Package ‘Anaquin’

January 30, 2017

Type Package
Title Statistical analysis of sequins
Version 1.0.0
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Author Ted Wong
Maintainer Ted Wong <t.wong@garvan.org.au>
Description The project is intended to support the use of sequins (synthetic sequencing spike-in controls) owned and made available by the Garvan Institute of Medical Research. The goal is to provide a standard open source library for quantitative analysis, modelling and visualization of spike-in controls.
License BSD_3_clause + file LICENSE
VignetteBuilder knitr
URL www.sequin.xyz
Depends R (>= 3.3)
Imports ggplot2, ROCR, knitr, qvalue, locfit, methods, stats, utils, plyr
Suggests RUnit, rmarkdown
BugReports https://github.com/student-t/RAnaquin/issues
LazyData true
biocViews DifferentialExpression, Preprocessing, RNASeq, GeneExpression, Software
NeedsCompilation no

R topics documented:

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### analysis

Return type of analysis from data set created by AnaquinData

**Usage**

```r
analysis(object, ...)
```

```r
## S4 method for signature 'AnaquinData'
analysis(object)
```

**Arguments**

- `...`: Not used
- `object`: S4 object created by AnaquinData

**Details**

This function takes an AnaquinData object and return the type of analysis.

**Value**

Type of analysis, eg: `PlotLinear`
Examples

# Sequin names
names <- row.names(UserGuideData_5.4.6.3)

# Input concentration
input <- log2(UserGuideData_5.4.6.3$InputConcent)

# Measured FPKM
measured <- log2(UserGuideData_5.4.6.3[,2:4])

anaquin <- AnaquinData(analysis="PlotLinear",
                      seqs=names,
                      input=input,
                      measured=measured)

analysis(anaquin)

AnaquinData
Create Anaquin dataset

Description

Create an Anaquin dataset. The resulting S4 object is required for every Anaquin analysis.

Usage

AnaquinData(analysis, ...)

Arguments

analysis Type of analysis to be performed (eg. 'PlotLinear', 'PlotLogistic', 'PlotROC', 'PlotLODR').
...

Analysis specific data inputs.

The function requires the following mandatory data inputs:

   analysis Type of analysis
   seqs   Sequin names
   ...     Analysis specific data inputs

analysis indicates the type of the analysis. The current release supports the following analysis:

PlotLinear Linear model with sequins
PlotLogistic GLM logistic model with sequins
PlotROC ROC analysis with sequins
PlotLODR LODR (LOESS) analysis with sequins

seqs gives the sequin names. The function will give an error message unless both analysis and seqs are given.

The function accepts the following optional data inputs:
### AnaquinData

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>std</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>pval</td>
<td>P-value probability</td>
</tr>
<tr>
<td>qval</td>
<td>Q-value probability</td>
</tr>
<tr>
<td>ratio</td>
<td>Expected sequin ratio</td>
</tr>
<tr>
<td>input</td>
<td>Input concentration (attomol/ul)</td>
</tr>
<tr>
<td>measured</td>
<td>Measured variable (eg: FPKM)</td>
</tr>
<tr>
<td>label</td>
<td>Classified labels (eg: 'TP', 'FP')</td>
</tr>
<tr>
<td>score</td>
<td>Value used for ranking sequins</td>
</tr>
</tbody>
</table>

### Details

Create an Anaquin dataset. The resulting R-object is required for every Anaquin analysis.

### Value

An S4 object of class AnaquinData.

### Author(s)

Ted Wong <t.wong@garvan.org.au>

### Examples

```r
# Example 1: Create Anaquin dataset for PlotLogistic
#
data(UserGuideData_5.4.5.1)

title <- 'Assembly Plot'
xlab <- 'Input Concentration (log2)'
ylab <- 'Sensitivity'

# Sequin names
seqs <- row.names(UserGuideData_5.4.5.1)

# Input concentration
input <- log2(UserGuideData_5.4.5.1$InputConcent)

# Measured sensitivity
measured <- UserGuideData_5.4.5.1$Sn

anaquin <- AnaquinData(analysis='PlotLogistic',
                       seqs=seqs,
                       input=input,
                       measured=measured)

plotLogistic(anaquin, title=title, xlab=xlab, ylab=ylab, showLOA=TRUE)

# Example 2: Create Anaquin dataset for PlotLinear
#
data(UserGuideData_5.4.6.3)
```
title <- 'Gene Expression'
xlab <- 'Input Concentration (log2)'
ylab <- 'FPKM (log2)'

