Package 'DELocal'

July 16, 2025

Title Identifies differentially expressed genes with respect to other
local genes

Version 1.9.0

Description The goal of DELocal is to identify DE genes compared to their
neighboring genes from the same chromosomal location. It has been shown
that genes of related functions are generally very far from each other
in the chromosome. DELocal utilzes this information to identify DE genes
comparing with their neighbouring genes.

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URL https://github.com/dasroy/DELocal

BugReports https://github.com/dasroy/DELocal/issues

Encoding UTF-8

LazyData false

RoxygenNote 7.2.3

biocViews GeneExpression, DifferentialExpression, RNASeq,
Transcriptomics

Imports DESeq2, dplyr, reshape2, limma, SummarizedExperiment, ggplot2,
matrixStats, stats

Suggests biomaRt, knitr, rmarkdown, stringr, BiocStyle

VignetteBuilder knitr

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Contents

DELocal *Finds differentially expressed genes by comparing neighboring genes*

Description

Finds differentially expressed genes by comparing neighboring genes

Usage

```
DELocal(
  pSmrExpt,
  nearest_neighbours,
  pDesign,
  pValue_cut = 0.05,
  pLogFold_cut = 0
)
```

Arguments

pSmrExpt   SummarizedExperiment object

nearest_neighbours

          How many nearest neighbours within 1 Mb window to evaluate?

pDesign   design formula

pValue_cut   cut off value for adjusted p-value

pLogFold_cut   cut off value for relative log fold change compared to neighbouring genes

Value

A data.frame with top significant genes with the following columns:

relative.logFC: relative logFC compared to neighbouring genes

P.Value: raw p-value

adj.P.Value: adjusted p-value

B: log-odds that the gene is differentially expressed

Examples

```
count_matrix <- as.matrix(read.table(file = system.file("extdata",
                                                "tooth_RNASeq_counts.txt",
                                                    package = "DELocal")))
colData <- data.frame(condition=gsub("\\..*",x=colnames(count_matrix),
                                replacement = ""))
gene_location <- read.table(file = system.file("extdata", "gene_location.txt",
                                package = "DELocal"))
smrExpt <- SummarizedExperiment::SummarizedExperiment(
                                assays=list(counts=count_matrix),
                                rowData = gene_location,
                                colData=colData)
contrast= c("condition","ME13","ME14")
require(dplyr)
```

```
x_genes <- SummarizedExperiment::rowData(smrExpt) %>%
    as.data.frame() %>%
    filter(chromosome_name=="X") %>% rownames()
DELocal_result <- DELocal(pSmrExpt = smrExpt[x_genes,],
                        nearest_neighbours = 5, pDesign = ~ condition,
                        pValue_cut = 0.05, pLogFold_cut = 0)
```

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plotNeighbourhood	*Returns median expression from different conditions of genes from a neighbourhood of a gene of interest*

Description

Returns median expression from different conditions of genes from a neighbourhood of a gene of interest

Usage

```
plotNeighbourhood(
  pSmrExpt,
  pNearest_neighbours = 5,
  pDesign = ~condition,
  colorFactor = "condition",
  pGene_id
)
```

Arguments

pSmrExpt	SummarizedExperiment object
pNearest_neighbours	
	How many nearest neighbours within 1 Mb window to plot
pDesign	design formula
colorFactor	The coloring factor
pGene_id	The gene of interest

Value

a list which contains both the data from the neighbourhood and a ggplot object

Examples

```
count_matrix <- as.matrix(read.table(file = system.file("extdata",
                                                "tooth_RNASeq_counts.txt",
                                                package = "DELocal")))
colData <- data.frame(condition=gsub("\\..*",x=colnames(count_matrix),
                                replacement = ""))
gene_location <- read.table(file = system.file("extdata", "gene_location.txt",
                                package = "DELocal"))
smrExpt <- SummarizedExperiment::SummarizedExperiment(assays=list(counts=count_matrix),
                                        rowData = gene_location,
                                        colData = colData)
contrast= c("condition","ME13","ME14")
```

```
require(dplyr)
x_genes <- SummarizedExperiment::rowData(smrExpt) %>%
      as.data.frame() %>%
      filter(chromosome_name=="X") %>% rownames()
DELocal::plotNeighbourhood(pSmrExpt = smrExpt, pGene_id = "ENSMUSG00000059401")
```

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