Package ‘methcon5’

December 20, 2019

Title Identify and Rank CpG DNA Methylation Conservation Along the Human Genome

Version 0.1.0

Description Identify and rank CpG DNA methylation conservation along the human genome. Specifically it includes bootstrapping methods to provide ranking which should adjust for the differences in length as without it short regions tend to get higher conservation scores.

License MIT + file LICENSE

Encoding UTF-8

LazyData true

RoxygenNote 7.0.2

Depends R (>= 2.10)

Imports magrittr, dplyr, purrr, rlang

Suggests ggplot2, testthat (>= 2.1.0), covr

URL https://github.com/EmilHvitfeldt/methcon5

BugReports https://github.com/EmilHvitfeldt/methcon5/issues

NeedsCompilation no

Author Emil Hvitfeldt [aut, cre] (<https://orcid.org/0000-0002-0679-1945>)

Maintainer Emil Hvitfeldt <emilhhvitfeldt@gmail.com>

Repository CRAN

Date/Publication 2019-12-20 13:50:02 UTC

R topics documented:

fake_methylation .......................................................... 2
meth_aggregate ............................................................. 2
meth_bootstrap .............................................................. 3

Index 5
fake_methylation  Simple simulated methylation dataset

Description
Simple simulated methylation dataset

Usage
fake_methylation

Format
A data frame with 2771 rows and 3 variables: gene, cons_level and meth.

Details
This dataset is for example use only. It contains 500 genes identified by gene each with one of 3 types of conservation levels "low", "medium" and "high". The methylation values are independent randomly distributed within each gene. Thus no spacial correlation is assumed.

meth_aggregate  Calculate region wise summary statistics

Description
Will take a data.frame and apply a function ('fun') to 'value' within the groups defined by the 'id' column.

Usage
meth_aggregate(data, id, value, fun = mean, ...)

Arguments
data  a data.frame.
id  variable name, to be aggregated around.
value  variable name, contains the value to take mean over. Must be a single column.
fun  function, summary statistic function to be calculated. Defaults to 'mean'.
...  Additional arguments for the function given to the argument fun.

Details
Please note the ordering of the data will matter depending on the choice of aggregation function.
Value

A methcon object. Contains the aggregated data along with original data.frame and variable selections.

Examples

meth_aggregate(fake_methylation, id = gene, value = meth, fun = mean)

meth_aggregate(fake_methylation, id = gene, value = meth, fun = var)

# custom functions can be used as well
mean_diff <- function(x) {
  mean(diff(x))
}

meth_aggregate(fake_methylation, id = gene, value = meth, fun = mean_diff)

meth_bootstrap

Bootstrapped randomly samples values

Description

"perm_v1" (the default method) will sample the variables the rows independently. "perm_v2" will sample regions of same size while allowing overlap between different regions. "perm_v3" will sample regions under the constraint that all sampled regions are contained in the region they are sampled in.

Usage

meth_bootstrap(data, reps, method = c("perm_v1", "perm_v2", "perm_v3"))

Arguments

data a methcon data.frame output from 'meth_bootstrap'.
reps Number of reps, defaults to 1000.
method Character, determining which method to use. See details for information about methods. Defaults to "perm_v1".

Details

Note that you can apply ‘meth_bootstrap’ multiple times to get values for different methods.

Value

A methcon object. Contains the aggregated data along with original data.frame and variable selections and bootstrapped values.
Examples

# Note that you likely want to do more than 10 repitions.
# rep = 10 was chosen to have the examples run fast.

fake_methylation %>%
  meth_aggregate(id = gene, value = meth, fun = mean) %>%
  meth_bootstrap(10)

fake_methylation %>%
  meth_aggregate(id = gene, value = meth, fun = mean) %>%
  meth_bootstrap(10, method = "perm_v2")

# Get multiple bootstraps
fake_methylation %>%
  meth_aggregate(id = gene, value = meth, fun = mean) %>%
  meth_bootstrap(10, method = "perm_v1") %>%
  meth_bootstrap(10, method = "perm_v2") %>%
  meth_bootstrap(10, method = "perm_v3")
Index

*Topic datasets
  fake_methylation, 2

fake_methylation, 2
meth_aggregate, 2
meth_bootstrap, 3