# Sequin names
seqs <- row.names(UserGuideData_5.4.6.3)

# Input concentration
input <- log2(UserGuideData_5.4.6.3$InputConcent)

# Measured FPKKM
measured <- log2(UserGuideData_5.4.6.3[,2:4])

anaquin <- AnaquinData(analysis="PlotLinear",
    seqs=seqs,
    input=input,
    measured=measured)

plotLinear(anaquin, title=title, xlab=xlab, ylab=ylab, showLOQ=TRUE)

# Example 3: Create Anaquin dataset for plotROC
#
data(UserGuideData_5.6.3)

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

# How ROC points are ranked (scoring function)
score <- 1-UserGuideData_5.6.3$Pval

# Classified labels (TP/FP)
label <- UserGuideData_5.6.3$Label

anaquin <- AnaquinData(analysis="PlotROC",
    seqs=seqs,
    ratio=ratio,
    score=score,
    label=label)

plotROC(anaquin, title="ROC Plot", refRats=0)

# Example 4: Create Anaquin dataset for plotLODR
#
data(UserGuideData_5.6.3)

xlab <- 'Average Counts'
ylab <- 'P-value'
title <- 'LODR Curves'

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Measured average mean
measured <- UserGuideData_5.6.3$Mean

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

# P-value
pval <- UserGuideData_5.6.3$Pval

# Q-value
qval <- UserGuideData_5.6.3$Qval

anaquin <- AnaquinData(analysis="PlotLODR",
                        seqs=seqs,
                        measured=measured,
                        ratio=ratio,
                        pval=pval,
                        qval=qval)

plotLODR(anaquin, xlab=xlab, ylab=ylab, title=title, FDR=0.1)

---

**input**

*Return input concentration*

---

**Description**

Return input concentration from data set created by AnaquinData.

**Usage**

```r
input(object, ...)
```

**Arguments**

- `object` S4 object created by AnaquinData
- `...` Not used

**Details**

This function takes an AnaquinData object and return the input concentration in the data set.

**Value**

List of input concentration for each sequin. Return NULL if unavailable.

**Author(s)**

Ted Wong <t.wong@garvan.org.au>
Examples

data(UserGuideData_5.4.6.3)

# Sequin names
names <- row.names(UserGuideData_5.4.6.3)

# Input concentration
input <- log2(UserGuideData_5.4.6.3$InputConcent)

# Measured FPKM
measured <- log2(UserGuideData_5.4.6.3[, 2:4])

anaquin <- AnaquinData(analysis="PlotLinear",
                        seqs=names,
                        input=input,
                        measured=measured)
input(anaquin)

label

Return classified labels

Description

Return classified labels from data set created by AnaquinData.

Usage

label(object, ...)
## S4 method for signature 'AnaquinData'
label(object)

Arguments

object        S4 object created by AnaquinData
...

Not used

Details

This function takes an AnaquinData object and return the classified labels.

Value

List of classified labels for each sequin. Return NULL if unavailable.

Author(s)

Ted Wong <t.wong@garvan.org.au>
Examples

data(UserGuideData_5.6.3)

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

# How the ROC curves are ranked
score <- 1-UserGuideData_5.6.3$Pval

# Classified labels (TP/FP)
label <- UserGuideData_5.6.3$Label

anaquin <- AnaquinData(analysis='PlotROC',
  seqs=seqs,
  ratio=ratio,
  score=score,
  label=label)

label(anaquin)

---

measured

Return measured abundance

Description

Return measured abundance from data set created by AnaquinData.

Usage

measured(object, ...)

## S4 method for signature 'AnaquinData'

measured(object)

Arguments

  object       S4 object created by AnaquinData
  ...         Not used

Details

This function takes an AnaquinData object and return the measured abundance.

Value

List of measured abundance for each sequin. Return NULL if unavailable.

