

Package ‘ChIPseeker’

May 20, 2024

Type Package

Title ChIPseeker for ChIP peak Annotation, Comparison, and Visualization

Version 1.41.0

Maintainer Guangchuang Yu <guangchuangyu@gmail.com>

Description This package implements functions to retrieve the nearest genes around the peak, annotate genomic region of the peak, statistical methods for estimate the significance of overlap among ChIP peak data sets, and incorporate GEO database for user to compare the own dataset with those deposited in database. The comparison can be used to infer cooperative regulation and thus can be used to generate hypotheses. Several visualization functions are implemented to summarize the coverage of the peak experiment, average profile and heatmap of peaks binding to TSS regions, genomic annotation, distance to TSS, and overlap of peaks or genes.

Depends R (>= 3.5.0)

Imports AnnotationDbi, BiocGenerics, boot, enrichplot, IRanges, GenomeInfoDb, GenomicRanges, GenomicFeatures, ggplot2, gplots, graphics, grDevices, gtools, methods, plotrix, dplyr, parallel, magrittr, rtracklayer, S4Vectors, stats, TxDb.Hsapiens.UCSC.hg19.knownGene, utils, aplot, yulab.utils, tibble

Suggests clusterProfiler, ggimage, ggplotify, ggupset, ggVennDiagram, ReactomePA, org.Hs.eg.db, knitr, rmarkdown, testthat, prettydoc

Remotes GuangchuangYu/enrichplot

URL <https://onlinelibrary.wiley.com/share/author/GYJGUBYCTRMJFN2JFZZ?target=10.1002/cpz1.585>

BugReports <https://github.com/YuLab-SMU/ChIPseeker/issues>

Encoding UTF-8

VignetteBuilder knitr

ByteCompile true

License Artistic-2.0

biocViews Annotation, ChIPSeq, Software, Visualization,
MultipleComparison

RoxygenNote 7.3.0

git_url <https://git.bioconductor.org/packages/ChIPseeker>

git_branch devel

git_last_commit dc9c243

git_last_commit_date 2024-05-14

Repository Bioconductor 3.20

Date/Publication 2024-05-20

Author Guangchuang Yu [aut, cre] (<<https://orcid.org/0000-0002-6485-8781>>),
Ming Li [ctb],
Qianwen Wang [ctb],
Yun Yan [ctb],
Hervé Pagès [ctb],
Michael Kluge [ctb],
Thomas Schwarzl [ctb],
Zhougeng Xu [ctb]

Contents

| | |
|--|----|
| ChIPseeker-package | 4 |
| | 5 |
| annotatePeak | 5 |
| as.data.frame.csAnno | 7 |
| as.GRanges | 8 |
| check_upstream_and_downstream | 8 |
| combine_csAnno | 9 |
| covplot | 9 |
| csAnno-class | 10 |
| downloadGEObedFiles | 11 |
| downloadGSMbedFiles | 11 |
| dropAnno | 12 |
| enrichAnnoOverlap | 12 |
| enrichPeakOverlap | 13 |
| getAnnoStat | 14 |
| getBioRegion | 14 |
| getGeneAnno | 15 |
| getGenomicAnnotation | 16 |
| getGEOgenomeVersion | 17 |
| getGEOInfo | 17 |
| getGEOspecies | 18 |
| getNearestFeatureIndicesAndDistances | 18 |
| getPromoters | 19 |
| getSampleFiles | 20 |

| | |
|--|----|
| getTagMatrix | 20 |
| getTagMatrix.binning.internal | 22 |
| getTagMatrix.internal | 23 |
| getTagMatrix2 | 23 |
| getTagMatrix2.binning.internal | 24 |
| getTagMatrix2.internal | 25 |
| info | 25 |
| makeBioRegionFromGranges | 26 |
| overlap | 27 |
| peakHeatmap | 27 |
| peakHeatmap_multiple_Sets | 29 |
| peak_Profile_Heatmap | 30 |
| plotAnnoBar | 31 |
| plotAnnoBar.data.frame | 32 |
| plotAnnoPie | 33 |
| plotAnnoPie.csAnno | 34 |
| plotAvgProf | 36 |
| plotAvgProf.binning | 37 |
| plotAvgProf2 | 38 |
| plotDistToTSS | 39 |
| plotDistToTSS.data.frame | 40 |
| plotMultiProf | 41 |
| plotMultiProf.binning | 42 |
| plotMultiProf.binning.internal | 43 |
| plotMultiProf.normal | 44 |
| plotMultiProf.normal.internal | 45 |
| plotPeakProf | 45 |
| plotPeakProf2 | 48 |
| plotPeakProf_MultiWindows | 50 |
| readPeakFile | 52 |
| reexports | 52 |
| seq2gene | 53 |
| show | 54 |
| shuffle | 54 |
| tagHeatmap | 55 |
| upsetplot | 56 |
| vennpie | 56 |
| vennplot | 57 |
| vennplot.peakfile | 58 |

| | |
|--------------------|---|
| ChIPseeker-package | <i>ChIPseeker: ChIPseeker for ChIP peak Annotation, Comparison, and Visualization</i> |
|--------------------|---|

Description

This package implements functions to retrieve the nearest genes around the peak, annotate genomic region of the peak, statistical methods for estimate the significance of overlap among ChIP peak data sets, and incorporate GEO database for user to compare the own dataset with those deposited in database. The comparison can be used to infer cooperative regulation and thus can be used to generate hypotheses. Several visualization functions are implemented to summarize the coverage of the peak experiment, average profile and heatmap of peaks binding to TSS regions, genomic annotation, distance to TSS, and overlap of peaks or genes.

Author(s)

Maintainer: Guangchuang Yu <guangchuangyu@gmail.com> ([ORCID](#))

Other contributors:

- Ming Li <limiang929@gmail.com> [contributor]
- Qianwen Wang <treywea@gmail.com> [contributor]
- Yun Yan <youryanyun@gmail.com> [contributor]
- Hervé Pagès <hpages.on.github@gmail.com> [contributor]
- Michael Kluge <michael.kluge@bio.ifi.lmu.de> [contributor]
- Thomas Schwarzl <schwarzl@embl.de> [contributor]
- Zhougeng Xu <xuzhougeng@163.com> [contributor]

See Also

Useful links:

- <https://onlinelibrary.wiley.com/share/author/GYJGUBYCTRMYYJFN2JFZZ?target=10.1002/cpz1.585>
- Report bugs at <https://github.com/YuLab-SMU/ChIPseeker/issues>

Description

capture name of variable

Usage

```
.(..., .env = parent.frame())
```

Arguments

| | |
|------|-------------|
| ... | expression |
| .env | environment |

Value

expression

Examples

```
x <- 1  
eval(.(x)[[1]])
```

| | |
|--------------|---------------------|
| annotatePeak | <i>annotatePeak</i> |
|--------------|---------------------|

Description

Annotate peaks

Usage

```
annotatePeak(  
  peak,  
  tssRegion = c(-3000, 3000),  
  TxDb = NULL,  
  level = "transcript",  
  assignGenomicAnnotation = TRUE,  
  genomicAnnotationPriority = c("Promoter", "5UTR", "3UTR", "Exon", "Intron",  
    "Downstream", "Intergenic"),  
  annoDb = NULL,  
  addFlankGeneInfo = FALSE,  
  flankDistance = 5000,  
  sameStrand = FALSE,
```

```

ignoreOverlap = FALSE,
ignoreUpstream = FALSE,
ignoreDownstream = FALSE,
overlap = "TSS",
verbose = TRUE,
columns = c("ENTREZID", "ENSEMBL", "SYMBOL", "GENENAME")
)

