Package 'BioVizSeq'

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Type Package

Title Visualizing the Elements Within Bio-Sequences

Version 1.0.5

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Description Visualizing the types and distribution of elements within bio-sequences. At the same time, We have developed a geom layer, geom_rrect(), that can generate rounded rectangles. No external references are used in the development of this package.

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License Artistic-2.0

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NeedsCompilation no

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`biovizseq` *BioVizSeq shiny app start function.*

Description

BioVizSeq shiny app start function.

Usage

```
biovizseq()
```

Value

Shinyapp: BioVizSeq shiny app.

Author(s)

Shiqi Zhao

Examples

```
# 1. Library BioVizSeq package
library(BioVizSeq)
```

cdd_plot *cdd_plot*

Description

Visualization of domain in CDD file

Usage

```
cdd_plot(
  cdd_file,
  fasta_file,
  the_order = NULL,
  domain_select = NULL,
  shape = "RoundRect",
  r = 0.3,
  legend_size = 15,
  domain_color = NULL
)
```

Arguments

cdd_file	The path of cdd file.
fasta_file	The path of fasta file.
the_order	The path of order file. A List of Gene ID , One ID Per Line.
domain_select	The domain ID which you want to align with.
shape	RoundRect or Rect.
r	The radius of rounded corners.
legend_size	The size of legend.
domain_color	The color set of domain.

Value

p

Author(s)

Shiqi Zhao

Examples

```
hitdata_path <- system.file("extdata", "hitdata.txt", package = "BioVizSeq")
fa_path <- system.file("extdata", "idpep.fa", package = "BioVizSeq")
cdd_plot(hitdata_path, fa_path)

order_path <- system.file("extdata", "order.csv", package = "BioVizSeq")
cdd_plot(hitdata_path, fa_path, the_order = order_path)
```

cdd_to_loc *cdd_to_loc*

Description

Extract the location information of domain from cdd file

Usage

```
cdd_to_loc(cdd_file)
```

Arguments

cdd_file	CDD file.

Value

data.frame

Author(s)

Shiqi Zhao

Examples

```
hitdata_path <- system.file("extdata", "hitdata.txt", package = "BioVizSeq")
cdd_file <- readLines(hitdata_path)
domain_loc <- cdd_to_loc(cdd_file)
```

combi_p *combi_p*

Description

Get ggplot2 files to facilitate free combination in patchwork

Usage

```
combi_p(
  tree_path,
  gff_path = NULL,
  meme_path = NULL,
  pfam_path = NULL,
  cdd_path = NULL,
  fa_path = NULL,
  smart_path = FALSE,
```

```
  plantcare_path = NULL,
  promoter_length = NULL,
  renamefile = NULL,
  groupfile = NULL,
  shape = "RoundRect",
  r = 0.3,
  legend_size = 6
)
```

Arguments

tree_path	The path of tree file (.newick).
gff_path	The path of .gff/gtf file.
meme_path	The path of .meme/mast file.
pfam_path	The path of pfam result file (.tsv).
cdd_path	The path of cdd result file (.txt).
fa_path	The path of protein file (.fa/fasta).
smart_path	Do SMART or not. (TRUE or FALSE)
plantcare_path	The path of plantcare file (.tab).
promoter_length	The length of promoter.
renamefile	Rename file. Two cols: new_name and old_name.
groupfile	Group information. Two cols: label and Group.
shape	RoundRect or Rect.
r	The radius of rounded corners.
legend_size	The size of legend.

Value

list

Author(s)

Shiqi Zhao

Examples

```
tree_path <- system.file("extdata", "idpep.nwk", package = "BioVizSeq")
plot_file <- combi_p(tree_path)
```

combi_p2 *combi_p2*

Description

Get ggplot2 files to facilitate free combination in patchwork

Usage

```
combi_p2(
  order_path,
  gff_path = NULL,
  meme_path = NULL,
  pfam_path = NULL,
  cdd_path = NULL,
  fa_path = NULL,
  smart_path = FALSE,
  plantcare_path = NULL,
  promoter_length = NULL,
  renamefile = NULL,
  shape = "RoundRect",
  r = 0.3,
  legend_size = 6
)
```

Arguments

order_path	The path of order file (.txt/.csv).
gff_path	The path of .gff/gtf file.
meme_path	The path of .meme/mast file.
pfam_path	The path of pfam result file (.tsv).
cdd_path	The path of cdd result file (.txt).
fa_path	The path of protein file (.fa/fasta).
smart_path	Do SMART or not. (TRUE or FALSE)
plantcare_path	The path of plantcare file (.tab).
promoter_length	The length of promoter.
renamefile	Rename file. Two cols: new_name and old_name.
shape	RoundRect or Rect.
r	The radius of rounded corners.
legend_size	The size of legend.