Author(s)

Ted Wong <t.wong@garvan.org.au>
Examples

```r
data(UserGuideData_5.4.6.3)

# Sequin names
seqs <- row.names(UserGuideData_5.4.6.3)

# Input concentration
input <- log2(UserGuideData_5.4.6.3$InputConcent)

# Measured FPKM
FPKM <- log2(UserGuideData_5.4.6.3[,2:4])

anaquin <- AnaquinData(analysis="PlotLinear",
                        seqs=seqs,
                        input=input,
                        measured=FPKM)

measured(anaquin)
```

---

**Description**

RnaQuin sequins are combined together across a range of concentration to formulate a mixture for emulating expression level. The concentration of each sequin within a mixture is specified in a CSV mixture file.

This is a staggered mixture (A) for RnaQuin, user can also download the file directly from s3.amazonaws.com/sequins/mixtures/MRN027_v001.csv.

**Usage**

```r
data(mixtureA)
```

**Format**

Data frame for each RnaQuin sequin:

- Length: Length in nucleotide bases
- MXA: Input concentration in attomol/ul

**Value**

A data frame with columns defined in Format.
### mixtureB

**RnaQuin mixture B**

**Description**

RnaQuin sequins are combined together across a range of concentration to formulate a mixture for emulating expression level. The concentration of each sequin within a mixture is specified in a CSV mixture file.

This is a staggered mixture (B) for RnaQuin, user can also download the file directly from s3.amazonaws.com/sequins/mixtures/MRN028_v001.csv.

**Usage**

```r
data(mixtureB)
```

**Format**

Data frame for each RnaQuin sequin:
- Length: Length in nucleotide bases
- MXB: Input concentration in attomol/ul

**Value**

A data frame with columns defined in Format.

### mixtureF

**RnaQuin mixture F**

**Description**

RnaQuin sequins are combined together across a range of concentration to formulate a mixture for emulating expression level. The concentration of each sequin within a mixture is specified in a CSV mixture file.

This is a flat mixture (F) for RnaQuin, user can also download the file directly from s3.amazonaws.com/sequins/mixtures/MRN030_v001.csv.

**Usage**

```r
data(mixtureF)
```

**Format**

Data frame for each RnaQuin sequin:
- Length: Length in nucleotide bases
- MXF: Input concentration in attomol/ul

**Value**

A data frame with columns defined in Format.
plotLinear

Plot linear model for sequins

Description

Create a scatter plot with expected abundance on the x-axis, and measured abundance on the y-axis.

Usage

plotLinear(data, title, xlab, ylab, showSD, showLOQ, xBreaks, yBreaks, showAxis, ...)

Arguments

data Anaquin dataset created by AnaquinData. It needs to define information in Details.
title Label of the plot.
xlab Label for the x-axis
ylab Label for the y-axis
xBreaks Breaks for the x-axis
yBreaks Breaks for the y-axis
showSD Show standard deviation bars vertically? Default to TRUE.
showLOQ Show limit-of-quantification? Default to TRUE.
showAxis Show x-axis and y-axis? Default to TRUE.
... Reserved for internal testing

Details

plotLinear requires the following data inputs from AnaquinData.

seqs List of sequin identifiers (eg. R2_11_2).
input Input concentration of sequins in attomol/ul.
measured Measured abundance of sequins (typically FPKM).

The plotLinear function plots a scatter plot with expected abundance on the x-axis, and measured abundance on the y-axis. The expected abundance is typically the input concentration of sequins in the mixture, although other measures (such as expected allele frequency) are also possible. The function builds a linear regression between the two variables, and reports associated statistics (R2, correlation and regression parameters) on the plot.

The function also estimates limit-of-quantification (LOQ) breakpoint, and reports it on the plot if found. LOQ is defined as the lowest empirical detection limit, a threshold value beyond which stochastic behavior occur. LOQ is estimated by fitting segmented linear regression with two segments on the entire data set, while minimizing the total sum of squares of the differences between the variables.

Value

The function does not return anything but it prints a scatter plot.
Author(s)
Ted Wong <t.wong@garvan.org.au>

Examples

```r
library(Anaquin)

# Data set generated by Cufflinks and Anaquin. described in Section 5.4.6.3 of # the user guide.
#
data(UserGuideData_5.4.6.3)

title <- 'Gene Expression'
xlab <- 'Input Concentration (log2)'
ylab <- 'FPKM (log2)'

# Sequin names
seqs <- row.names(UserGuideData_5.4.6.3)

# Input concentration
input <- log2(UserGuideData_5.4.6.3$InputConcent)

# Measured FPKM
measured <- log2(UserGuideData_5.4.6.3[,2:4])

anaquin <- AnaquinData(analysis="PlotLinear",
                        seqs=seqs,
                        input=input,
                        measured=measured)

plotLinear(anaquin, title=title, xlab=xlab, ylab=ylab, showLOQ=TRUE)
```

---

plotLODR

Create Limit-of-Detection Ratio (LODR) plot

Description

Create a Limit-of-Detection Ratio (LODR) plot between measured abundance (x-axis) and p-value probability (y-axis).

