

# Package ‘trackViewer’

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**Type** Package

**Title** A R/Bioconductor package with web interface for drawing elegant interactive tracks or lollipop plot to facilitate integrated analysis of multi-omics data

**Version** 1.45.1

**Maintainer** Jianhong Ou <jou@morgridge.org>

**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)

**Depends** R (>= 3.5.0), grDevices, methods, GenomicRanges, grid

**Imports** GenomeInfoDb, GenomicAlignments, GenomicFeatures, Gviz, Rsamtools, S4Vectors, rtracklayer, BiocGenerics, scales, tools, IRanges, AnnotationDbi, grImport, htmlwidgets, InteractionSet, utils, rhdf5, strawr, txdbmaker

**Suggests** biomaRt, TxDb.Hsapiens.UCSC.hg19.knownGene, RUnit, org.Hs.eg.db, BiocStyle, knitr, VariantAnnotation, httr, htmltools, rmarkdown, motifStack

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| trackViewer-package | <i>Minimal designed plotting tool for genomic data</i> |
|---------------------|--------------------------------------------------------|

---

## 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.

## Author(s)

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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 | <i>Add arrow mark to the figure at a given position</i> |
|--------------|---------------------------------------------------------|

---

## 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 <code>grid.locator</code> , which will get the location of the mouse click.           |
| label    | A character or expression vector.                                                                                                                                                                     |
| angle    | A parameter passed into <code>grid::arrow</code> 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 <code>grid::arrow</code> function. A unit 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 <code>grid::arrow</code> 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 <a href="#">viewTracks</a>                                                                                                                               |

**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 | <i>Add guide lines to the tracks</i> |
|--------------|--------------------------------------|

---

### 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 <a href="#">viewTracks</a> |

### See Also

See Also as [getCurTrackViewport](#), [addArrowMark](#), [viewTracks](#)

### Examples

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

---

|                          |                                                                 |
|--------------------------|-----------------------------------------------------------------|
| addInteractionAnnotation | <i>Add annotation markers to the figure at a given position</i> |
|--------------------------|-----------------------------------------------------------------|

---

### Description

A function to add annotation markers for emphasizing interactions

### Usage

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

**Arguments**

|                    |                                                                                                                                                                                                                                                                                                                                |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>obj</code>   | A <a href="#">GInteractions</a> object, <a href="#">GRanges</a> 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.                                                                                      |
| <code>idx</code>   | The layer number of track.                                                                                                                                                                                                                                                                                                     |
| <code>FUN</code>   | Function for plot. Available functions are <a href="#">grid.polygon</a> , <a href="#">grid.lines</a> , and <a href="#">grid.text</a> for <a href="#">GInteractions</a> object; <a href="#">grid.lines</a> , and <a href="#">grid.text</a> for <a href="#">GRanges</a> object; <code>FUN</code> is not used for numeric vector. |
| <code>panel</code> | Plot regions. Available values are "top", "bottom".                                                                                                                                                                                                                                                                            |
| <code>...</code>   | Parameters will be passed to <code>FUN</code> .                                                                                                                                                                                                                                                                                |

**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))
```

**Description**

Extract the interaction signal means from given coordinates.

**Usage**

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

**Arguments**

|                                   |                                                                                                                                                      |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>gr</code>                   | A ‘GRanges’ object. The center of the object will be used for alignment for all the given regions.                                                   |
| <code>upstream, downstream</code> | numeric(1L). Upstream and downstream from the center of given ‘gr’ input will be used to extract the signals.                                        |
| <code>resolution</code>           | numeric(1L). The resolution will be passed to <a href="#">importInteractions</a> function.                                                           |
| <code>...</code>                  | The parameters used by <a href="#">importInteractions</a> 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=1000000), 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 <code>trackList</code>                   |
| gr            | an object of <code>GRanges</code>                     |
| 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 <code>browseTracks</code>                                                                               |
| env           | The environment in which to evaluate <code>expr</code> .                                                                               |
| quoted        | Is <code>expr</code> a quoted expression (with <code>quote()</code> )? This is useful if you want to save an expression in a variable. |

---

|            |                           |
|------------|---------------------------|
| coverageGR | <i>calculate coverage</i> |
|------------|---------------------------|

---

**Description**

calculate coverage for [GRanges](#), [GAlignments](#) or [GAlignmentPairs](#)

**Usage**