Value

list

Author(s)

Shiqi Zhao

Examples

```
order_path <- system.file("extdata", "order.csv", package = "BioVizSeq")
gff_path <- system.file("extdata", "idpro.gff3", package = "BioVizSeq")
plot_file <- combi_p2(order_path, gff_path = gff_path)
```

`fastaleng` *fastaleng*

Description

Statistical sequence length

Usage

```
fastaleng(fasta_file)
```

Arguments

`fasta_file`	The path of protein fasta file.

Value

data.frame

Author(s)

Shiqi Zhao

Examples

```
fasta_path <- system.file("extdata", "idpep.fa", package = "BioVizSeq")
fastaleng(fasta_path)
```

geom_rrect *geom_rrect*

Description

Rounded rectangle

Usage

```
geom_rrect(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  r = 0.2,
  ...,
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE
)
```

Arguments

mapping	Set of aesthetic mappings created by aes. If specified and inherit.aes = TRUE (the default), it is combined with the default mapping at the top level of the plot. You must supply mapping if there is no plot mapping.
data	A data.frame, or other object, will override the plot data. All objects will be fortified to produce a data frame.
stat	Name of stat to modify data.
position	The position adjustment to use for overlapping points on this layer.
r	The radius of rounded corners.
...	additional parameter, e.g. color, linewidth, alpha.
na.rm	If "FALSE" (default), missing values are removed with a warning. If "TRUE", missing values are silently removed, logical.
show.legend	Whether to show legend, logical.
inherit.aes	Whether to inherit aesthetic mappings, logical, defaults to "TRUE".

Details

draws rounded rectangle by using the locations of the four corners (xmin, xmax, ymin and ymax) like geom_rect().

Value

ggplot object

Aesthetics

geom_rrect() understands the following aesthetics (required aesthetics are in bold):

- xmin
- xmax
- ymin
- ymax
- alpha
- colour
- fill
- group
- linetype

Learn more about setting these aesthetics in vignette("ggplot2-specs").

Author(s)

Shiqi Zhao

Examples

```
library(ggplot2)
df <- data.frame(
 xmin = c(1, 2, 3),
 xmax = c(2, 3, 4),
 ymin = c(1, 2, 3),
 ymax = c(2, 3, 4),
 category = c("A", "B", "C")
 )

 p <- ggplot(df) +
   geom_rrect(aes(xmin = xmin, xmax = xmax,
              ymin = ymin, ymax = ymax, fill = category),
             r = 0.4, linewidth = 1, colour = "black")

 print(p)
```

---

gff_plot *gff_plot*

Description

Visualization of element in gff or gtf file

Usage

```
gff_plot(
  gff_file,
  the_order = NULL,
  shape = "Rect",
  r = 0.3,
  legend_size = 15,
  element_color = NULL
)
```

Arguments

gff_file	The path of gff file.
the_order	The path of order of mRNA. It is also the mRNA you want to showcase. A List of Gene ID , One ID Per Line.
shape	RoundRect or Rect.
r	The radius of rounded corners.
legend_size	The size of legend.
element_color	The color set of element.

Value

p

Author(s)

Shiqi Zhao

Examples

```
gff_path <- system.file("extdata", "test.gff", package = "BioVizSeq")
gff_plot(gff_path)
```

---

gff_statistics *gff_statistics*

Description

Extract the information of element from gff or gtf file

Usage

```
gff_statistics(gff_data, mRNA_ID = NULL)
```

Arguments

gff_data	gff file.
mRNA_ID	The mRNA you selected. If NULL, it means selecting all mRNAs.