Usage

```r
plotLODR(data, FDR, title, xlab, ylab, legTitle, showConf, ...)
```

Arguments

- **data**: Anaquin dataset created by `AnaquinData`. It needs to define information in Details.
- **FDR**: Chosen false-discovery-rate. Default to `NULL`.
- **title**: Label of the plot. Default to `NULL`.
- **xlab**: Label for the x-axis. Default to `NULL`.  

plotLODR

yllab Label for the y-axis. Default to NULL.
legTitle Title for the legend. Default to 'Ratio'.
showConf Show confidence interval? Default to FALSE.
... Reserved for internal testing

Details

plotLODR requires the following data inputs from AnaquinData.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>seqs</td>
<td>List of sequin identifiers (eg. R2_11_2).</td>
</tr>
<tr>
<td>measured</td>
<td>Measured abundance (eg: average counts, DP field in a VCF file etc)</td>
</tr>
<tr>
<td>ratio</td>
<td>Expected ratio; eg: expected log-fold ratio or expected allele frequency etc</td>
</tr>
<tr>
<td>pval</td>
<td>P-value probability</td>
</tr>
</tbody>
</table>

Create a Limit-of-Detection Ratio (LODR) plot between measured abundance (x-axis) and p-value probability (y-axis).
The LODR plot indicates the confidence in measurement relative to the magnitude of the measurement. For example, p-value should converge to zero as the sequencing depth increases.
The function also fits non-parametric curves for each sequin ratio group. The curves are modelled with local regression analysis, and are colored by the sequin group.

plotLODR is an amendment from the LODR code in the ERCC dashboard R-package. Further details on the statistical algorithm is available in the ERCC documentation at https://bioconductor.org/packages/release/bioc/html/erccdashboard.html.

Value

The functions does not return anything but it prints a LODR plot.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

library(Anaquin)

# Data set generated by DESeq2 and Anaquin. described in Section 5.6.3.3 of # the user guide.
# data(UserGuideData_5.6.3)

xlab <- 'Average Counts'
ylab <- 'P-value'
title <- 'LODR Curves'

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

# Measured average abundance
measured <- UserGuideData_5.6.3$Mean

# P-value
pval <- UserGuideData_5.6.3$Pval

# Q-value
qval <- UserGuideData_5.6.3$Qval

anaquin <- AnaquinData(analysis='PlotLODR',
    seqs=seqs,
    measured=measured,
    ratio=ratio,
    pval=pval,
    qval=qval)

plotLODR(anaquin, xlab=xlab, ylab=ylab, title=title, FDR=0.1)

plotLogistic

**Plot logistic model for sequins**

**Description**
Create a scatter plot with input concentration on the x-axis, and measured proportion on the y-axis.

**Usage**

`plotLogistic(data, title, xlab, ylab, showLOA, threshold, ...)`

**Arguments**

data: Anaquin dataset created by `AnaquinData`. It needs to define information in `Details`.

title: Title of the plot. (Default to NULL).

xlab: Label for the x-axis. (Default to NULL).

ylab: Label for the y-axis. (Default to NULL).

showLOA: Display limit-of-assembly. (Default to TRUE).

threshold: Threshold required for limit-of-assembly (LOA)

...: Reserved for internal testing

**Details**

`plotLogistic` requires the following data inputs from `AnaquinData`.

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>seqs</td>
<td>List of sequin identifiers (eg. R2_11_2).</td>
</tr>
<tr>
<td>input</td>
<td>Input concentration of sequins in attomol/ul.</td>
</tr>
<tr>
<td>measured</td>
<td>Measured variable (eg: sensitivity).</td>
</tr>
</tbody>
</table>

The `plotLogistic` function creates a scatter plot with input concentration on the x-axis, and measured proportion on the y-axis. Common measured statistics include p-value, percentage and sensi-
The plot builds a GLM logistic regression model between the two variables. The function also estimates limit-of-assembly (LOA) breakpoint, and reports it on the plot if found. The LOA breakpoint is an empirical detection limit, and also the abundance whereby the fitted logistic curve exceeds a user-defined threshold.