```

Arguments

| | |
|---------------------------|---|
| peak | peak file or GRanges object |
| tssRegion | Region Range of TSS |
| TxDb | TxDb or EnsDb annotation object |
| level | one of transcript and gene |
| assignGenomicAnnotation | logical, assign peak genomic annotation or not |
| genomicAnnotationPriority | genomic annotation priority |
| annoDb | annotation package |
| addFlankGeneInfo | logical, add flanking gene information from the peaks |
| flankDistance | distance of flanking sequence |
| sameStrand | logical, whether find nearest/overlap gene in the same strand |
| ignoreOverlap | logical, whether ignore overlap of TSS with peak |
| ignoreUpstream | logical, if True only annotate gene at the 3' of the peak. |
| ignoreDownstream | logical, if True only annotate gene at the 5' of the peak. |
| overlap | one of 'TSS' or 'all', if overlap="all", then gene overlap with peak will be reported as nearest gene, no matter the overlap is at TSS region or not. |
| verbose | print message or not |
| columns | names of columns to be obtained from database |

Value

data.frame or GRanges object with columns of:

all columns provided by input.

annotation: genomic feature of the peak, for instance if the peak is located in 5'UTR, it will annotated by 5'UTR. Possible annotation is Promoter-TSS, Exon, 5' UTR, 3' UTR, Intron, and Inter-genic.

geneChr: Chromosome of the nearest gene

geneStart: gene start

geneEnd: gene end

geneLength: gene length

geneStrand: gene strand
 geneId: entrezgene ID
 distanceToTSS: distance from peak to gene TSS
 if annoDb is provided, extra column will be included:
 ENSEMBL: ensembl ID of the nearest gene
 SYMBOL: gene symbol
 GENENAME: full gene name

Author(s)

G Yu

See Also

[plotAnnoBar](#) [plotAnnoPie](#) [plotDistToTSS](#)

Examples

```

## Not run:
require(TxDb.Hsapiens.UCSC.hg19.knownGene)
txdb <- TxDb.Hsapiens.UCSC.hg19.knownGene
peakfile <- system.file("extdata", "sample_peaks.txt", package="ChIPseeker")
peakAnno <- annotatePeak(peakfile, tssRegion=c(-3000, 3000), TxDb=txdb)
peakAnno

## End(Not run)

```

as.data.frame.csAnno *as.data.frame.csAnno*

Description

convert csAnno object to data.frame

Usage

```

## S3 method for class 'csAnno'
as.data.frame(x, row.names = NULL, optional = FALSE, ...)

```

Arguments

| | |
|-----------|-----------------------|
| x | csAnno object |
| row.names | row names |
| optional | should be omitted. |
| ... | additional parameters |

Value

data.frame

Author(s)

Guangchuang Yu <https://guangchuangyu.github.io>

as.GRanges

as.GRanges

Description

convert csAnno object to GRanges

Usage

```
as.GRanges(x)
```

Arguments

x csAnno object

Value

GRanges object

Author(s)

Guangchuang Yu <https://guangchuangyu.github.io>

check_upstream_and_downstream

check upstream and downstream parameter

Description

check_upstream_and_downstream

Usage

```
check_upstream_and_downstream(upstream, downstream)
```

Arguments

upstream upstream

downstream downstream

| | |
|----------------|-----------------------|
| combine_csAnno | <i>combine_csAnno</i> |
|----------------|-----------------------|

Description

Combine csAnno Object

Usage

```
combine_csAnno(x, ...)
```

Arguments

| | |
|-----|----------------|
| x | csAnno object |
| ... | csAnno objects |

Details

<https://github.com/YuLab-SMU/ChIPseeker/issues/157>

Value

csAnno object

| | |
|---------|----------------|
| covplot | <i>covplot</i> |
|---------|----------------|

Description

plot peak coverage

Usage

```
covplot(  
  peak,  
  weightCol = NULL,  
  xlab = "Chromosome Size (bp)",  
  ylab = "",  
  title = "ChIP Peaks over Chromosomes",  
  chrs = NULL,  
  xlim = NULL,  
  lower = 1,  
  fill_color = NULL  
)
```

Arguments

| | |
|------------|--|
| peak | peak file or GRanges object |
| weightCol | weight column of peak |
| xlab | xlab |
| ylab | ylab |
| title | title |
| chrs | selected chromosomes to plot, all chromosomes by default |
| xlim | ranges to plot, default is whole chromosome |
| lower | lower cutoff of coverage signal |
| fill_color | specify the color for the plot. Order matters |

Value

ggplot2 object

Author(s)

G Yu

csAnno-class

Class "csAnno" This class represents the output of ChIPseeker Annotation

Description

Class "csAnno" This class represents the output of ChIPseeker Annotation

Slots

anno annotation
tssRegion TSS region
level transcript or gene
hasGenomicAnnotation logical
detailGenomicAnnotation Genomic Annotation in detail
annoStat annotation statistics
peakNum number of peaks

Author(s)

Guangchuang Yu <https://guangchuangyu.github.io>

See Also

[annotatePeak](#)

downloadGEObedFiles *downloadGEObedFiles*

Description

download all BED files of a particular genome version

Usage

```
downloadGEObedFiles(genome, destDir = getwd())
```

Arguments

| | |
|---------|--------------------|
| genome | genome version |
| destDir | destination folder |

Author(s)

G Yu

downloadGSMbedFiles *downloadGSMbedFiles*

Description

download BED supplementary files of a list of GSM accession numbers

Usage

```
downloadGSMbedFiles(GSM, destDir = getwd())
```

Arguments

| | |
|---------|-----------------------|
| GSM | GSM accession numbers |
| destDir | destination folder |

Author(s)

G Yu

dropAnno *dropAnno*

Description

dropAnno

Usage

```
dropAnno(csAnno, distanceToTSS_cutoff = 10000)
```

Arguments

csAnno output of annotatePeak
distanceToTSS_cutoff distance to TSS cutoff

Details

drop annotation exceeding distanceToTSS_cutoff

Value

csAnno object

Author(s)

Guangchuang Yu

enrichAnnoOverlap *enrichAnnoOverlap*

Description

calculate overlap significant of CHIP experiments based on their nearest gene annotation

Usage

```
enrichAnnoOverlap(  
  queryPeak,  
  targetPeak,  
  TxDb = NULL,  
  pAdjustMethod = "BH",  
  chainFile = NULL,  
  distanceToTSS_cutoff = NULL  
)
```

Arguments

| | |
|----------------------|---|
| queryPeak | query bed file |
| targetPeak | target bed file(s) or folder containing bed files |
| TxDb | TxDb |
| pAdjustMethod | pvalue adjustment method |
| chainFile | chain file for liftOver |
| distanceToTSS_cutoff | restrict nearest gene annotation by distance cutoff |

Value

data.frame

Author(s)

G Yu

enrichPeakOverlap *enrichPeakOverlap*

Description

calculate overlap significant of ChIP experiments based on the genome coordinations

Usage

```
enrichPeakOverlap(
  queryPeak,
  targetPeak,
  TxDb = NULL,
  pAdjustMethod = "BH",
  nShuffle = 1000,
  chainFile = NULL,
  pool = TRUE,
  mc.cores = detectCores() - 1,
  verbose = TRUE
)
```

Arguments

| | |
|---------------|---|
| queryPeak | query bed file or GRanges object |
| targetPeak | target bed file(s) or folder that containing bed files or a list of GRanges objects |
| TxDb | TxDb |
| pAdjustMethod | pvalue adjustment method |

| | |
|-----------|---|
| nShuffle | shuffle numbers |
| chainFile | chain file for liftOver |
| pool | logical, whether pool target peaks |
| mc.cores | number of cores, see mclapply |
| verbose | logical |

Value

data.frame

Author(s)

G Yu

| | |
|-------------|--------------------|
| getAnnoStat | <i>getAnnoStat</i> |
|-------------|--------------------|

Description

getting status of annotation

Usage

```
getAnnoStat(x)
```

Arguments

x csAnno object

| | |
|--------------|---------------------|
| getBioRegion | <i>getBioRegion</i> |
|--------------|---------------------|

Description

prepare a bioregion of selected feature

Usage

```
getBioRegion(
  TxDb = NULL,
  upstream = 1000,
  downstream = 1000,
  by = "gene",
  type = "start_site"
)
```

Arguments

| | |
|------------|--|
| TxDB | TxDB |
| upstream | upstream from start site or end site |
| downstream | downstream from start site or end site |
| by | one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', 'UTR' |
| type | one of "start_site", "end_site", "body" |

Details

this function combined previous functions getPromoters(), getBioRegion() and getGeneBody() in order to solve the following issues.