Value

data.frame

Author(s)

Shiqi Zhao

Examples

```
gff_path <- system.file("extdata", "idpro.gff3", package = "BioVizSeq")
gff_data <- read.table(gff_path, header = FALSE, sep = '\t')
gff_statistics_data <- gff_statistics(gff_data)
```

---

gff_to_loc *gff_to_loc*

Description

Extract the location information of element from gff or gtf file

Usage

```
gff_to_loc(gff_data, mRNA_ID = NULL)
```

Arguments

gff_data	gff file.
mRNA_ID	The mRNA you selected. If NULL, it means selecting all mRNAs.

Value

list

Author(s)

Shiqi Zhao

Examples

```
gff_path <- system.file("extdata", "test.gff", package = "BioVizSeq")
gff_data <- read.table(gff_path, header = FALSE, sep = '\t')
gff_loc <- gff_to_loc(gff_data)

ID_path <- system.file("extdata", "ID_select.csv", package = "BioVizSeq")
mRNA_ID <- readLines(ID_path)
gff_loc <- gff_to_loc(gff_data, mRNA_ID=mRNA_ID)
```

`meme_plot` *meme_plot*

Description

Visualization of motif in meme file or mast file

Usage

```
meme_plot(
  meme_file,
  the_order = NULL,
  motif_select = NULL,
  shape = "RoundRect",
  show_motif_id = FALSE,
  r = 0.3,
  legend_size = 15,
  motif_color = NULL
)
```

Arguments

`meme_file`	The path of meme file or mast file.
`the_order`	The path of order file. A List of Gene ID , One ID Per Line.
`motif_select`	The motif ID which you want to align with.
`shape`	RoundRect or Rect.
`show_motif_id`	Display the name of the motif.
`r`	The radius of rounded corners.
`legend_size`	The size of legend.
`motif_color`	The color set of motif.

Value

p

Author(s)

Shiqi Zhao

Examples

```
mast_path <- system.file("extdata", "mast.xml", package = "BioVizSeq")
meme_plot(mast_path)

meme_plot(mast_path, motif_select="1", show_motif_id = TRUE)

order_path <- system.file("extdata", "order.csv", package = "BioVizSeq")
meme_plot(mast_path, the_order=order_path, motif_select="1")
```

---

meme_seq *meme_seq*

Description

Get motif sequence from meme file or mast file

Usage

```
meme_seq(meme_file)
```

Arguments

meme_file	The path of meme file or mast file.

Value

data.frame

Author(s)

Shiqi Zhao

Examples

```
mast_path <- system.file("extdata", "mast.xml", package = "BioVizSeq")
mast_file <- readLines(mast_path)
motifseq<- meme_seq(mast_file)
```

meme_to_loc *meme_to_loc*

Description

Extract the location information of motif from mast or meme file

Usage

```
meme_to_loc(motif_file)
```

Arguments

motif_file	The motif data of mast or meme file.

Value

list

Author(s)

Shiqi Zhao

Examples

```
mast_path <- system.file("extdata", "mast.xml", package = "BioVizSeq")
mast_file <- readLines(mast_path)
motif_loc <- meme_to_loc(mast_file)
```

motif_plot *motif_plot*

Description

Draws multiple rounded rectangle.

Usage

```
motif_plot(
  motif_loc,
  gene_length,
  the_order = NULL,
  motif_select = NULL,
  shape = "RoundRect",
  show_motif_id = FALSE,
```

```
  r = 0.3,
  legend_size = 15,
  motif_color = NULL
)
```

Arguments

motif_loc	A data.frame contains for columuns: ID, motif, start, end.
gene_length	A data.fram of the length of biosequences. Two columns: ID, length.
the_order	A List of Gene ID , One ID Per Line.
motif_select	The motif ID which you want to align with.
shape	RoundRect or Rect.
show_motif_id	Display the name of the motif.
r	The radius of rounded corners.
legend_size	The size of legend.
motif_color	The color set of motif.