Value

The functions does not return anything but it prints a scatter plot with a fitted logistic function.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

```r
library(Anaquin)

# Data set generated by Cufflinks and Anaquin. described in Section 5.4.5.1 of
# the user guide.
# data(UserGuideData_5.4.5.1)

title <- 'Assembly Plot'
xlab <- 'Input Concentration (log2)'
ylab <- 'Sensitivity'

# Sequin names
seqs <- row.names(UserGuideData_5.4.5.1)

# Input concentration
input <- log2(UserGuideData_5.4.5.1$InputConcent)

# Measured sensitivity
measured <- UserGuideData_5.4.5.1$Sn

anaquin <- AnaquinData(analysis='PlotLogistic',
                        seqs=seqs,
                        input=input,
                        measured=measured)

plotLogistic(anaquin, title=title, xlab=xlab, ylab=ylab, showLOA=TRUE)
```

Description

Create a receiver operating characteristic (ROC) plot at various threshold settings.

Usage

```r
plotROC(data, refRats, title, legTitle, ...)
```
plotROC

Arguments

data Anaquin dataset created by AnaquinData. It needs to define information in Details.
refRats Reference ratio groups
title Label of the plot. Default to NULL.
legTitle Title of the legend. Default to Ratio.
...

Reserved for internal testing

Details

plotROC requires the following data inputs from AnaquinData.

seqs List of sequin identifiers (eg. R2_11_2)
label Classified labels (‘TP’ or ‘FP’)
score How the ROC points should be ranked
ratio Expected ratio; eg: expected log-fold ratio

Create a receiver operating characteristic (ROC) plot at various threshold settings. The true positive rate (TPR) is plotted on the x-axis and false positive rate (FPR) is plotted on the y-axis.

The function requires a scoring threshold function, and illustrates the performance of the data as the threshold is varied. Common scoring threshold include p-value, sequencing depth and allele frequency, etc.

ROC plot is a useful diagnostic performance tool; it provides tools to select possibly optimal models and to discard suboptimal ones. In particularly, the AUC statistics indicate the performance of the model relatively to a random experiment (AUC 0.5).

Value

The functions does not return anything but it prints a ROC plot and it’s AUC statistics.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

library(Anaquin)

# Data set generated by DESeq2 and Anaquin. described in Section 5.6.3.3 of
# the user guide.
# data(UserGuideData_5.6.3)

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

# How the ROC curves are ranked
pval <- 1-UserGuideData_5.6.3$Pval

# Classified labels (TP/FP)
label <- UserGuideData_5.6.3$Label

anaquin <- AnaquinData(analysis='PlotROC',
                       seqs=seqs,
                       ratio=ratio,
                       score=score,
                       label=label)

plotROC(anaquin, title='ROC Plot', refRats=0)

pval

## S4 method for signature 'AnaquinData'
pval(object)

Arguments

object S4 object created by AnaquinData
... Not used

Details

This function takes an AnaquinData object and return its p-value probability.

Value

List of p-value probability for each sequin. Return NULL if unavailable.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

data(UserGuideData_5.6.3)

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

Description

Return p-value probability from data set created by AnaquinData.

Usage

pval(object, ...)

Arguments

object S4 object created by AnaquinData
... Not used

Details

This function takes an AnaquinData object and return its p-value probability.

Value

List of p-value probability for each sequin. Return NULL if unavailable.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

data(UserGuideData_5.6.3)

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC
# Measured average abundance
measured <- UserGuideData_5.6.3$Mean

# P-value
pv <- UserGuideData_5.6.3$Pval

# Q-value
qv <- UserGuideData_5.6.3$Qval

anaquin <- AnaquinData(analysis="PlotLODR",
                      seqs=seqs,
                      measured=measured,
                      ratio=ratio,
                      pval=pv,
                      qval=qv)

pval(anaquin)

---

### qval

**Return q-value probability**

**Description**

Return q-value probability from data set created by AnaquinData.

**Usage**

qval(object, ...)

