling frame

Like setTrackStyleParam, this method assigns the updated object back to the variable passed as tvs in the caller's environment, so setTrackViewerStyleParam(tvs, "xaxis", TRUE) is sufficient on its own and the result need not be re-assigned. It is also returned invisibly for use in contexts, such as lapply, where that calling-frame assignment has no visible target — see setTrackStyleParam for a worked example of that case.

See Also

trackViewerStyle, setTrackStyleParam, setTrackXscaleParam, setTrackYaxisParam

Examples

```
tvs <- trackViewerStyle()
setTrackViewerStyleParam(tvs, "xaxis", TRUE)

tvs <- trackViewerStyle()

## turn on the shared x-axis and rotate its labels
setTrackViewerStyleParam(tvs, "xaxis", TRUE)
setTrackViewerStyleParam(tvs, "xlas", 2)

## choose explicit tick positions and labels
setTrackViewerStyleParam(tvs, "xat", c(122929000, 122929500, 122930000))
setTrackViewerStyleParam(tvs, "xlabel", c("122,929,000", "122,929,500", "122,930,000"))

## tighten the plot margins
setTrackViewerStyleParam(tvs, "margin", c(.02, .08, .01, .01))

## flip the plot, e.g. for a minus-strand gene
setTrackViewerStyleParam(tvs, "flip", TRUE)

## Not run:
## rejected: xlas must be one of 0:3
setTrackViewerStyleParam(tvs, "xlas", 5)
## rejected: not a slot of trackViewerStyle
setTrackViewerStyleParam(tvs, "color", "red")

## End(Not run)
```

`viewGene` *plot tracks based on gene name*

Description

given a gene name, plot the tracks.

Usage

```
viewGene(
  symbol,
  filenames,
  format,
  txdb,
  org,
  upstream = 1000,
  downstream = 1000,
  anchor = c("gene", "TSS"),
  plot = FALSE
)
```

Arguments

`symbol`	Gene symbol
`filenames`	files used to generate tracks

format	file format used to generate tracks
txdb	txdb will be used to extract the genes
org	org package name
upstream	upstream from anchor
downstream	downstream from anchor
anchor	TSS, or gene
plot	plot the tracks or not.

Value

an invisible list of a trackList, a trackViewerStyle and a GRanges

Examples

```
library(TxDb.Hsapiens.UCSC.hg19.knownGene)
library(org.Hs.eg.db)
extdata <- system.file("extdata", package="trackViewer", mustWork=TRUE)
filename = file.path(extdata, "fox2.bed")
optSty <- viewGene("HSPA8", filenames=filename, format="BED",
                   txdb=TxDb.Hsapiens.UCSC.hg19.knownGene,
                   org="org.Hs.eg.db")
```

---

viewTracks *plot the tracks*

Description

A function to plot the data for given range

Usage

```
viewTracks(
  trackList,
  chromosome,
  start,
  end,
  strand,
  gr = GRanges(),
  ignore.strand = TRUE,
  viewerStyle = trackViewerStyle(),
  autoOptimizeStyle = FALSE,
  newpage = TRUE,
  operator = NULL,
  smooth = FALSE,
  lollipop_style_switch_limit = 10
)
```

Arguments

trackList	an object of trackList
chromosome	chromosome
start	start position
end	end position
strand	strand
gr	an object of GRanges
ignore.strand	ignore the strand or not when do filter. default TRUE
viewerStyle	an object of trackViewerStyle
autoOptimizeStyle	should use optimizeStyle to optimize style
newpage	should be draw on a new page?
operator	operator, could be +, -, *, /, ^, %%, and NA. "-" means dat - dat2, and so on. NA means do not apply any operator. Note: if multiple operator is supplied, please make sure the length of operator keep same as the length of trackList.
smooth	logical(1) or numeric(). Plot smooth curve or not. If it is numeric, eg n, mean of nearby n points will be used for plot. If it is numeric, the second number will be the color. Default coloer is 2 (red).
lollipop_style_switch_limit	The cutoff value for lollipop style for the 'circle' type. If the max score is greater than this cutoff value, trackViewer will only plot one shape at the highest score. Otherwise trackViewer will draw the shapes like 'Tanghulu'.

Value

An object of viewport for addGuideLine

See Also

See Also as addGuideLine, addArrowMark

Examples

```
extdata <- system.file("extdata", package="trackViewer",
                       mustWork=TRUE)
files <- dir(extdata, "-.wig")
tracks <- lapply(paste(extdata, files, sep="/"),
                 importScore, format="WIG")
tracks <- lapply(tracks, function(.ele) {strand(.ele@dat) <- "-"; .ele})
fox2 <- importScore(paste(extdata, "fox2.bed", sep="/"), format="BED")
dat <- coverageGR(fox2@dat)
fox2@dat <- dat[strand(dat)=="+"]
fox2@dat2 <- dat[strand(dat)=="-"]
gr <- GRanges("chr11", IRanges(122929275, 122930122), strand="-")
viewTracks(trackList(track=tracks, fox2=fox2), gr=gr, autoOptimizeStyle=TRUE)
```

xscale-class *Class* "xscale"

Description

An object of class "xscale" represents x-scale style.

Slots

`from` A pos class, indicates the start point postion of x-scale.

`to` A pos class, indicates the end point postion of x-scale.

`label` "character" the label of x-scale

`gp` A "list" object, It will convert to an object of class gpar. This is basically a list of graphical parameter settings of x-scale.

`draw` A "logical" value indicating whether the x-scale should be draw.

yaxisStyle-class *Class* "yaxisStyle"

Description

An object of class "yaxisStyle" represents y-axis style.

Slots

`at` "numeric" vector of y-value locations for the tick marks

`label` "logical" value indicating whether to draw the labels on the tick marks.

`gp` A "list" object, It will convert to an object of class gpar. This is basically a list of graphical parameter settings of y-axis.

`draw` A "logical" value indicating whether the y-axis should be draw.

`main` A "logical" value indicating whether the y-axis should be draw in left (TRUE) or right (FALSE).

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