Details

motif_plot() draws multiple rounded rectangle to represent the above elements of biosequences, but not limited to biosequences

Value

p

Author(s)

Shiqi Zhao

Examples

```
df <- data.frame(
 ID = rep(c("geneA", "geneB", "geneC"), each = 3),
 motif = rep(c("1", "2", "3"), times = 3),
 start = c(1, 3, 6, 1, 6, 10, 10, 7, 17),
 end = c(3, 5, 11, 3, 8, 15, 12, 9, 22)
 )

 length_data <- data.frame(
 ID = c("geneA", "geneB", "geneC"),
 length = c(15, 27, 30)
 )

 order_data <- c("geneB", "geneA", "geneC")

 motif_plot(df, length_data)
 motif_plot(df, length_data, the_order = order_data)
```

pfam_plot *pfam_plot*

Description

Visualization of domain in pfam result file

Usage

```
pfam_plot(
  pfam_file,
  the_order = NULL,
  domain_select = NULL,
  shape = "RoundRect",
  r = 0.3,
  legend_size = 15,
  domain_color = NULL
)
```

Arguments

pfam_file	The path of meme file or mast file.
the_order	The path of order file. A List of Gene ID , One ID Per Line.
domain_select	The domain ID which you want to align with.
shape	RoundRect or Rect.
r	The radius of rounded corners.
legend_size	The size of legend.
domain_color	The color set of domain.

Value

p

Author(s)

Shiqi Zhao

Examples

```
pfam_path <- system.file("extdata", "iprscan.tsv", package = "BioVizSeq")
order_path <- system.file("extdata", "order.csv", package = "BioVizSeq")
pfam_plot(pfam_path)
pfam_plot(pfam_path, the_order=order_path)
```

pfam_to_loc *pfam_to_loc*

Description

Extract the location information of domain from pfam result

Usage

```
pfam_to_loc(pfam_data)
```

Arguments

pfam_data	The result file (.tsv) of pfam (via InterPro).

Value

list

Author(s)

Shiqi Zhao

Examples

```
pfam_path <- system.file("extdata", "iprscan.tsv", package = "BioVizSeq")
pfam_file <- read.table(pfam_path, sep='\t', header = FALSE)
motif_loc <- pfam_to_loc(pfam_file)
```

plantcare_classify *plantcare_classify*

Description

Classify the functions of cis element from Plantcare

Usage

```
plantcare_classify(plantcare_file)
```

Arguments

plantcare_file	The result file (.tab) of Plantcare.

Value

data.frame

Author(s)

Shiqi Zhao

Examples

```
plantcare_path <- system.file("extdata", "plantCARE_output.tab", package = "BioVizSeq")
plantcare_file <- read.table(plantcare_path, header = FALSE, sep = '\t', quote="")
plantcare_data <- plantcare_classify(plantcare_file)
```

---

plantcare_plot *plantcare_plot*

Description

Visualization of cis-element in plantcare result file

Usage

```
plantcare_plot(
  plantcare_file,
  promoter_length = 2000,
  the_order = NULL,
  shape = "Rect",
  r = 6,
  legend_size = 15,
  element_color = NULL
)
```

Arguments

plantcare_file	The path of plantcare result file (.tab).
promoter_length	The promoter length.
the_order	The path of order file. A List of Gene ID , One ID Per Line.
shape	RoundRect or Rect.
r	The radius of rounded corners.
legend_size	The size of legend.
element_color	The color set of cis-element.

Value

p

Author(s)

Shiqi Zhao

Examples

```
plantcare_path <- system.file("extdata", "plantCARE_output.tab", package = "BioVizSeq")
plantcare_plot(plantcare_path, promoter_length = 2000)
```

---

plantcare_plot1 *plantcare_plot1*

Description

Heatmap of the number of cis-element in plantcare result file

Usage

```
plantcare_plot1(plantcare_file, the_order = NULL)
```

Arguments

plantcare_file	The path of plantcare result file (.tab).
the_order	The path of order file. A List of Gene ID , One ID Per Line.

Value

p

Author(s)

Shiqi Zhao

Examples

```
plantcare_path <- system.file("extdata", "plantCARE_output.tab", package = "BioVizSeq")
plantcare_plot1(plantcare_path)
```

---

plantcare_plot2 *plantcare_plot2*

Description

Bar plot1 of the number of cis-element in plantcare result file

Usage

```
plantcare_plot2(plantcare_file, the_order = NULL)
```

Arguments

plantcare_file	The path of plantcare result file (.tab).
the_order	The path of order file. A List of Gene ID , One ID Per Line.