## S4 method for signature 'AnaquinData'

qval(object)

**Arguments**

- **object**: S4 object created by AnaquinData
- **...**: Not used

**Details**

This function takes an AnaquinData object and return it’s q-value probability.

**Value**

List of q-value proability for each sequin. Return NULL if unavailable.

**Author(s)**

Ted Wong <t.wong@garvan.org.au>
Examples

data(UserGuideData_5.6.3)

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

# Measured average abundance
measured <- UserGuideData_5.6.3$Mean

# P-value
pv <- UserGuideData_5.6.3$Pval

# Q-value
qv <- UserGuideData_5.6.3$Qval

anaquin <- AnaquinData(analysis="PlotLODR",
                     seqs=seqs,
                     measured=measured,
                     ratio=ratio,
                     pval=pv,
                     qval=qv)

qval(anaquin)

---

ratio

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return ratio from data set created by AnaquinData.</td>
</tr>
</tbody>
</table>

## Usage

ratio(object, ...)

### Arguments

- **object**
  - S4 object created by AnaquinData
- **...**
  - Not used

### Details

This function takes an AnaquinData data set object and return its sequin ratio.

## Value

List of sequin ratio for each sequin. Return NULL if unavailable.
RnaQuin.gen2iso

Author(s)
Ted Wong <t.wong@garvan.org.au>

Examples

```r
# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

# How the ROC curves are ranked
score <- 1-UserGuideData_5.6.3$Pval

# Classified labels (TP/FP)
label <- UserGuideData_5.6.3$Label

anaquin <- AnaquinData(analysis='PlotROC',
                        seqs=seqs,
                        ratio=ratio,
                        score=score,
                        label=label)

ratio(anaquin)
```

RnaQuin.gen2iso Convert sequin isoforms to genes

Description
Convert RnaQuin sequin isoforms to genes.

Usage
RnaQuin.gen2iso(names)

Arguments

names Sequin isoform names

Details
For example:
R1_11_1 to R1_11 R1_11_2 to R1_11 R1_12_2 to R1_12

Value
A list of RnaQuin sequin genes.

Author(s)
Ted Wong <t.wong@garvan.org.au>
RnaQuin.genes

Examples

data(UserGuideData_5.4.5.1)
RnaQuin.gen2iso(row.names(UserGuideData_5.4.5.1))

RnaQuin.genes

Return RnaQuin genes

Description

Return RnaQuin genes from data set created by AnaquinData.

Usage

RnaQuin.genes(object, ...)
## S4 method for signature 'AnaquinData'
RnaQuin.genes(object)

Arguments

object S4 object created by AnaquinData
...
Not used

Details

This function takes an AnaquinData object and return the RnaQuin genes identifiers.

Value

Data frame with the genes and their input concentration. Return NULL if unavailable.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

library(Anaquin)

# Data set generated by Cufflinks and Anaquin. described in Section 5.4.5.1 of
# the user guide.
# data(UserGuideData_5.4.5.1)

data <- UserGuideData_5.4.5.1

# Sequin names
seqs <- row.names(data)

# Input concentration
input <- log2(data$InputConcent)

# Measured sensitivity
measured <- data$Sn

anaquin <- AnaquinData(analysis="PlotLogistic",
  seqs=seqs,
  input=input,
  measured=measured)

RnaQuin.genes(anaquin)

RnaQuin.isoforms

Return RnaQuin isoforms

Description

Return RnaQuin isoforms from data set created by AnaquinData.

Usage

RnaQuin.isoforms(object, ...)

## S4 method for signature 'AnaquinData'
RnaQuin.isoforms(object)

Arguments

object S4 object created by AnaquinData
...

Not used

Details

This function takes an AnaquinData object and return the RnaQuin isoform identifiers.

Value

Data frame with the isoforms and their input concentration. Return NULL if unavailable.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

library(Anaquin)

# Data set generated by Cufflinks and Anaquin. described in Section 5.4.5.1 of
# the user guide.
# data(UserGuideData_5.4.5.1)
data <- UserGuideData_5.4.5.1

# Sequin names
seqs <- row.names(data)
# Input concentration
input <- log2(data$InputConcent)

anaquin <- new("AnaquinData", analysis = 'Mixture',
               seqs = row.names(data),
               input = log2(data$InputConcent))
RnaQuin.isoforms(anaquin)

score

Return scores

Description

Return scores from data set created by AnaquinData.