(1) <https://github.com/GuangchuangYu/ChIPseeker/issues/16>

(2) <https://github.com/GuangchuangYu/ChIPseeker/issues/87>

The getBioRegion() function can provide a region of interest from txdb object. There are three kinds of regions, start_site, end_site and body.

We take transcript region to explain the differences of these three regions. tx: chr1 1000 1400.

body region refers to the 1000-1400bp.

start_site region with upstream = 100, downstream = 100 refers to 900-1100bp.

end_site region with upstream = 100, downstream = 100 refers to 1300-1500bp.

Value

GRanges object

Author(s)

Guangchuang Yu, Ming L

getGeneAnno

getGeneAnno

Description

get gene annotation, symbol, gene name etc.

Usage

```
getGeneAnno(annoDb, geneID, type, columns)
```

Arguments

| | |
|---------|---|
| annoDb | annotation package |
| geneID | query geneID |
| type | gene ID type |
| columns | names of columns to be obtained from database |

Value

data.frame

Author(s)

G Yu

getGenomicAnnotation *getGenomicAnnotation*

Description

get Genomic Annotation of peaks

Usage

```
getGenomicAnnotation(  
  peaks,  
  distance,  
  tssRegion = c(-3000, 3000),  
  TxDb,  
  level,  
  genomicAnnotationPriority,  
  sameStrand = FALSE  
)
```

Arguments

| | |
|---------------------------|--------------------------------------|
| peaks | peaks in GRanges object |
| distance | distance of peak to TSS |
| tssRegion | tssRegion, default is -3kb to +3kb |
| TxDb | TxDb object |
| level | one of gene or transcript |
| genomicAnnotationPriority | genomic Annotation Priority |
| sameStrand | whether annotate gene in same strand |

Value

character vector

Author(s)

G Yu

`getGEOgenomeVersion` *getGEOgenomeVersion*

Description

get genome version statistics collecting from GEO ChIPseq data

Usage

```
getGEOgenomeVersion()
```

Value

data.frame

Author(s)

G Yu

`getGEOInfo` *getGEOInfo*

Description

get subset of GEO information by genome version keyword

Usage

```
getGEOInfo(genome, simplify = TRUE)
```

Arguments

| | |
|-----------------------|------------------------|
| <code>genome</code> | genome version |
| <code>simplify</code> | simplify result or not |

Value

data.frame

Author(s)

G Yu

| | |
|----------------------------|----------------------|
| <code>getGEOspecies</code> | <i>getGEOspecies</i> |
|----------------------------|----------------------|

Description

accessing species statistics collecting from GEO database

Usage

```
getGEOspecies()
```

Value

data.frame

Author(s)

G Yu

| | |
|---|---|
| <code>getNearestFeatureIndicesAndDistances</code> | <i>getNearestFeatureIndicesAndDistances</i> |
|---|---|

Description

get index of features that closest to peak and calculate distance

Usage

```
getNearestFeatureIndicesAndDistances(  
  peaks,  
  features,  
  sameStrand = FALSE,  
  ignoreOverlap = FALSE,  
  ignoreUpstream = FALSE,  
  ignoreDownstream = FALSE,  
  overlap = "TSS"  
)
```

Arguments

| | |
|------------------|--|
| peaks | peak in GRanges |
| features | features in GRanges |
| sameStrand | logical, whether find nearest gene in the same strand |
| ignoreOverlap | logical, whether ignore overlap of TSS with peak |
| ignoreUpstream | logical, if True only annotate gene at the 3' of the peak. |
| ignoreDownstream | logical, if True only annotate gene at the 5' of the peak. |
| overlap | one of "TSS" or "all" |

Value

list

Author(s)

G Yu

| | |
|--------------|---------------------|
| getPromoters | <i>getPromoters</i> |
|--------------|---------------------|

Description

prepare the promoter regions

Usage

```
getPromoters(TxDb = NULL, upstream = 1000, downstream = 1000, by = "gene")
```

Arguments

| | |
|------------|---------------------------|
| TxDb | TxDb |
| upstream | upstream from TSS site |
| downstream | downstream from TSS site |
| by | one of gene or transcript |

Value

GRanges object

`getSampleFiles` *getSampleFiles*

Description

get filenames of sample files

Usage

```
getSampleFiles()
```

Value

list of file names

Author(s)

G Yu

`getTagMatrix` *getTagMatrix*

Description

calculate the tag matrix

Usage

```
getTagMatrix(  
  peak,  
  upstream,  
  downstream,  
  windows,  
  type,  
  by,  
  TxDb = NULL,  
  weightCol = NULL,  
  nbin = NULL,  
  verbose = TRUE,  
  ignore_strand = FALSE  
)
```

Arguments

| | |
|---------------|--|
| peak | peak peak file or GRanges object |
| upstream | the distance of upstream extension |
| downstream | the distance of downstream extension |
| windows | a collection of region |
| type | one of "start_site", "end_site", "body" |
| by | one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', or specified by users |
| TxDb | TxDb or self-made granges object, served as txdb |
| weightCol | column name of weight, default is NULL |
| nbin | the amount of nbins |
| verbose | print message or not |
| ignore_strand | ignore the strand information or not |

Details

getTagMatrix() function can produce the matrix for visualization. peak stands for the peak file. window stands for a collection of regions that users want to look into. Users can use window to capture the peak of interest. There are two ways to input window.

The first way is that users can use getPromoters()/getBioRegion()/makeBioRegionFromGranges() to get window and put it into getTagMatrix().

The second way is that users can use getTagMatrix() to call getPromoters()/getBioRegion()/makeBioRegionFromGranges(). In this way users do not need to input window parameter but they need to input txdb.

txdb is a set of packages contained annotation of regions of different genomes. Users can get the regions of interest through specific functions. These specific functions are built in getPromoters()/getBioRegion(). Many regions can not be gain through txdb, like insulator and enhancer regions. Users can provide these regions in the form of granges object. These self-made granges object will be passed to TxDb parameter and they will be passed to makeBioRegionFromGranges() to produce the window. In a word, TxDb parameter is a reference information. Users can pass txdb object or self-made granges into it.

Details see [getPromoters](#), [getBioRegion](#) and [makeBioRegionFromGranges](#)

upstream and downstream parameter have different usages:

(1) window parameter is provided,

if type == 'body', upstream and downstream can use to extend the flank of body region.

if type == 'start_site'/'end_site', upstream and downstream do not play a role in getTagMatrix() function.

(2) window parameter is missing,

if type == 'body', upstream and downstream can use to extend the flank of body region.

if type == 'start_site'/'end_site', upstream and downstream refer to the upstream and downstream of the start_site or the end_site.

weightCol refers to column in peak file. This column acts as a weight vaule. Details see <https://github.com/YuLab-SMU/ChIPseeker/issues/15>

nbin refers to the number of bins. getTagMatrix() provide a binning method to get the tag matrix.