```
coverageGR(gr)
```

**Arguments**

gr                    an object of [RGenes](#), [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 | <i>dandelion.plots</i> |
|----------------|------------------------|

---

**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 <a href="#">GRanges</a> or <a href="#">GRangesList</a> . All the width of GRanges must be 1.                                                                                                                                                         |
| features                    | A object of <a href="#">GRanges</a> or <a href="#">GRangesList</a> .                                                                                                                                                                                             |
| ranges                      | A object of <a href="#">GRanges</a> or <a href="#">GRangesList</a> .                                                                                                                                                                                             |
| 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 | <i>Prepare gene model from an object of TxDb</i> |
|-------------------|--------------------------------------------------|

---

## 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 <a href="#">TxDb</a>                                                                                               |
| 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 <code>as.list(txdb)</code> , 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 | <i>track from TxDb</i> |
|-----------|------------------------|

---

### 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 <a href="#">TxDb</a> .                         |
| 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 | <i>Get current track viewport</i> |
|---------------------|-----------------------------------|

---

### Description

Get current track viewport for addGuideLine

### Usage

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

### Arguments

|                |                                               |
|----------------|-----------------------------------------------|
| curViewerStyle | an object of <a href="#">trackViewerStyle</a> |
| 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 | <i>get gene ids by genomic location</i> |
|--------------------|-----------------------------------------|

---

**Description**

retrieve gene ids from txdb object by genomic location.

**Usage**

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

**Arguments**

|      |                                     |
|------|-------------------------------------|
| gr   | GRanges object.                     |
| txdb | An object of <a href="#">TxDb</a> . |

**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 | <i>get genomic location by gene symbol</i> |
|-------------|--------------------------------------------|

---

### 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 | <i>convert GInteractions to track object</i> |
|----------|----------------------------------------------|

---

### 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 | <i>color scheme for the schema for Chromosome Band (Ideogram)</i> |
|----------|-------------------------------------------------------------------|

---

**Description**

Describe the colors of giemsa stain results

**Usage**

```
gieStain()
```

**Value**

A character vector of colors

**Examples**

```
gieStain()
```

---

|           |                               |
|-----------|-------------------------------|
| GOperator | <i>GInteractions operator</i> |
|-----------|-------------------------------|

---

**Description**

GInteractions operations (add, subtract, multiply, divide)

**Usage**

```
GOperator(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))
GOperator(list(gi, gi2), col="score", operator="+")
GOperator(list(gi, gi2), col="score", operator="-")
```

---

|          |                              |
|----------|------------------------------|
| gridPlot | <i>plot GRanges metadata</i> |
|----------|------------------------------|

---

### Description

plot GRanges metadata for different types

### Usage

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

### Arguments

|        |                                                                                   |
|--------|-----------------------------------------------------------------------------------|
| gr     | an object of <a href="#">GRanges</a> with metadata. All metadata must be numeric. |
| gp     | an object of <a href="#">gpar</a>                                                 |
| type   | type of the figure, could be barplot, line, point and heatmap                     |
| xscale | x scale of the viewport                                                           |

---

|            |                         |
|------------|-------------------------|
| GRoperator | <i>GRanges operator</i> |
|------------|-------------------------|

---

### Description

GRanges operations (add, subtract, 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 | <i>plot ideogram with data</i> |
|--------------|--------------------------------|

---

## 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")),
  colorScheme = gieStain(),
  gp = gpar(fill = NA, lwd = 2),
  ...
)
```

## Arguments

|               |                                                                                                                                                                |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ideo          | output of <a href="#">loadIdeogram</a> .                                                                                                                       |
| dataList      | a <a href="#">GRangesList</a> 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. |
| colorScheme   | A character vector of giemsa stain colors.                                                                                                                     |
| gp            | parameters used for <a href="#">grid.roundrect</a> .                                                                                                           |
| ...           | 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 <a href="#">GRanges</a> to indicate the range to be imported                |
| pairs  | logical object to indicate the BAM is paired or not. See <a href="#">readGAlignments</a> |

**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 | <i>Reading data from a BED or WIG file to RleList</i> |
|------------|-------------------------------------------------------|

---

## 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 <a href="#">GRanges</a> 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 <a href="#">GRanges</a> 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 <a href="#">GRanges</a> 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 <a href="#">readGAlignmentsList</a> or <a href="#">readGAlignments</a> |
| txdb              | TxDb object for gene model.                                                               |
| gene              | Gene name to plot. (row value)                                                            |
| id                | The id of gene used in txdb.                                                              |
| idents            | identity class to define the groups to plot. (column value)                               |
| gr                | GRanges object to define the plotting 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 | <i>List the available chromosome</i> |
|-----------------|--------------------------------------|

---

### 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 | <i>List the available normalizations</i> |
|--------------------|------------------------------------------|

---

**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 | <i>List the available resolutions</i> |
|-----------------|---------------------------------------|

---

**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 | <i>load ideogram from UCSC</i> |
|--------------|--------------------------------|

---

### 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 <a href="#">Ranges</a> object with the intervals.                      |
| ...    | Additional arguments to pass to the <a href="#">GRanges</a> constructor. |

### Value

A [GRanges](#) object.