Usage

score(object, ...)
## S4 method for signature 'AnaquinData'
score(object)

Arguments

object S4 object created by AnaquinData
...
Not used

Details

This function takes an AnaquinData object and return the ROC ranking scores.

Value

List of scores for each sequin. Return NULL if unavailable.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

data(UserGuideData_5.6.3)

# Sequin names
seqs <- row.names(UserGuideData_5.6.3)

# Expected log-fold
ratio <- UserGuideData_5.6.3$ExpLFC

# How the ROC curves are ranked
score <- 1-UserGuideData_5.6.3$Pval

# Classified labels (TP/FP)
label <- UserGuideData_5.6.3$Label
anaquin <- AnaquinData(analysis='PlotROC',
                     seqs=seqs,
                     ratio=ratio,
                     score=score,
                     label=label)

score(anaquin)

---

### Description

Return sequin names from AnaquinData data set.

### Usage

```r
seqs(object, ...)  
## S4 method for signature 'AnaquinData'
seqs(object)
```

### Arguments

- `object` S4 object created by `AnaquinData`
- `...` Not used

### Details

This function takes an `AnaquinData` object and return the sequin names in the data set.

### Value

List of sequin names.

### Author(s)

Ted Wong <t.wong@garvan.org.au>

### Examples

```r
data(UserGuideData_5.4.6.3)

# Sequin names
names <- row.names(UserGuideData_5.4.6.3)

# Input concentration
input <- log2(UserGuideData_5.4.6.3$InputConcent)

# Measured FPKM
measured <- log2(UserGuideData_5.4.6.3[,2:4])

anaquin <- AnaquinData(analysis='PlotLinear',
                        seqs=names,
                        ...)
```
Description

Return standard deviation from AnaquinData data set.

Usage

\[
\text{std}(\text{object}, \ldots)
\]

## S4 method for signature 'AnaquinData'

\[
\text{std}(\text{object})
\]

Arguments

- **object**: S4 object created by AnaquinData
- **...**: Not used

Details

This function takes an AnaquinData object and return the standard deviation in the data set.

Value

List of standard deviation for each sequin. Return NULL if unavailable.

Author(s)

Ted Wong <t.wong@garvan.org.au>

Examples

```r
data(UserGuideData_5.6.3)

# Sequin names
names <- row.names(UserGuideData_5.6.3)

# Expected LFC
input <- log2(UserGuideData_5.6.3$ExpLFC)

# Measured LFC
measured <- log2(UserGuideData_5.6.3$ObsLFC)

# Standard deviation
sd <- UserGuideData_5.6.3$SD

anaquin <- AnaquinData(analysis=\textquoteleft \text{PlotLinear}\textquoteleft ,
  seqs=names,
  input=input,
  std=sd,
  measured=measured)

```
UserGuideData_5.4.5.1 Section 5.4.5.1 Assembly Dataset

Description
Assembly sensitivity estimated by Cuffcompare. Section 5.4.5.1 of the Anaquin user guide has details on the data set.

Usage
data(UserGuideData_5.4.5.1)

Format
Data frame:
- InputConcent: Input concentration in attomol/ul
- Sn: Measured sensitivity

Value
Data frame with columns defined in Format.

Source

UserGuideData_5.4.6.3 Gene expression (RnaQuin)

Description
Gene expression estimated by Cufflinks. Section 5.4.6.3 of the Anaquin user guide has details on the data set.

Usage
data(UserGuideData_5.4.6.3)

Format
Data frame:
- InputConcent: Input concentration in attomol/ul
- Observed1: Measured FPKM for the first replicate
- Observed2: Measured FPKM for the second replicate
- Observed3: Measured FPKM for the third replicate
Value

Data frame with columns defined in Format.

Source


---

**UserGuideData_5.6.3**  
*Differential expression (RnaQuin)*

Description

Differential gene expression estimated by DESeq2. Section 5.6.3 has details on the data set.

Usage

`data(UserGuideData_5.6.3)`

Format

Data frame:

- `ExpLFC`: Expected log-fold change
- `ObsLFC`: Observed log-fold change
- `SD`: Standard deviation of the measurement
- `Pval`: P-value probability
- `Qval`: Q-value probability
- `Mean`: Average counts across the samples
- `Label`: Average counts across the samples

Value

Data frame with columns defined in Format.

Source

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