Value

tagMatrix

```
getTagMatrix.binning.internal
    getTagMatrix.binning.internal
```

Description

calculate the tagMatrix by binning the idea was derived from the function of deeptools <https://deeptools.readthedocs.io/en/dev>

Usage

```
getTagMatrix.binning.internal(
    peak,
    weightCol = NULL,
    windows,
    nbin = 800,
    upstream = NULL,
    downstream = NULL,
    ignore_strand = FALSE
)
```

Arguments

| | |
|---------------|--|
| peak | peak peak file or GRanges object |
| weightCol | weightCol column name of weight, default is NULL |
| windows | windows a collection of region with equal or not equal size, eg. promoter region, gene region. |
| nbin | the amount of nbines needed to be splited and it should not be more than min_body_length |
| upstream | rel object, NULL or actual number |
| downstream | rel object, NULL or actual number |
| ignore_strand | ignore the strand information or not |

Value

tagMatrix

`getTagMatrix.internal` *getTagMatrix.internal*

Description

calculate the tag matrix

Usage

```
getTagMatrix.internal(peak, weightCol = NULL, windows, ignore_strand = FALSE)
```

Arguments

| | |
|---------------|--|
| peak | peak file or GRanges object |
| weightCol | column name of weight, default is NULL |
| windows | a collection of region with equal size, eg. promoter region. |
| ignore_strand | ignore the strand information or not |

Value

tagMatrix

Author(s)

G Yu

`getTagMatrix2` *getTagMatrix2*

Description

Nested function for `getTagMatrix()` to deal with multiple windows

Usage

```
getTagMatrix2(  
  peak,  
  upstream,  
  downstream,  
  windows_name,  
  type,  
  by,  
  TxDb = NULL,  
  weightCol = NULL,  
  nbin = NULL,
```

```

    verbose = TRUE,
    ignore_strand = FALSE
  )

```

Arguments

| | |
|---------------|--|
| peak | peak peak file or GRanges object |
| upstream | the distance of upstream extension |
| downstream | the distance of downstream extension |
| windows_name | the names of windows |
| type | one of "start_site", "end_site", "body" |
| by | one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', or specified by users |
| TxDb | TxDb or self-made granges object, served as txdb |
| weightCol | column name of weight, default is NULL |
| nbin | the amount of nbines |
| verbose | print message or not |
| ignore_strand | ignore the strand information or not |

Details

This is an internal function.

Value

tagMatrix

```

getTagMatrix2.binning.internal
      internal function

```

Description

internal function

Usage

```

getTagMatrix2.binning.internal(
  peak,
  weightCol = NULL,
  windows,
  windows_name,
  nbin = 800,
  upstream = NULL,
  downstream = NULL,
  ignore_strand = FALSE
)

```


Arguments

| | |
|---------------|--|
| peak | peak peak file or GRanges object |
| weightCol | column name of weight, default is NULL |
| windows | a collection of region |
| windows_name | the name of windows |
| nbin | the amount of nbins |
| upstream | the distance of upstream extension |
| downstream | the distance of downstream extension |
| ignore_strand | ignore the strand information or not |

getTagMatrix2.internal

getTagMatrix2.internal

Description

getTagMatrix2.internal

Usage

```
getTagMatrix2.internal(
  peak,
  weightCol = NULL,
  windows,
  windows_name,
  ignore_strand = FALSE
)
```

Arguments

| | |
|---------------|--|
| peak | peak peak file or GRanges object |
| weightCol | column name of weight, default is NULL |
| windows | a collection of region |
| windows_name | the name of windows |
| ignore_strand | ignore the strand information or not |

info

Information Datasets

Description

ucsc genome version, precalcuated data and gsm information

`makeBioRegionFromGranges`*makeBioRegionFromGranges*

Description

make windows from granges object

Usage

```
makeBioRegionFromGranges(gr, by, type, upstream = 1000, downstream = 1000)
```

Arguments

| | |
|-------------------------|---|
| <code>gr</code> | a grange object contain region of interest |
| <code>by</code> | specify be users, e.g. gene, insulator, enhancer |
| <code>type</code> | one of "start_site", "end_site", "body" |
| <code>upstream</code> | upstream from start site or end site, can be NULL if the type == 'body' |
| <code>downstream</code> | downstream from start site or end site, can be NULL if the type == 'body' |

Details

`makeBioRegionFromGranges()` function can make bioregion from granges object.

The differences between `makeBioRegionFromGranges()` and `getBioRegion()` is that `getBioRegion()` get the region object from `txdb` object but `makeBioRegionFromGranges()` get the region from the granges object provided by users. For example, `txdb` object do not contain insulator or enhancer regions. Users can provide these regions through self-made granges object

There are three kinds of regions, `start_site`, `end_site` and `body`.

We take enhancer region to explain the differences of these three regions. enhancer: chr1 1000 1400.

body region refers to the 1000-1400bp.

`start_site` region with `upstream = 100`, `downstream = 100` refers to 900-1100bp.

`end_site` region with `upstream = 100`, `downstream = 100` refers to 1300-1500bp.

In `makeBioRegionFromGranges()`, `upstream` and `downstream` can be NULL if the type == 'body'. `by` should be specified by users and can not be omitted. `by` parameter will be used to made labels. `type` should also be specified.

<https://github.com/YuLab-SMU/ChIPseeker/issues/189>

Value

GRanges object

| | |
|---------|----------------|
| overlap | <i>overlap</i> |
|---------|----------------|

Description

calculate the overlap matrix, which is useful for vennplot

Usage

```
overlap(Sets)
```

Arguments

Sets a list of objects

Value

data.frame

Author(s)

G Yu

| | |
|-------------|--------------------|
| peakHeatmap | <i>peakHeatmap</i> |
|-------------|--------------------|

Description

plot the heatmap of peaks

Usage

```
peakHeatmap(  
  peak,  
  weightCol = NULL,  
  TxDb = NULL,  
  upstream = 1000,  
  downstream = 1000,  
  xlab = "",  
  ylab = "",  
  title = NULL,  
  palette = NULL,  
  verbose = TRUE,  
  by = "gene",  
  type = "start_site",  
  nbin = NULL,  
)
```

```
ignore_strand = FALSE,  
windows,  
ncol = NULL,  
nrow = NULL  
)
```

Arguments

| | |
|---------------|---|
| peak | peak file or GRanges object |
| weightCol | column name of weight |
| TxDb | TxDb object |
| upstream | upstream position |
| downstream | downstream position |
| xlab | xlab |
| ylab | ylab |
| title | title |
| palette | palette to be filled in,details see scale_colour_brewer |
| verbose | print message or not |
| by | one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', 'UTR' |
| type | one of "start_site", "end_site", "body" |
| nbin | the amount of nbines |
| ignore_strand | ignore the strand information or not |
| windows | a collection of region |
| ncol | the ncol of plotting a list of peak |
| nrow | the nrow of plotting a list of peak |

Value

figure

Author(s)

G Yu

```
peakHeatmap_multiple_Sets
      peakHeatmap
```

Description

plot the heatmap of peaks align to a sets of regions

Usage

```
peakHeatmap_multiple_Sets(  
  peak,  
  weightCol = NULL,  
  TxDb = NULL,  
  upstream = 1000,  
  downstream = 1000,  
  xlab = "",  
  ylab = "",  
  title = NULL,  
  palette = NULL,  
  verbose = TRUE,  
  by = "gene",  
  type = "start_site",  
  nbin = NULL,  
  ignore_strand = FALSE,  
  windows_name = NULL,  
  ncol = NULL,  
  nrow = NULL,  
  facet_label_text_size = 12  
)
```

Arguments

| | |
|------------|---|
| peak | peak file or GRanges object |
| weightCol | column name of weight |
| TxDb | TxDb object |
| upstream | upstream position |
| downstream | downstream position |
| xlab | xlab |
| ylab | ylab |
| title | title |
| palette | palette to be filled in,details see scale_colour_brewer |
| verbose | print message or not |
| by | one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', 'UTR' |

| | |
|-----------------------|--|
| type | one of "start_site", "end_site", "body" |
| nbin | the amount of nbines |
| ignore_strand | ignore the strand information or not |
| windows_name | the name for each window, which will also be showed in the picture as labels |
| ncol | the ncol of plotting a list of peak |
| nrow | the nrow of plotting a list of peak |
| facet_label_text_size | the size of facet label text |

Value

figure

peak_Profile_Heatmap *peak_Profile_Heatmap*

Description

plot peak heatmap and profile in a picture

Usage

```
peak_Profile_Heatmap(
  peak,
  weightCol = NULL,
  TxDb = NULL,
  upstream = 1000,
  downstream = 1000,
  xlab = "",
  ylab = "",
  title = NULL,
  palette = NULL,
  verbose = TRUE,
  by = "gene",
  type = "start_site",
  nbin = NULL,
  ignore_strand = FALSE,
  windows_name = NULL,
  ncol = NULL,
  nrow = NULL,
  facet_label_text_size = 12,
  conf,
  facet = "row",
  free_y = TRUE,
  height_proportion = 4
)
```