### See Also

See Also as [ideogramPlot](#)

### Examples

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

---

|             |                     |
|-------------|---------------------|
| lollipoplot | <i>Lollipoplots</i> |
|-------------|---------------------|

---

### Description

Plot variants and somatic mutations

**Usage**

```
lollipop(
  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 <a href="#">GRanges</a> , <a href="#">GRangesList</a> or a list of <a href="#">GRanges</a> . All the width of <a href="#">GRanges</a> must be 1.                                                                                               |
| features                    | A object of <a href="#">GRanges</a> , <a href="#">GRangesList</a> or a list of <a href="#">GRanges</a> . The metadata 'featureLayerID' are used for drawing features in different layers. See details in vignette.                                         |
| ranges                      | A object of <a href="#">GRanges</a> or <a href="#">GRangesList</a> .                                                                                                                                                                                       |
| 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. Rescale 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)
lollipop(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 | <i>convert WIG format track to BED format track</i> |
|----------|-----------------------------------------------------|

---

**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 | <i>plot GRanges data</i> |
|-------------|--------------------------|

---

**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],
  colorScheme = gieStain(),
  gp = gpar(fill = NA),
  ...
)
```

**Arguments**

ideo output of [loadIdeogram](#).  
 chrom A length 1 character vector of chromosome name.  
 colorScheme 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 | <i>plot ideogram with data for one chromosome</i> |
|-------------|---------------------------------------------------|

---

**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],
  colorScheme = gieStain(),
  gp = gpar(fill = NA, lwd = 2),
  ...
)
```

**Arguments**

|               |                                                                                                                                                                |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ideo          | output of <a href="#">loadIdeogram</a> .                                                                                                                       |
| dataList      | a <a href="#">GRangesList</a> 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.                                                                                                                |
| colorScheme   | A character vector of giemsa stain colors.                                                                                                                     |
| gp            | parameters used for <a href="#">grid.roundrect</a> .                                                                                                           |
| ...           | 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" apesifying 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 | <i>List of tracks</i> |
|-----------------|-----------------------|

---

**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 <a href="#">track</a> . |
| heightDist | A vector or NA to define the height of each track.                                                                                                                                                  |

**See Also**

[track](#).

---

|                  |                           |
|------------------|---------------------------|
| trackStyle-class | <i>Class "trackStyle"</i> |
|------------------|---------------------------|

---

**Description**

An object of class "trackStyle" represents track style.

An object of class "track" represents scores of a given track.

**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

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                                     |
| ts     | An object of track.                                                  |
| attr   | the name of slot of <a href="#">trackStyle</a> object to be changed. |

**Details**

The attr of setTrackXscaleParam could not only be a slot of xscale, but also be position. If the attr is set to position, value must be a list of x, y and label. For example setTrackXscaleParam(track, attr="position", value=list(x=122929675, y=4, label=500))

**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 position, 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 label 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 scores of a given track. It should contain score metadata.

dat2 Object of class [GRanges](#) the scores of a given track. It should contain score metadata. When dat2 and dat is paired, dat will be drawn as positive value where dat2 will be drawn as negative value (-1 \* score)

type The type of track. It could be 'data', 'gene', 'transcript', 'scSeq', 'lollipopData' or 'interactionData'.

format The format of the input. It could be "BED", "bedGraph", "WIG", "BigWig" or "BAM"

style Object of class [trackStyle](#)

name unused yet

**See Also**

Please try to use [importScore](#) and [importBam](#) to generate the object.

**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))
```

---

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.                                            |

## 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

## Examples

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

---

|          |                                       |
|----------|---------------------------------------|
| viewGene | <i>plot tracks based on gene name</i> |
|----------|---------------------------------------|

---

## 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 <a href="#">trackList</a>                                                                                                                                                                                                   |
| chromosome                  | chromosome                                                                                                                                                                                                                               |
| start                       | start position                                                                                                                                                                                                                           |
| end                         | end position                                                                                                                                                                                                                             |
| strand                      | strand                                                                                                                                                                                                                                   |
| gr                          | an object of <a href="#">GRanges</a>                                                                                                                                                                                                     |
| ignore.strand               | ignore the strand or not when do filter. default TRUE                                                                                                                                                                                    |
| viewerStyle                 | an object of <a href="#">trackViewerStyle</a>                                                                                                                                                                                            |
| autoOptimizeStyle           | should use <a href="#">optimizeStyle</a> 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 color 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 | <i>Class "xscale"</i> |
|--------------|-----------------------|

---

**Description**

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

**Slots**

from A [pos](#) class, indicates the start point position of x-scale.

to A [pos](#) class, indicates the end point position 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 | <i>Class "yaxisStyle"</i> |
|------------------|---------------------------|

---

**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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