Value

p

Author(s)

Shiqi Zhao

Examples

```
plantcare_path <- system.file("extdata", "plantCARE_output.tab", package = "BioVizSeq")
plantcare_plot2(plantcare_path)
```

---

plantcare_plot3 *plantcare_plot3*

Description

Bar plot2 of the number of cis-element in plantcare result file

Usage

```
plantcare_plot3(plantcare_file, the_order = NULL)
```

Arguments

plantcare_file	The path of plantcare result file (.tab).
the_order	The path of order file. A List of Gene ID , One ID Per Line.

Value

p

Author(s)

Shiqi Zhao

Examples

```
plantcare_path <- system.file("extdata", "plantCARE_output.tab", package = "BioVizSeq")
plantcare_plot3(plantcare_path)
```

plantcare_statistic1 *plantcare_statistic1*

Description

Count the number of cis element from Plantcare for heatmap

Usage

```
plantcare_statistic1(plantcare_data)
```

Arguments

plantcare_data	The result of plantcare_classify().

Value

data.frame

Author(s)

Shiqi Zhao

Examples

```
plantcare_path <- system.file("extdata", "plantCARE_output.tab", package = "BioVizSeq")
plantcare_file <- read.table(plantcare_path, header = FALSE, sep = '\t', quote="")
plantcare_data <- plantcare_classify(plantcare_file)
statistic_data1 <- plantcare_statistic1(plantcare_data)
```

plantcare_statistic2 *plantcare_statistic2*

Description

Count the number of cis element from Plantcare for Bar chart

Usage

```
plantcare_statistic2(plantcare_data)
```

Arguments

plantcare_data	The result of plantcare_classify().

Value

data.frame

Author(s)

Shiqi Zhao

Examples

```
plantcare_path <- system.file("extdata", "plantCARE_output.tab", package = "BioVizSeq")
plantcare_file <- read.table(plantcare_path, header = FALSE, sep = '\t', quote="")
plantcare_data <- plantcare_classify(plantcare_file)
statistic_data2 <- plantcare_statistic2(plantcare_data)
```

---

plantcare_to_loc *plantcare_to_loc*

Description

Extract the location information of cis-element from Plantcare

Usage

```
plantcare_to_loc(plantcare_data)
```

Arguments

plantcare_data	The result of plantcare_classify().

Value

data.frame

Author(s)

Shiqi Zhao

Examples

```
plantcare_path <- system.file("extdata", "plantCARE_output.tab", package = "BioVizSeq")
plantcare_file <- read.table(plantcare_path, header = FALSE, sep = '\t', quote="")
plantcare_data <- plantcare_classify(plantcare_file)
plantcare_loc <- plantcare_to_loc(plantcare_data)
```

`ProtParam_calc` *ProtParam_calc*

Description

Extract the information of protein sequence

Usage

```
ProtParam_calc(input_file)
```

Arguments

`input_file`	The path of potein fasta file.

Value

data.frame

Author(s)

Shiqi Zhao

`smart_plot` *smart_plot*

Description

Visualization of domain in SMART result file

Usage

```
smart_plot(
  fasta_file,
  the_order = NULL,
  domain_select = NULL,
  shape = "RoundRect",
  r = 0.3,
  legend_size = 15,
  domain_color = NULL
)
```

Arguments

fasta_file	The path of protein fasta file.
the_order	The path of order file. A List of Gene ID , One ID Per Line.
domain_select	The domain ID which you want to align with.
shape	RoundRect or Rect.
r	The radius of rounded corners.
legend_size	The size of legend.
domain_color	The color set of domain.

Value

p

Author(s)

Shiqi Zhao

---

smart_to_loc *smart_to_loc*

Description

Extract the location information of domain from SMART result

Usage

```
smart_to_loc(input_file, do_pfam = TRUE)
```

Arguments

input_file	The path of potein fasta file.
do_pfam	Include the pfam domain or not.

Value

list

Author(s)

Shiqi Zhao

upload_fa_to_plantcare *upload_fa_to_plantcare*

Description

Upload the promoter file to Plantcare database

Usage

```
upload_fa_to_plantcare(fasta_file, email)
```

Arguments

fasta_file	The path of promoter file.
email	e-mail address.

Details

Due to the file size limitation of plantcare on fasta, upload_fa_to_plantcare() first splits fasta file. Then uploads the splited fasta files to the plantcare database, and automatically returns the results to the email provided by the user.

upload_fa_to_plantcare("the path/test.fasta", "your e-mail address")

Value

plantcare_result

Author(s)

Shiqi Zhao

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