Arguments

| | |
|-----------------------|--|
| peak | peak file or GRanges object |
| weightCol | column name of weight |
| TxDb | TxDb object |
| upstream | upstream position |
| downstream | downstream position |
| xlab | xlab |
| ylab | ylab |
| title | title |
| palette | palette to be filled in,details see scale_colour_brewer |
| verbose | print message or not |
| by | one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', 'UTR' |
| type | one of "start_site", "end_site", "body" |
| nbin | the amount of nbines |
| ignore_strand | ignore the strand information or not |
| windows_name | the name for each window, which will also be showed in the picture as labels |
| ncol | the ncol of plotting a list of peak |
| nrow | the nrow of plotting a list of peak |
| facet_label_text_size | the size of facet label text |
| conf | confidence interval |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled by AvgProf |
| height_proportion | the proportion of profiling picture and heatmap |

plotAnnoBar

plotAnnoBar method generics

Description

plotAnnoBar method for csAnno instance

Usage

```
plotAnnoBar(  
  x,  
  xlab = "",  
  ylab = "Percentage%",  
  title = "Feature Distribution",  
  ...  
)  
  
## S4 method for signature 'list'  
plotAnnoBar(  
  x,  
  xlab = "",  
  ylab = "Percentage%",  
  title = "Feature Distribution",  
  ...  
)  
  
plotAnnoBar(x, xlab="", ylab='Percentage%',title="Feature Distribution", ...)
```

Arguments

| | |
|--------------------|---------------------|
| <code>x</code> | csAnno instance |
| <code>xlab</code> | xlab |
| <code>ylab</code> | ylab |
| <code>title</code> | title |
| <code>...</code> | additional paramter |

Value

plot

Author(s)

Guangchuang Yu <https://guangchuangyu.github.io>

`plotAnnoBar.data.frame`

plotAnnoBar.data.frame

Description

plot feature distribution based on their chromosome region

Usage

```
plotAnnoBar.data.frame(  
  anno.df,  
  xlab = "",  
  ylab = "Percentage%",  
  title = "Feature Distribution",  
  categoryColumn  
)
```

Arguments

| | |
|----------------|------------------|
| anno.df | annotation stats |
| xlab | xlab |
| ylab | ylab |
| title | plot title |
| categoryColumn | category column |

Details

plot chromosome region features

Value

bar plot that summarize genomic features of peaks

Author(s)

Guangchuang Yu <https://yulab-smu.top>

See Also

[annotatePeak](#) [plotAnnoPie](#)

plotAnnoPie

plotAnnoPie method generics

Description

plotAnnoPie method for csAnno instance

Usage

```
plotAnnoPie(  
  x,  
  ndigit = 2,  
  cex = 0.9,  
  col = NA,  
  legend.position = "rightside",  
  pie3D = FALSE,  
  radius = 0.8,  
  ...  
)
```

```
plotAnnoPie(x,ndigit=2,cex=0.9,col=NA,legend.position="rightside",pie3D=FALSE,radius=0.8,...)
```

Arguments

| | |
|-----------------|--------------------------|
| x | csAnno instance |
| ndigit | number of digit to round |
| cex | label cex |
| col | color |
| legend.position | topright or other. |
| pie3D | plot in 3D or not |
| radius | radius of the pie |
| ... | extra parameter |

Value

plot

Author(s)

Guangchuang Yu <https://guangchuangyu.github.io>

plotAnnoPie.csAnno *plotAnnoPie*

Description

pieplot from peak genomic annotation

Usage

```
plotAnnoPie.csAnno(  
  x,  
  ndigit = 2,  
  cex = 0.8,  
  col = NA,  
  legend.position = "rightside",  
  pie3D = FALSE,  
  radius = 0.8,  
  ...  
)
```

Arguments

| | |
|-----------------|--------------------------|
| x | csAnno object |
| ndigit | number of digit to round |
| cex | label cex |
| col | color |
| legend.position | topright or other. |
| pie3D | plot in 3D or not |
| radius | radius of Pie |
| ... | extra parameter |

Value

pie plot of peak genomic feature annotation

Author(s)

Guangchuang Yu <https://yulab-smu.top>

See Also

[annotatePeak](#) [plotAnnoBar](#)

Examples

```
## Not run:  
require(TxDb.Hsapiens.UCSC.hg19.knownGene)  
txdb <- TxDb.Hsapiens.UCSC.hg19.knownGene  
peakfile <- system.file("extdata", "sample_peaks.txt", package="chipseeker")  
peakAnno <- annotatePeak(peakfile, TxDb=txdb)  
plotAnnoPie(peakAnno)  
  
## End(Not run)
```

`plotAvgProf`*plotAvgProf*

Description

plot the profile of peaks

Usage

```
plotAvgProf(  
  tagMatrix,  
  xlim,  
  xlab = "Genomic Region (5'→3')",  
  ylab = "Peak Count Frequency",  
  conf,  
  facet = "none",  
  free_y = TRUE,  
  origin_label = "TSS",  
  verbose = TRUE,  
  ...  
)
```

Arguments

| | |
|---------------------------|--------------------------------------|
| <code>tagMatrix</code> | tagMatrix or a list of tagMatrix |
| <code>xlim</code> | xlim |
| <code>xlab</code> | x label |
| <code>ylab</code> | y label |
| <code>conf</code> | confidence interval |
| <code>facet</code> | one of 'none', 'row' and 'column' |
| <code>free_y</code> | if TRUE, y will be scaled by AvgProf |
| <code>origin_label</code> | label of the center |
| <code>verbose</code> | print message or not |
| <code>...</code> | additional parameter |

Value

ggplot object

Author(s)

G Yu; Y Yan

plotAvgProf.binning *plotAvgProf.binning*

Description

plot the profile of peaks by binning

Usage

```
plotAvgProf.binning(  
  tagMatrix,  
  xlab = "Genomic Region (5'->3')",  
  ylab = "Peak Count Frequency",  
  conf,  
  facet = "none",  
  free_y = TRUE,  
  upstream = NULL,  
  downstream = NULL,  
  label,  
  ...  
)
```

Arguments

| | |
|------------|---|
| tagMatrix | tagMatrix or a list of tagMatrix |
| xlab | x label |
| ylab | y label |
| conf | confidence interval |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled |
| upstream | rel object reflects the percentage of flank extension, e.g rel(0.2) integer reflects the actual length of flank extension or TSS region NULL reflects the gene body with no extension |
| downstream | rel object reflects the percentage of flank extension, e.g rel(0.2) integer reflects the actual length of flank extension or TSS region NULL reflects the gene body with no extension |
| label | label |
| ... | additional parameter |

Value

ggplot object

plotAvgProf2

plotAvgProf

Description

plot the profile of peaks that align to flank sequences of TSS

Usage

```
plotAvgProf2(
  peak,
  weightCol = NULL,
  TxDb = NULL,
  upstream = 1000,
  downstream = 1000,
  xlab = "Genomic Region (5'->3')",
  ylab = "Peak Count Frequency",
  conf,
  facet = "none",
  free_y = TRUE,
  verbose = TRUE,
  ignore_strand = FALSE,
  ...
)
```

Arguments

| | |
|---------------|--------------------------------------|
| peak | peak file or GRanges object |
| weightCol | column name of weight |
| TxDb | TxDb object |
| upstream | upstream position |
| downstream | downstream position |
| xlab | xlab |
| ylab | ylab |
| conf | confidence interval |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled by AvgProf |
| verbose | print message or not |
| ignore_strand | ignore the strand information or not |
| ... | additional parameter |

Details

This function is the old function of plotPeakProf2. It can only plot the start site region of gene.

Value

ggplot object

Author(s)

G Yu, Ming L

plotDistToTSS

*plotDistToTSS method generics***Description**

plotDistToTSS method for csAnno instance

Usage

```

plotDistToTSS(
  x,
  distanceColumn = "distanceToTSS",
  xlab = "",
  ylab = "Binding sites (%) (5'→3')",
  title = "Distribution of transcription factor-binding loci relative to TSS",
  ...
)

## S4 method for signature 'list'
plotDistToTSS(
  x,
  distanceColumn = "distanceToTSS",
  xlab = "",
  ylab = "Binding sites (%) (5'→3')",
  title = "Distribution of transcription factor-binding loci relative to TSS",
  ...
)

plotDistToTSS(x,distanceColumn="distanceToTSS", xlab="",
ylab="Binding sites (%) (5'→3')",
title="Distribution of transcription factor-binding loci relative to TSS",...)

```

Arguments

| | |
|----------------|----------------------|
| x | csAnno instance |
| distanceColumn | distance column name |
| xlab | xlab |
| ylab | ylab |
| title | title |
| ... | additional parameter |

Value

plot

Author(s)Guangchuang Yu <https://guangchuangyu.github.io>

`plotDistToTSS.data.frame`*plotDistToTSS.data.frame*

Description

plot feature distribution based on the distances to the TSS

Usage

```
plotDistToTSS.data.frame(  
  peakDist,  
  distanceColumn = "distanceToTSS",  
  xlab = "",  
  ylab = "Binding sites (%) (5'->3')",  
  title = "Distribution of transcription factor-binding loci relative to TSS",  
  categoryColumn  
)
```

Arguments

| | |
|-----------------------------|---|
| <code>peakDist</code> | peak annotation |
| <code>distanceColumn</code> | column name of the distance from peak to nearest gene |
| <code>xlab</code> | x label |
| <code>ylab</code> | y lable |
| <code>title</code> | figure title |
| <code>categoryColumn</code> | category column |

Value

bar plot that summarize distance from peak to TSS of the nearest gene.

Author(s)Guangchuang Yu <https://guangchuangyu.github.io>**See Also**[annotatePeak](#)

Examples

```
## Not run:
require(TxDb.Hsapiens.UCSC.hg19.knownGene)
txdb <- TxDb.Hsapiens.UCSC.hg19.knownGene
peakfile <- system.file("extdata", "sample_peaks.txt", package="ChIPseeker")
peakAnno <- annotatePeak(peakfile, TxDb=txdb)
plotDistToTSS(peakAnno)

## End(Not run)
```

`plotMultiProf`*internal function for plotPeakProf_MultiWindows*

Description

internal function for plotPeakProf_MultiWindows

Usage

```
plotMultiProf(
  tagMatrix,
  conf,
  xlab = "Genomic Region (5'->3')",
  ylab = "Peak Count Frequency",
  facet = "none",
  free_y = TRUE,
  ...
)
```

Arguments

| | |
|------------------------|--------------------------------------|
| <code>tagMatrix</code> | <code>tagMatrix</code> |
| <code>conf</code> | confidence interval |
| <code>xlab</code> | <code>xlab</code> |
| <code>ylab</code> | <code>ylab</code> |
| <code>facet</code> | one of 'none', 'row' and 'column' |
| <code>free_y</code> | if TRUE, y will be scaled by AvgProf |
| <code>...</code> | additional parameter |

plotMultiProf.binning *internal function*

Description

internal function

Usage

```
plotMultiProf.binning(  
  tagMatrix,  
  xlab = "Genomic Region (5'->3')",  
  ylab = "Peak Count Frequency",  
  conf,  
  facet = "none",  
  free_y = TRUE,  
  upstream = NULL,  
  downstream = NULL,  
  label,  
  ...  
)
```

Arguments

| | |
|------------|--------------------------------------|
| tagMatrix | tagMatrix |
| xlab | xlab |
| ylab | ylab |
| conf | confidence interval |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled by AvgProf |
| upstream | the upstream extension |
| downstream | the downstream extension |
| label | the label of the center |
| ... | additional parameter |

plotMultiProf.binning.internal
internal function

Description

internal function

Usage

```
plotMultiProf.binning.internal(  
  tagMatrix,  
  conf,  
  xlab = "Genomic Region (5'->3')",  
  ylab = "Peak Count Frequency",  
  facet = "none",  
  free_y = TRUE,  
  upstream = NULL,  
  downstream = NULL,  
  label,  
  ...  
)
```

Arguments

| | |
|------------|--------------------------------------|
| tagMatrix | tagMatrix |
| conf | confidence interval |
| xlab | xlab |
| ylab | ylab |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled by AvgProf |
| upstream | the upstream extension |
| downstream | the downstream extension |
| label | the label of the center |
| ... | additional parameter |

plotMultiProf.normal *internal function*

Description

internal function

Usage

```
plotMultiProf.normal(  
  tagMatrix,  
  xlim,  
  xlab = "Genomic Region (5'->3')",  
  ylab = "Peak Count Frequency",  
  conf,  
  facet = "none",  
  free_y = TRUE,  
  origin_label = "TSS",  
  verbose = TRUE,  
  ...  
)
```

Arguments

| | |
|--------------|--------------------------------------|
| tagMatrix | tagMatrix |
| xlim | xlim |
| xlab | xlab |
| ylab | ylab |
| conf | confidence interval |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled by AvgProf |
| origin_label | the label of the center |
| verbose | print message or not |
| ... | additional parameter |

```
plotMultiProf.normal.internal
      internal function
```

Description

internal function

Usage

```
plotMultiProf.normal.internal(
  tagMatrix,
  conf,
  xlim = c(-3000, 3000),
  xlab = "Genomic Region (5'->3')",
  ylab = "Peak Count Frequency",
  facet = "row",
  free_y = TRUE,
  origin_label,
  ...
)
```

Arguments

| | |
|--------------|--------------------------------------|
| tagMatrix | tagMatrix |
| conf | confidence interval |
| xlim | xlim |
| xlab | xlab |
| ylab | ylab |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled by AvgProf |
| origin_label | the label of the center |
| ... | additional parameter |

```
plotPeakProf      plotPeakProf_MultiWindows
```

Description

plot the profile of peaks 'plotPeakProf_MultiWindows()' is almost the same as plotPeakProf2(), having the main difference of accepting two or more granges objects. Accepting more granges objects can help compare the same peaks in different windows.

Usage

```

plotPeakProf(
  tagMatrix = NULL,
  peak,
  upstream,
  downstream,
  conf,
  by,
  type,
  windows_name = NULL,
  weightCol = NULL,
  TxDb = NULL,
  xlab = "Genomic Region (5'->3')",
  ylab = "Peak Count Frequency",
  facet = "row",
  free_y = TRUE,
  verbose = TRUE,
  nbin = NULL,
  ignore_strand = FALSE,
  ...
)

```

Arguments

| | |
|---------------|--|
| tagMatrix | tagMatrix or a list of tagMatrix |
| peak | peak file or GRanges object |
| upstream | upstream position |
| downstream | downstream position |
| conf | confidence interval |
| by | feature of interest |
| type | one of "start_site", "end_site", "body" |
| windows_name | the name for each window, which will also be showed in the picture as labels |
| weightCol | column name of weight |
| TxDb | TxDb object or self-made granges objects |
| xlab | xlab |
| ylab | ylab |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled by AvgProf |
| verbose | print message or not |
| nbin | the amount of bins |
| ignore_strand | ignore the strand information or not |
| ... | additional parameter |

Details

TxDB parameter can accept txdb object. But many regions can not be obtained by txdb object. In this case, Users can provide self-made granges served the same role as txdb object and pass to TxDb object.

by the features of interest.

(1) if users use txdb, by can be one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', 'UTR'. These features can be obtained by functions from txdb object.

(2) if users use self-made granges object, by can be everything. Because this by will not pass to functions to get features, which is different from the case of using txdb object. This by is only used to made labels showed in picture.

type means the property of the region. one of the "start site", "end site" and "body".

upstream and downstream parameter have different usages:

(1) if type == 'body', upstream and downstream can use to extend the flank of body region.

(2) if type == 'start_site'/'end_site', upstream and downstream refer to the upstream and downstream of the start_site or the end_site.

weightCol refers to column in peak file. This column acts as a weight value. Details see <https://github.com/YuLab-SMU/ChIPseeker/issues/15>

nbin refers to the number of bins. getTagMatrix() provide a binning method to get the tag matrix.

There are two ways input a list of window.

(1) Users can input a list of self-made granges objects

(2) Users can input a list of by and only one type. In this way, plotPeakProf_MultiWindows() can made a list of window from txdb object based on by and type.

Warning:

(1) All of these window should be the same type. It means users can only compare a list of "start site"/"end site"/"body region" with the same upstream and downstream.

(2) So it will be only one type and several by.

(3) Users can make window by txdb object or self-made granges object. Users can only choose one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR' or 'UTR' in the way of using txdb object. User can input any by in the way of using self-made granges object.

(4) Users can mingle the by designed for the two ways. plotPeakProf_MultiWindows can accept the hybrid by. But the above rules should be followed.

<https://github.com/YuLab-SMU/ChIPseeker/issues/189>

Value

ggplot object

plotPeakProf2

plotPeakProf2

Description

plot the profile of peaks automatically

Usage

```
plotPeakProf2(
  peak,
  upstream,
  downstream,
  conf,
  by,
  type,
  weightCol = NULL,
  TxDb = NULL,
  xlab = "Genomic Region (5'->3')",
  ylab = "Peak Count Frequency",
  facet = "none",
  free_y = TRUE,
  verbose = TRUE,
  nbin = NULL,
  ignore_strand = FALSE,
  ...
)
```

Arguments

| | |
|------------|--|
| peak | peak file or GRanges object |
| upstream | upstream position |
| downstream | downstream position |
| conf | confidence interval |
| by | e.g. 'gene', 'transcript', 'exon' or features of interest(e.g. "enhancer") |
| type | one of "start_site", "end_site", "body" |
| weightCol | column name of weight |
| TxDb | TxDb object, or self-made granges object |
| xlab | xlab |
| ylab | ylab |
| facet | one of 'none', 'row' and 'column' |
| free_y | if TRUE, y will be scaled by AvgProf |
| verbose | print message or not |

| | |
|---------------|--------------------------------------|
| nbin | the amount of nbines |
| ignore_strand | ignore the strand information or not |
| ... | additional parameter |

Details

peak stands for the peak file.

by the features of interest.

(1) if users use txdb, by can be one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', 'UTR'. These features can be obtained by functions from txdb object.

(2) if users use self-made granges object, by can be everything. Because this by will not pass to functions to get features, which is different from the case of using txdb object. This by is only used to made labels showed in picture.

type means the property of the region. one of the "start site", "end site" and "body".

upstream and downstream parameter have different usages:

(1) if type == 'body', upstream and downstream can use to extend the flank of body region.

(2) if type == 'start_site'/'end_site', upstream and downstream refer to the upstream and downstream of the start_site or the end_site.

weightCol refers to column in peak file. This column acts as a weight vaule. Details see <https://github.com/YuLab-SMU/ChIPseeker/issues/15>

nbin refers to the number of bins, providing a binning method to get the tag matrix.

TxDB parameter can accept txdb object. But many regions can not be obtained by txdb object. In this case, Users can provide self-made granges served the same role as txdb object and pass to TxDb object.

plotPeakProf2() is different from the plotPeakProf(). plotPeakProf2() do not need to provide window parameter, which means plotPeakProf2() will call relevent functions to make window automatically.

Value

ggplot object

Author(s)

G Yu, Ming Li

```
plotPeakProf_MultiWindows
      plotPeakProf_MultiWindows
```

Description

plot the profile of peaks in two or more windows

Usage

```
plotPeakProf_MultiWindows(
  peak,
  upstream,
  downstream,
  conf,
  by,
  type,
  windows_name = NULL,
  weightCol = NULL,
  TxDb = NULL,
  xlab = "Genomic Region (5'->3')",
  ylab = "Peak Count Frequency",
  facet = "row",
  free_y = TRUE,
  verbose = TRUE,
  nbin = NULL,
  ignore_strand = FALSE,
  ...
)
```

Arguments

| | |
|--------------|--|
| peak | peak file or GRanges object |
| upstream | upstream position |
| downstream | downstream position |
| conf | confidence interval |
| by | feature of interest |
| type | one of "start_site", "end_site", "body" |
| windows_name | the name for each window, which will also be showed in the picture as labels |
| weightCol | column name of weight |
| TxDb | TxDb object or self-made granges objects |
| xlab | xlab |
| ylab | ylab |
| facet | one of 'none', 'row' and 'column' |

| | |
|---------------|--------------------------------------|
| free_y | if TRUE, y will be scaled by AvgProf |
| verbose | print message or not |
| nbin | the amount of bins |
| ignore_strand | ignore the strand information or not |
| ... | additional parameter |

Details

This function comes from <https://github.com/YuLab-SMU/ChIPseeker/issues/189> 'plotPeakProf_MultiWindows()' is almost the same as plotPeakProf2(), having the main difference of accepting two or more granges objects. Accepting more granges objects can help compare the same peaks in different windows.

TxDb parameter can accept txdb object. But many regions can not be obtained by txdb object. In this case, Users can provide self-made granges served the same role as txdb object and pass to TxDb object.

by the features of interest.

(1) if users use txdb, by can be one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR', 'UTR'. These features can be obtained by functions from txdb object.

(2) if users use self-made granges object, by can be everything. Because this by will not pass to functions to get features, which is different from the case of using txdb object. This by is only used to made labels showed in picture.

type means the property of the region. one of the "start site", "end site" and "body".

upstream and downstream parameter have different usages:

(1) if type == 'body', upstream and downstream can use to extend the flank of body region.

(2) if type == 'start_site'/'end_site', upstream and downstream refer to the upstream and downstream of the start_site or the end_site.

weightCol refers to column in peak file. This column acts as a weight value. Details see <https://github.com/YuLab-SMU/ChIPseeker/issues/15>

nbin refers to the number of bins. getTagMatrix() provide a binning method to get the tag matrix.

There are two ways input a list of window.

(1) Users can input a list of self-made granges objects

(2) Users can input a list of by and only one type. In this way, plotPeakProf_MultiWindows() can made a list of window from txdb object based on by and type.

Warning:

(1) All of these window should be the same type. It means users can only compare a list of "start site"/"end site"/"body region" with the same upstream and downstream.

(2) So it will be only one type and several by.

(3) Users can make window by txdb object or self-made granges object. Users can only choose one of 'gene', 'transcript', 'exon', 'intron', '3UTR', '5UTR' or 'UTR' in the way of using txdb object. User can input any by in the way of using self-made granges object.

(4) Users can mingle the by designed for the two ways. plotPeakProf_MultiWindows can accept the hybrid by. But the above rules should be followed.

Value

ggplot object

| | |
|--------------|---------------------|
| readPeakFile | <i>readPeakFile</i> |
|--------------|---------------------|

Description

read peak file and store in data.frame or GRanges object

Usage

```
readPeakFile(peakfile, as = "GRanges", ...)
```

Arguments

| | |
|----------|---|
| peakfile | peak file |
| as | output format, one of GRanges or data.frame |
| ... | additional parameter |

Value

peak information, in GRanges or data.frame object

Author(s)

G Yu

Examples

```
peakfile <- system.file("extdata", "sample_peaks.txt", package="ChIPseeker")
peak.gr <- readPeakFile(peakfile, as="GRanges")
peak.gr
```

| | |
|-----------|---|
| reexports | <i>Objects exported from other packages</i> |
|-----------|---|

Description

These objects are imported from other packages. Follow the links below to see their documentation.

GenomicRanges [GRangesList](#)

ggplot2 [rel](#)

| | |
|----------|-----------------|
| seq2gene | <i>seq2gene</i> |
|----------|-----------------|

Description

annotate genomic regions to genes in many-to-many mapping

Usage

```
seq2gene(seq, tssRegion, flankDistance, TxDb, sameStrand = FALSE)
```

Arguments

| | |
|---------------|--|
| seq | genomic regions in GRanges object |
| tssRegion | TSS region |
| flankDistance | flanking search radius |
| TxDb | TranscriptDb object |
| sameStrand | logical whether find nearest/overlap gene in the same strand |

Details

This function associates genomic regions with coding genes in a many-to-many mapping. It first maps genomic regions to host genes (either located in exon or intron), proximal genes (located in promoter regions) and flanking genes (located in upstream and downstream within user specify distance).

Value

gene vector

Author(s)

Guangchuang Yu

Examples

```
## Not run:
library(TxDb.Hsapiens.UCSC.hg19.knownGene)
TxDb <- TxDb.Hsapiens.UCSC.hg19.knownGene
file <- getSampleFiles()[[1]] # a bed file
gr <- readPeakFile(file)
genes <- seq2gene(gr, tssRegion=c(-1000, 1000), flankDistance = 3000, TxDb)

## End(Not run)
```

show *show method*

Description

show method for csAnno instance

Usage

show(object)

Arguments

object A csAnno instance

Value

message

Author(s)

Guangchuang Yu <https://guangchuangyu.github.io>

shuffle *shuffle*

Description

shuffle the position of peak

Usage

shuffle(peak.gr, TxDb)

Arguments

peak.gr GRanges object
TxDb TxDb

Value

GRanges object

Author(s)

G Yu

| | |
|------------|-------------------|
| tagHeatmap | <i>tagHeatmap</i> |
|------------|-------------------|

Description

plot the heatmap of tagMatrix

Usage

```
tagHeatmap(  
  tagMatrix,  
  xlab = "",  
  ylab = "",  
  title = NULL,  
  palette = "RdBu",  
  nrow = NULL,  
  ncol = NULL  
)
```

Arguments

| | |
|-----------|---|
| tagMatrix | tagMatrix or a list of tagMatrix |
| xlab | xlab |
| ylab | ylab |
| title | title |
| palette | palette to be filled in,details see scale_colour_brewer |
| nrow | the nrow of plotting a list of peak |
| ncol | the ncol of plotting a list of peak |

Value

figure

Author(s)

G Yu

| | |
|-----------|-------------------------|
| upsetplot | <i>upsetplot method</i> |
|-----------|-------------------------|

Description

upsetplot method generics

Usage

```
upsetplot(x, ...)
```

Arguments

| | |
|-----|----------------------|
| x | A csAnno instance |
| ... | additional parameter |

Value

plot

Author(s)

Guangchuang Yu <https://guangchuangyu.github.io>

| | |
|---------|--------------------------------|
| vennpie | <i>vennpie method generics</i> |
|---------|--------------------------------|

Description

vennpie method generics

Usage

```
vennpie(x, r = 0.2, cex = 1.2, ...)
```

```
vennpie(x, r = 0.2, cex=1.2, ...)
```

Arguments

| | |
|-----|------------------------|
| x | A csAnno instance |
| r | initial radius |
| cex | value to adjust legend |
| ... | additional parameter |

Value

plot

Author(s)

Guangchuang Yu <https://guangchuangyu.github.io>

vennplot

vennplot

Description

plot the overlap of a list of object

Usage

```
vennplot(Sets, by = "gplots", ...)
```

Arguments

| | |
|------|---|
| Sets | a list of object, can be vector or GRanges object |
| by | one of gplots, ggVennDiagram or Vennerable |
| ... | extra parameters using ggVennDiagram. Details see ggVennDiagram |

Details

There are two ways to plot, which users can specify through 'by'.

The first way is to use 'gplots' packages, by setting 'by = gplots'. This method is default method. The venn plot produced through this way has no color.

The second way is to use 'ggVennDiagram' packages, by setting 'by = ggVennDiagram'. The venn plot produced through this way has colors which can be defined by users using ggplot2 grammar e.g.(scale_fill_distiller()). And users can specify any details, like digital number, text size and showing percentage or not, by inputting '...' extra parameters.

Value

venn plot that summarize the overlap of peaks from different experiments or gene annotation from different peak files.

Author(s)

G Yu

Examples

```
## example not run
## require(TxDb.Hsapiens.UCSC.hg19.knownGene)
## txdb <- TxDb.Hsapiens.UCSC.hg19.knownGene
## peakfiles <- getSampleFiles()
## peakAnnoList <- lapply(peakfiles, annotatePeak)
## names(peakAnnoList) <- names(peakfiles)
## genes= lapply(peakAnnoList, function(i) as.data.frame(i)$geneId)
## vennplot(genes)
```

| | |
|-------------------|--------------------------|
| vennplot.peakfile | <i>vennplot.peakfile</i> |
|-------------------|--------------------------|

Description

vennplot for peak files

Usage

```
vennplot.peakfile(files, labels = NULL)
```

Arguments

| | |
|--------|-----------------------|
| files | peak files |
| labels | labels for peak files |

Value

figure

Author(s)

G Yu

Index

- * **classes**
 - csAnno-class, 10
- * **datasets**
 - info, 25
- * **internal**
 - ChIPseeker-package, 4
 - reexports, 52
- ., 5
- annotatePeak, 5, 10, 33, 35, 40
- as.data.frame.csAnno, 7
- as.GRanges, 8

- check_upstream_and_downstream, 8
- ChIPseeker (ChIPseeker-package), 4
- ChIPseeker-package, 4
- combine_csAnno, 9
- covplot, 9
- csAnno-class, 10

- downloadGEObedFiles, 11
- downloadGSMbedFiles, 11
- dropAnno, 12

- enrichAnnoOverlap, 12
- enrichPeakOverlap, 13

- getAnnoStat, 14
- getBioRegion, 14, 21
- getGeneAnno, 15
- getGenomicAnnotation, 16
- getGEOgenomeVersion, 17
- getGEOInfo, 17
- getGEOspecies, 18
- getNearestFeatureIndicesAndDistances, 18
- getPromoters, 19, 21
- getSampleFiles, 20
- getTagMatrix, 20
- getTagMatrix.binning.internal, 22
- getTagMatrix.internal, 23

- getTagMatrix2, 23
- getTagMatrix2.binning.internal, 24
- getTagMatrix2.internal, 25
- ggVennDiagram, 57
- GRangesList, 52
- GRangesList (reexports), 52
- gsminfo (info), 25

- info, 25

- makeBioRegionFromGranges, 21, 26
- mclapply, 14

- overlap, 27

- peak_Profile_Heatmap, 30
- peakHeatmap, 27
- peakHeatmap_multiple_Sets, 29
- plotAnnoBar, 7, 31, 35
- plotAnnoBar, csAnno, ANY-method (plotAnnoBar), 31
- plotAnnoBar, csAnno-method (csAnno-class), 10
- plotAnnoBar, list-method (plotAnnoBar), 31
- plotAnnoBar.data.frame, 32
- plotAnnoPie, 7, 33, 33
- plotAnnoPie, csAnno, ANY-method (plotAnnoPie), 33
- plotAnnoPie, csAnno-method (csAnno-class), 10
- plotAnnoPie.csAnno, 34
- plotAvgProf, 36
- plotAvgProf.binning, 37
- plotAvgProf2, 38
- plotDistToTSS, 7, 39
- plotDistToTSS, csAnno, ANY-method (plotDistToTSS), 39
- plotDistToTSS, csAnno-method (csAnno-class), 10

plotDistToTSS, list-method
 (plotDistToTSS), 39
plotDistToTSS.data.frame, 40
plotMultiProf, 41
plotMultiProf.binning, 42
plotMultiProf.binning.internal, 43
plotMultiProf.normal, 44
plotMultiProf.normal.internal, 45
plotPeakProf, 45
plotPeakProf2, 48
plotPeakProf_MultiWindows, 50

readPeakFile, 52
reexports, 52
rel, 52
rel (reexports), 52

scale_colour_brewer, 28, 29, 31, 55
seq2gene, 53
show, 54
show, csAnno, ANY-method (show), 54
show, csAnno-method (csAnno-class), 10
shuffle, 54
subset, csAnno-method (csAnno-class), 10

tagHeatmap, 55
tagMatrixList (info), 25

ucsc_release (info), 25
upsetplot, 56
upsetplot, csAnno-method (csAnno-class),
 10

vennpie, 56
vennpie, csAnno-method (csAnno-class), 10
vennplot, 57
vennplot.peakfile, 58